# THE APPLICATION OF REPERTORY GRIDS TO ASSESS CLINICAL CHANGE IN FORENSIC PSYCHIATRIC PATIENTS ATTENDING FOR ANGER GROUP THERAPY

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**Declaration**

"This thesis has been composed by myself and the work contained herein is my own"

Signed

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**ABSTRACT**

In evaluating therapeutic interventions with forensic populations, standard psychometric assessments have often been found to be inconsistent with clinical observations relating to clients' problems or failed to reflect perceived changes in them as a result of treatment. The Repertory Grid Technique is an alternative method, derived from Personal Construct Theory, which instead has been used to explore the idiographic way in which offenders construe their world. However there has been little examination of its use with mentally disordered offenders, particularly in relation to treatment outcome. The present study investigates the use of Repertory Grids to assess clinical change with eight forensic psychiatric patients attending for anger group therapy at a high security hospital. The relationship between data obtained from Repertory Grids and from standard psychometric assessments is examined, and the utility of Repertory Grids in exploring clinical change is discussed.

# 1. INTRODUCTION

## 1.1 Context of the study

The present study developed from the author's discussions while working with clinicians engaged in offence-focussed work with forensic patients in a secure hospital. In particular, these Clinical Psychologists observed that patient scores on psychometric self-assessment "anger" measures often seemed inconsistent with the general "clinical picture" of the patient at that time (i.e. scores were inconsistent with clinical impression; various forms of behavioural observation; or self-report scores obtained at other times). It was noted that unlike most other areas of general clinical practice where patients would be keen to reveal the extent of a distressing emotional state e.g. depression, there might be good contextual and other reasons why anger could sometimes be under reported, particularly when patients were subject to compulsory detention (Novaco 1997; Ramm 1996; Ramm & Novaco, 1997).

There are many aspects relating to this observed phenomenon, which will be explored in detail in this thesis, but it is important to note at this point that having "high-anger" is usually linked with a variety of negative connotations in our society (Averill, 1983; Novaco & Chemtob 1998). Further, in a forensic institution the results of an assessment of "anger" in particular, is often assumed to be closely linked to the decision-making processes regarding detention, release, or transfer (Novaco, 1997; Renwick, Black, Ramm & Novaco 1997). Patient concern about this fact, may be one of the main reasons which underlies the sometimes observed discrepancy on evaluations of "anger-level" or "anger-control" between patients and clinicians (Quayle & Moore, 1998; Ramm & Novaco 1997). As Ramm (1996) states, "The use to which a patient believes their self-report scores will be put, may have a significant impact on their responses" (p. 4). Other reasons for a discrepancy include poor patient insight/awareness about personal anger reactions or a lack of acknowledgement that a problem exists (Quayle & Moore

1998). Novaco & Chemtob (1998, p.176) therefore note that "the interpretation of anger scores on self-report scales must be done cautiously"

The valid assessment of anger with mentally ill offenders, however, is not only relevant to issues concerning detention. It is equally important for informing clinical practice and to evaluate the therapeutic effectiveness of interventions for patients with anger-mediated problems. Clinicians have a particular responsibility to evaluate clinical interventions that may help patients and reduce the risk to the public of re-offending. For good reasons, which will be explored in this thesis, standardised psychometric self-report measures have been used as one of the main measures of therapeutic outcome (Edmonson & Conger 1996). The problems associated with self-report measures to investigate clinical progress and treatment-evaluation following anger therapy is therefore of particular interest in this thesis.

In order to address some of the difficulties outlined above, Ramm & Novaco (1998, Research Proposal) are exploring the use of a number of methods that may help to more accurately assess changes in anger-level and anger-control in forensic patients. These include the use of multiple measures (including psychometric instruments; various observational procedures; interviews; clinical ratings; imaginal-provocation scenarios; social-desirability indicators and behavioural measures). These measures are obtained at various time points and used to triangulate effects in relation to their context and wider framework.

The research presented here will limit itself to an examination of the use of 'self-report Repertory Grid Technique' (Fransella & Bannister, 1977; Kelly, 1955/1991), as an alternative to 'self-report psychometric assessment' when examining clinical change in forensic patients attending for an anger management group intervention. These two assessment approaches will be compared directly in relation to a cohort of forensic patients before and immediately after an

anger management group intervention. There will not be sufficient time to consider other assessment modalities, or change over a longer time span. It is anticipated that using Repertory Grid Technique may avoid some of the problems already referred to, and implicit in using more standardised types of self-report psychometric assessment, while potentially providing more useful clinical data. From Personal Construct Theory (Kelly, 1955/1991), which underlies Repertory Grid Technique, two assumptions are taken: (a) using an idiographic approach is a more productive way of understanding an individual than comparison with peers using standardised assessments, and (b) a focus on the changes in an individual's ways of construing, will be more productive in evaluating an intervention than looking for changes in 'group mean scores' on psychometric measures. In practice both 'self-report psychometric measures' and 'self-report Repertory Grid measures' may have their own advantages and disadvantages, but it is anticipated that the latter may be more useful with this diverse and problematic client group, and may more clearly show clinical change related to treatment.

## 1.2 Literature review

### 1.2.1 Anger Management: Its application and evaluation with forensic groups and mentally ill offenders.

In spite of the extensive research literature on aggressive behaviour, the emotional state of anger and its relationship to behaviour has only recently begun to receive greater interest (Howells 1998; Novaco, Ramm & Black, 2000; Renwick et al 1997). In 1975, Raymond Novaco proposed a model of anger and subsequently a therapy programme (Novaco 1975). This has since become the basis of most Cognitive-Behavioural treatments for anger problems and underlies the approach of "Anger Management".

Novaco's (1975) anger model consists of four interacting domains (a) external events, (b) cognitive appraisals, (c) physiological arousal, and (d) behavioural reactions. All of these domains have a reciprocal relationship with each other, which means that they interact in a dynamic fashion. Within the individual, Novaco suggests that cognitive appraisals of external events will largely determine whether anger arousal results, and suggests that high physiological arousal level and particular cognitive processes will make the individual more prone to experience anger (Novaco, 1978). Whether an external provocation results in anger arousal depends on cognitive processes including cognitive appraisals of current and past situations, cognitive expectations of situations, and private speech (Novaco, 1978). Individuals who are prone to experience anger (high trait anger) tend to have distortions in these cognitive processes, including attribution of hostile intent (Averill, 1983; Epps & Kendall, 1995), ruminating about upsetting events (McDougall, Venables & Roger, 1991), and having irrational beliefs (Berenbaum, Fujita & Pfenning, 1995; Stuckless, Ford & Vitelli, 1995). Physiological arousal is the third component of Novaco's model of anger. Heightened physiological activation in response to provocation, including heart rate change, muscle tension, trembling and sweating, is common among people with high trait anger (Deffenbacher et al., 1996; Howells, 1989). Numerous behavioural reactions may follow the subjective experience of anger, including violent and aggressive behaviour, as well as more constructive responses, including assertive behaviour (Averill, 1983). Anger prone individuals tend to report less constructive coping strategies in response to provocation (Deffenbacher et al., 1996). Within this theoretical framework therefore, a number of authors suggest that anger results from the way in which a person cognitively appraises the personal meaning of an event. However, different theorists put the emphasis on different aspects of appraisal.

Fuller discussion of Novaco's anger model will not be considered in this thesis, but detailed accounts can be found in various texts (e.g. Howells 1989; Novaco 1998). Equally it will not be possible to review other models or explanations of the anger experience

(e.g. Berkowitz, 1989; Deffenbacher, Oetting, Thwaites, Lynch, Baker, Stark, Thacker & Eiswerth-Cox, 1996; Power & Dalgleish, 1997; Teasdale, 1999). A fuller review of this area including a brief consideration of the psychodynamic perspective in relation to research on cognition and emotion, is given in Dalgleish & Power (1999).

Therapeutic cognitive-behavioural anger management interventions based directly on Novaco's approach, have been delivered on an individual and group basis. They should typically identify an emotional dysregulation problem on the part of the patient and address this through the specific application of some key therapeutic elements. Although in practice there has been a difference in the length, content and complexity of different interventions (Novaco, et al, 2000), those which can be considered to be "anger management" will consist typically of the following components: (a) learning to have a greater awareness of one's own provocations and reactions, (b) critically evaluating one's own appraisals and using cognitive techniques to enhance self-control, (c) reducing physiological arousal levels, (d) using adaptive behavioural strategies or improved social skills. In general these elements will be incorporated within a structured programme that ensure a gradual progression towards more advanced coping skills, and Novaco (1977) encourages employing the stress inoculation procedure of Meichenbaum (1975, 1985). Very little data currently exists on the differential effects of the different components of therapy (Edmonson & Conger, 1996).

Anger management therapy consistent with Novaco's theory of anger has been shown to be effective in many populations volunteering for treatment (Blackburn 1993; Howells, 1998). A meta-analytic review of anger management by Edmonson & Conger (1996) is broadly supportive of anger management interventions with individuals who are high in 'trait' (self-reported pervasive) anger. However most of these studies typically involve students, rather than offenders or mentally ill offenders with serious anger control problems (Novaco, 1997; Watt, 1996). In reviews, Novaco (1997) and Howells (1998), have noted that the limited research

conducted with offenders or violent populations is characterised by methodological problems and is lacking in controlled studies, the use of assessments other than self-report, and longer term follow-up.

Various studies however do offer a degree of support for anger management intervention with offenders (Goldstein & Glick, 1996; McDougall & Boddis, 1991; Stermac, 1986;). Beck & Fernandez (1998) carried out a meta-analysis of 50 cognitive behavioural programmes of which six included prison inmates as participants. They suggested an overall treatment effect of .85. Chemtob, Novaco, Hamada & Gross (1997), conducted a randomised control trial with Vietnam veterans suffering from Post Traumatic Stress Disorder in addition to exhibiting serious anger problems, and reported significant improvements on anger and anger-control indices. In relation to mentally ill offenders, Renwick et al (1997) carried out the first systematic study with mentally ill offenders who had entrenched and enduring anger problems and reported some encouraging results. They emphasise the importance of considering the appropriate complexity and tailoring of treatment to meet the needs of different client groups (Novaco et al, 2000; Ramm, 1997). However, caution is raised by these authors, and by Quayle & Moore (1998) about the difficulties in using self-report measures to accurately assess patient change. Further, Watt (1996) and Watt and Howells (1999) report studies with violent prisoners where no differences were found between treatment groups and controls on a range of dependent measures. It may be that anger management is inappropriate for this group and Howells (1998) notes that no pre-treatment assessment took place to see whether violent offending was actually anger-mediated. He emphasises this because anger management is a treatment for anger-mediated problems and not for violence. However, in a study with few behavioural indices, he does not discuss the possibility that the results may have been due to the type of self-report problems already mentioned.

### 1.2.2 Difficulties in assessing anger in forensic populations using standardised self-report psychometric assessments

Studies assessing change in clients with anger-mediated problems following therapeutic intervention have most commonly employed self-report measures pre- and post-treatment. In their review of anger treatment studies (meeting good design criteria) between 1970 and 1994, Edmondson & Conger (1996) noted that although a few other measures (e.g. observer-report) were used by some researchers, "Studies in the present review ... relied on self-report methods of assessing anger experience" (p.265). The reliance on client self-report measures as the main evaluative instrument is perhaps not surprising. As Novaco & Chemtob (1998, p.176) point out "Anger is a subjective emotion, and it is therefore very appropriate that anger has been assessed primarily by self-report measures". Indeed because anger is a subjective emotion it is difficult to study using anything other than self-report measures (Averill, 1983; Novaco, 1994). Only the individual experiencing a particular emotion can easily report on the physiological and cognitive components.

However, Ramm (1996), Renwick et al (1997), Quayle & Moore (1998), and Ramm & Novaco (1997) have noted the tendency for forensic psychiatric patients undergoing anger treatment in high security hospitals to sometimes under report, or even deny, their experiences of anger. This seems to be most evident in self-report data acquired in the initial stages of contact with clients. For example, self-report anger scores for some individuals have been found to increase post-treatment relative to pre-treatment results (Grant, 1999; Quayle & Moore, 1998). Such increase has been found to be at an almost statistically significant level (Quayle & Moore, 1998). Similarly, some reports of increased anger or interpersonal difficulties post-treatment on psychometric assessments, may be viewed as indications of 'clinical improvement' in some

patients rather than a 'deterioration' (Quayle & Moore, 1998; Ramm, 1996) e.g. 'greater insight' or difficulties caused in the short term by the application of new coping strategies.

A number of factors have been highlighted in the literature which could contribute to the confusing findings sometimes found with self-report measures. Some of these may potentially affect the validity and reliability of self-report anger measures particularly when used with forensic psychiatric patients. These difficulties will be explored below.

One factor which may influence the validity of some self-report psychometric assessments when used with forensic psychiatric patients detained in high security hospitals, is that their relevance to these patients is often somewhat questionable. Widely used questionnaires and inventories frequently contain items irrelevant to the lives of clients within such an abnormal setting as a secure hospital (Quayle & Moore, 1998). However, central to most of the problems associated with self-report psychometric anger assessments is the high face validity of the assessments or questionnaires used. Anastasi (1988) suggests that face validity can be a desirable feature of a questionnaire as it makes the purpose of an assessment clear to the individual completing it. Further, she suggests, that without face validity the assessment may appear "irrelevant, inappropriate, or silly" to the respondent. This, Anastasi (1988) suggests, may result in poor co-operation regardless of the actual validity of an assessment measure. However, it could be argued that such transparency may leave an instrument open to response bias, which may be a source of error in the measurement of anger in forensic populations.

At its most extreme, one of the problems with self-report psychometric measures is that they are susceptible to intentional response biases such as malingering, or faking good (Anastasi, 1988). Anastasi suggests that most items on self-report inventories have one response that is recognisable as socially more desirable or acceptable than others and that

respondents may be motivated to fake good, choose answers that create a favourable impression, or fake bad. The distortion of psychological problems and symptoms is considered a major concern in forensic contexts (Scragg, Bor & Mendham, 2000) and it has been suggested that a defensive stance, socially desirable responding, faking good (Gazono & Meloy, 1994; Gudjonsson, 1990), and 'malingering' (Gudjonsson, 1990) often occur in forensic psychiatric patients.

However, socially desirable responding may not necessarily be entirely conscious and deliberate (Klein, 1992). To highlight this point, McCann (1998) suggests that malingering, denial and other forms of deception fall along a continuum between intentional malingering, through honesty, to unintentional denial. He suggests that several important variants of deception e.g. unintentional symptom exaggeration secondary to psychopathology, acquiescent responding that involves the endorsement of symptoms due to mental confusion, and varying levels of intentional and unintentional self-deception lie along this continuum.

It has been suggested that socially desirable responding may indicate a lack of insight on the part of an individual into their own characteristics; self-deception; or an unwillingness to face up to their limitations. Crowne & Marlowe (1964) provide evidence to suggest that the strength of the social desirability response set is related to the individual's more general need for self-protection, avoidance of criticism, social conformity and social approval. Whereas presenting unfavourably may be motivated more by a need for attention, sympathy, or help in meeting personal problems.

Ramm (1997) and Ramm & Novaco (1998) note that many compulsorily detained forensic psychiatric patients do in fact lack the ability to self-reflect, and to identify emotions, or differentiate between them in type and degree of intensity. They have developed a "Preparatory Phase" when working with individuals with such problems to allow the development of these

skills prior to starting formal anger management (Renwick et al, 1997) . They further suggest that such individuals may also be unaccustomed to self-deliberating on their thoughts, feelings, and behaviours in specific situations. Thus, limitations in the patient's capacity for self-monitoring can be a major source of error in self-report psychometric assessments (Ramm 1996; Ramm & Novaco, 1997). Additionally, as an individual goes through therapy their self-awareness may increase. This, Quayle & Moore (1998) and Ramm (1996) propose, may account for the finding that self-ratings of anger go up on self-report post-treatment measures in some clients attending for anger management who are judged to be becoming less overtly angry.

In undergraduate students, Flett, Blankstein, Pline & Bator (1988) found that self-deception (i.e. the motivated distortion of environmental information which has the potential to be damaging to the self) and impression-management (i.e. favourable self-presentations to others) measures, correlated significantly with the reported frequency, intensity and duration of negative emotions, and that self-deception but not impression-management was correlated with ratings of positive emotions. Self-deception and impression-management were correlated significantly with self-report measures of dimensions of anger.

If self-reported emotional experiences contain some element of impression management, then it is reasonable to expect that individuals characterised by a tendency towards impression management would be especially likely to modify their reported emotions by admitting the presence of positive emotions and denying the presence of negative emotions. It has been argued that self-deception is particularly apparent in social situations involving self-appraisal (Gilbert & Cooper, 1985) and it is possible that self-deception is present in self-appraisals of emotion. If individuals believe that negative emotions are equated with social rejection, then one way to maintain a positive self-conception would be to deny the presence of negative emotions and to recognise positive ones (Flett et al, 1988). Flett et al propose that response biases reflecting impression-

management and self-deception influence self-reports of emotional experiences. They suggest that their results also illustrate the importance of including measures of self-report biases in studies involving the cognitive appraisal of emotion. They further argue that their results support the contention that the expression of emotion varies as a function of self-presentation and concerns about the social consequences of publicly expressed emotions. If normal undergraduates are so susceptible to these influences then the implications for assessing forensic patients in compulsory detention are obvious.

The context in which an individual is assessed may then have a significant bearing on response style. In this respect a difference in response style may emerge between those who voluntarily seek psychological evaluation and treatment, and those who are required to undergo this. Forensic psychiatric patients detained within a secure hospital frequently fall into the latter category. They often feel coerced into treatment and may not see themselves as having anger problems (Renwick et al, 1997; Valliant, Jensen & Raven-Brook, 1995). This may impact on attempts to engage them in assessment and therapy.

Patients in secure environments can be highly motivated to present in a socially desirable way, or deny or minimise their difficulties. For example, admitting to having an anger problem, could impact on how they are viewed by those involved in their clinical care on important decisions regarding their detention. The consequence could be prolonged detention. Ramm (1996) and Ramm & Novaco (1997) propose that forensic psychiatric patients therefore may under-report their anger on psychometric assessments because they are responding to what they perceive to be the consequences of their questionnaire results.

It has been suggested that the establishment of rapport with a client may motivate them to respond more frankly (Anastasi, 1988). Cronbach (1984) argues that if an individual does not feel strongly affiliated with the person administering an assessment, "they cannot be expected to

be open with regard to matters tinged with shame or guilt" (p.473). However, the establishment of rapport may be more easily achieved with some client groups, e.g. those with anxiety problems, who are usually motivated to reduce their anxiety (Edmondson & Conger, 1996), than others, e.g. forensic clients who feel coerced into treatment. Theilgaard (1996) cautions that whilst most clients in forensic settings will co-operate with psychological testing if the purposes of the tests are explained and good rapport is established, problems may arise with paranoid clients. Such clients, he argues, are often suspicious of tests and they may try to elicit details about the nature and content of the assessment, before co-operating. The danger here is that giving detailed information may invalidate the results obtained since doing so may enhance the individual's ability to fake test results.

Novaco (1997), Ramm (1996) and Ramm & Novaco (1997) argue that issues relating to trust can profoundly impact on attempts to engage forensic patients in assessment. They note that these individuals often have had very troubled lives and recurrent institutionalisation, and are commonly distrusting and suspicious. Moreover, anger is often entrenched in their personal identity. It is a protected part of the person, centrally involving matters of self-worth, and is not readily revealed or surrendered (Renwick, et al., 1997; Novaco, 1997). These authors propose that anger is also very much entangled with other distress emotions, and is often part of a personal history of trauma, fear and sadness associated with abuse, rejection, disappointment, and abandonment. They argue that tapping into anger thus carries with it other personal distress. Consequently, disclosure about anger becomes guarded. Further, forensic patients can easily view the individual administrating an assessment as a representative of a threatening system. As a result they may be more likely to be very guarded about self-disclosure and ambivalent about engaging in assessment (Novaco et al, 2000; Ramm, 1996; Ramm & Novaco, 1997). Novaco & Chemtob (1998) state that the establishment of trust and confidentiality with individuals with anger difficulties will serve to maximise the validity of anger self-report measures.

Attempts have been made to detect, prevent or reduce dissimulation on self-report assessments through the construction of relatively subtle or socially neutral items in assessments (Anastasi & Urbina, 1996; Cronbach, 1984; Klein, 1992), or through the inclusion of validity scales e.g. as employed in the Minnesota Multiphasic Personality Inventory-2 (MMPI-2) (Butcher, Dahlstrom, Graham, Tellegan & Kaemmer, 1989), or the Marlowe-Crowne social desirability scale (1964). Such scales act as checks on carelessness, misunderstanding, malingering and the operation of response sets and test-taking attitudes (Anastasi, 1988; Cronbach, 1984).

Whilst it is not suggested that all forensic psychiatric patients will demonstrate response sets when responding to psychometric assessments, this is something which Simon (1995) suggests must always be considered by professionals undertaking assessments with forensic populations. The incentive for this client group to "present well" or "fake good" on psychometric assessments is certainly a difficulty which needs to be addressed (Gudjonsson & Haward, 1998).

### 1.2.3 The limitations of using group means for treatment evaluation

In addition to the often observed (and perhaps inevitable) dependence on self-report psychometric assessments when trying to assess individual change, it should be noted that the main focus in anger management evaluation studies has been on summing these changes and looking for group mean changes. Evidence of positive change in the predicted direction is sought in the means on pre- and post-treatment assessments. Using a randomised control group design has been seen as more valid since confounding variables are better controlled for (Howard, Orlinsky & Lueger, 1994). To date there are few randomised control trials relating to anger treatment with forensic or mentally ill patients (Renwick et al 1997; Novaco, 1997).

In recent years, however, some clinicians and researchers have suggested that there may be problems in looking for group as opposed to individual changes, because these forensic populations are so heterogeneous. It has been found that group mean scores from self-report psychometric assessments of both anger and interpersonal functioning can fail to reflect individual variation and/or be inconsistent with clinical observations of individual change in forensic psychiatric patients (Quayle & Moore, 1998; Ramm, 1996). Further, it would therefore seem that results from assessments require to be interpreted with respect to what would be considered a positive change for a particular individual, at a particular time, rather than interpretation of group data (Quayle & Moore, 1998). Similar observations have been made with non-forensic individuals with learning disabilities undergoing anger management and assertiveness skill training (Walker & Cheseldine, 1997).

### 1.2.4 Nomothetic vs idiographic approaches to assessment

Nomothetic approaches to assessment are concerned with the development of general rules for understanding people. They measure common traits or dimensions which we are all assumed to possess to some degree. Psychometric assessments employ the nomothetic approach. Scales, questionnaires, and inventories are developed along with standardised procedures for their administration. How scores from these are distributed in a particular population is determined, and the score(s) an individual obtains on a particular assessment is then used to evaluate where that individual stands in relation to a particular reference group. These standardised formats may have the advantage of providing robust and objective data. Such an approach provides an individual with a structured and direct means of reporting their experiences which might otherwise not be expressed. However, psychometric assessments are circumscribed in what they measure and do not allow for idiographic variation in terms of administration and scoring (Gudjonnson & Haward, 1998). These authors suggest that in

some cases this lack of flexibility and the apparent crudeness of some psychometric assessments may reduce their psychological value.

By way of contrast to the nomothetic approach, the idiographic approach is more concerned with the measurement of the unique qualities of an individual (Klein, 1992). Idiographic procedures tap into common cognitive constructs, yet recognise the uniqueness of an individual's personality structure. Such methods access individual differences at a level which nomothetic approaches do not have the sensitivity to detect, and may therefore provide important clinical insights and a wealth of data on an individual which would be lost using nomothetic approaches (Klein, 1992).

One method of assessment which adopts an idiographic approach is the Repertory Grid Technique, which derived from Personality Construct Theory (Kelly, 1955/1991). Prior to discussing the advantages of using this idiographic approach to assessment with forensic psychiatric patients, a brief outline of Kelly's (1955/1991) Personal Construct Theory will be given. This is important as some authors have expressed concerns that researchers at times detach the repertory grid technique from the theory from which it is derived (e.g. Beail, 1985; Easterby-Smith, 1980; Fransella & Bannister, 1977; Houston, 1998; Jahoda, 1988; Phillips, 1989; Winter, 1992a). They argue that it is important to bear in mind the theory underpinning the technique at all stages of the procedure, from its design through to the interpretation of the data obtained from it. Space does not permit an exhaustive critique of Personal Construct Theory, or an extensive review of its application in the clinical setting. These are provided in for example, Button, 1985, Fransella, 1995, Fransella & Bannister, 1977 and Winter, 1992a. However, some time will be spent discussing how the personal construct perspective has influenced clinical psychologists working with offending populations, and how repertory grid technique has been used in the assessment of change in clinical samples.

### 1.2.5 Personal Construct Theory

Kelly (1955/1991) proposes that we all strive to make sense of our experiences and in so doing develop our own individual way of construing reality. He suggests that there is no single correct way of construing reality, but rather, we make interpretations of it. He argues that all events are open to alternative interpretations, and consequently our constructions may be subject to revision or replacement.

Kelly (1955/1991) perceives of human thinking as essentially dichotomous, and argues that we never affirm anything without simultaneously denying something. For example, if we say that someone is 'honest', we are also saying that they are not 'dishonest'. In line with this view, constructs, to Kelly, are bi-polar dimensions created by an individual to discriminate between what he refers to as 'elements' i.e. anything which can be construed. Further, constructs have a 'range of convenience' i.e. they have a finite number of elements to which they apply. For example, the construct 'kind versus cruel' may be applied to describe people but would not be appropriate when describing furniture or a car.

Kelly (1955/1991) argues that we all develop our own unique 'personal construct systems' and that these develop by construing patterns in events from the ways in which they resemble or differ from each other. Having construed these similarities and differences, allows us to anticipate or make predictions about future events. For example, having construed a friend as being 'honest' as opposed to being 'dishonest' we can predict that they will behave in an honest way. Kelly (1955/1991) proposes that choosing between poles of a dichotomous construct, in order to make the best sense of events occurs in a way that we will use to enhance our future predictions.

Kelly (1955/1991) argues that an individual's personal construct system not only differs from others' in terms of it's content i.e. the constructs which it is made up of, but also in how such constructs are organised within the system. He proposes that our personal construct systems consist of a number of interrelated constructs, organised in a complex hierarchical network with some broad, wide ranging constructs in a superordinate position relative to other subordinate constructs. For example the construct 'attractive-unattractive' may subsume constructs about size of face, colour of eyes, body size etc. Higher order, superordinate, constructs are seen to be generally more stable, increasingly abstract and value laden, and constitute the core constructs which give an individual a sense of identity and continuity. They are the constructs which an individual uses to conceptualise themselves, in an attempt to anticipate their own and others' behaviour.

Our personal construct system concerning others determines our reactions to them and also affects our own social behaviour (Button, 1985). For example, Kelly (1955/1991) suggests that we tend to play roles that fulfil, and thus validate, other people's constructs involving us. To Kelly (1955/1991) interpersonal relationships involve our attempts to construe the construction processes of others, i.e. we form hypotheses about what others may be thinking about us, and test these out by altering our behaviour as necessary. Further, whilst our constructions of events are idiosyncratic they may also be commonly held by others. Thus, insofar as people construe in a similar manner they may also behave in a similar manner to one another.

Kelly (1955/1991) argues that we use our construct systems to anticipate events and plan future courses of action. Further, each of us strives to develop construct systems which are better able to predict events, and consequently our personal construct systems are constantly changing in the light of experience. For example, Kelly (1955/1991) suggests that we form hypotheses about what will happen in given situations, which we test out in behavioural interactions with others, the consequence of which always has feedback effects on how we

construe further events. If our hypotheses are confirmed our personal construct systems will be retained, but when they are invalidated it may be necessary to modify or reject individual constructs, or whole sub-systems of our construct system. Modifications may be minor and involve simply moving an element from one pole of a construct to the other. Alternatively, our predictions may be wrong so often that we are required to make more major alterations to our construct systems, or elements may turn out to be outside the range of convenience of our construct. Kelly (1955/1991) argues that when we are able to revise our constructions in the light of our experience our construct system will continue to evolve. Further, the better that our construct systems are to predict things, the more adaptive control we will have.

Kelly (1955/1991) introduces the notion of permeability as a central concept dictating change in construct systems. He suggests that a construct which is permeable is one which has a good degree of elasticity and can be readily modified with experience. Too much elasticity may cause a person to be too changeable or unstable. By contrast, an impermeable construct is one which fails to modify with experience. In individuals with erroneous but impermeable constructs, they may repeat their difficulties while never learning from experience (Brown & Chiesa, 1990). Kelly (1955/1991) suggests that the greater degree to which our more over-arching constructs have flexibility, then the more able our overall construct system will be to accommodate changes. Although an individual can elaborate their construct system by engaging in new activities and entering new situations Kelly (1955/1991) argues that by doing so they simultaneously expose themselves to 'anxiety and threat'. New constructs, he argues, will usually emerge if they do not pose an insurmountable 'threat' to an individual's construct system i.e. if they are not incompatible with superordinate constructs.

Kelly (1955/1991) described some experiences such as threat, anxiety, aggression, hostility, which others would generally refer to as 'feelings' or 'emotions', in terms of transitions in personal construct systems. Therefore his view of what others would generally term emotions

or feelings is not always consistent with conventionally held notions of these entities. For Kelly (1995/1991) 'threat' is the awareness of imminent comprehensive change in an individual's core constructs. Button (1985), gives the example of imminent death, loss of a limb for an athlete, or any other experience where an individual's most basic assumptions about themselves and their world are called into question. For Kelly, 'anxiety' is the awareness that the events with which an individual is confronted lie outside the range of convenience of their construct system i.e. they do not know how to construe them, and consequently are unable to anticipate the outcome. Kelly (1955/1991) emphasises that a complete failure to anticipate or something totally unconstruable would however neither be perceived nor lead to anxiety. A person may react to anxiety and threat by tightening and constricting their construct system or by broadening and loosening it. If the process goes too far, however, in either direction, Kelly (1955/1991) argues psychological disorder may result.

'Aggressiveness' and 'hostility' in personal construct terms involve the active elaboration or defence of one's perceptual field. They are not akin to purely 'anti-social impulse' since they can be viewed as adaptive mechanisms. The aggressive person may be actively doing things, which precipitate himself and others into situations where predictable choices and action are required. 'Hostility' may be seen as the continued effort to extort validational evidence in favour of a type of social prediction. For example, when faced with evidence that we are wrong we may go to extraordinary lengths to hold on to our views. Rather than facing the inevitability of this change, the hostile person may seek to force others to behave in ways which validate their constructs.

Kelly (1955/1991) did not provide a definition of anger, although McCoy (1981) provides definitions of a number of 'negative' emotions including anger from a Personal Construct perspective. She suggests that most negative emotions like anxiety result from an awareness of information which may invalidate the individual's constructs and some negative

emotions like anger involve more an absolute defence of the construct. Lack of awareness that a construct is invalid removes any sense that the construct needs to be revised or abandoned.

Psychological disorders, and many personality problems, from a personal construct perspective, are seen to result from the repeated use of invalidated constructs. For example, Bannister (1963, 1965) suggests that schizophrenic thought disorder may reflect the loosening of construct relationships to a point where constructs which were usually reliable and firmly linked come to relate to each other in a more or less random way. He proposes that this degree of construct loosening occurs as a result of repeated invalidation of predictions. Further, psychotic symptoms are viewed as giving structure and meaning to the chaotic experiences which arise out of the use of invalidated constructs (Landfield & Leitner, 1980). In the case of anxiety, an individual is thought to face events which lie outside the range of convenience of their construct system i.e. their constructs do not apply to the events they face. They may respond to this by loosening their constructs which may help them deal with the ambiguities, however, this results in constructs becoming less predictive. Alternatively the anxiety created by the inadequacy of the construct system may be dealt with by tightening of constructs. It could be argued that obsessive-compulsive symptoms could be one result of this. Obsessional rituals may represent an extreme attempt at making totally unvarying predictions. Thus constructs are impermeable in the sense that no new elements can be introduced into them.

In personal construct terms, a person functioning fully is one who is able to construe the world in such a way that predictions are for the most part validated. However should invalidation occur they accept this and deal with it by reconstruing. Kelly (1955/1991) suggests that the basic unit of experience comprises of a cycle with five phases namely: anticipation, investment, encounter, confirmation or disconfirmation, and constructive revision. On the other hand, an individual who is incapable of dealing with invalidation may become increasingly anxious when confronted by an event which they find difficult to construe. Much of

psychological therapy might be seen in terms of helping a distressed individual to deal with making adaptive changes to their own personal construct system. This may involve helping an individual with fixed but non-adaptive constructs to go through the difficult process of making change, or helping an individual with too flexible a construct system to build a more stable and useful structure. Whether this occurs in a person's normal experience in life or during the course of therapy, this process of 'reconstruction' is based on experience.

Kelly (1955/1991) views psychotherapy as a process of the client's reconstruction of experience and therefore suggests that it would be expected that if a client's therapy is successful that reconstruing would be revealed in changes in their repertory grid scores. Such changes have been demonstrated in various studies of group therapy. A number of approaches have been taken in these studies. For example having therapists complete a grid for each client as he or she imagines they would complete it if therapy were successful (Morris, 1977), or predicting change by inspecting the client's pre-treatment grid. Winter (1985, 1992b) provides guidelines for those wishing to adopt these approaches.

Personal construct theory would predict that aspects of both the structure and content of an individual's construct system will determine the likelihood of their response to therapy. The relationship between construing and subsequent group therapy outcome has been examined in a few grid studies. These have shown, for example, that a tightly organised construct system (Orford, 1974; Morris, 1977; Winter, 1983), or tightening of the system over the course of therapy (Bailey & Sims, 1991) is predictive of poor response to group psychotherapy, perhaps because the group is likely to invalidate its members' constructs to some extent, and because a tightly organised system may be so brittle as to be vulnerable to structural breakdown following invalidation of any of its constituent constructs (Lawlor & Cochran, 1981). This may lead the person who construes tightly to be particularly threatened by, and therefore resistant to, group psychotherapy. A symptom-focused treatment may be less threatening for such an individual,

which may explain findings indicating that the relationship between tight construing and treatment outcome in behaviour therapy is the converse of that in group-analytic therapy (e.g. Winter, 1983; McKain, Glass, Arnkoff, Sydnor-Greenberg & Shea, 1988).

Therapy creates situations in which the individual can experiment with alternative ways of construing and behaving. The therapist's role is largely to restore the predictive effectiveness of the individual's personal construct system, through the creating of situations in which the individual could experiment with alternative ways of construing and acting. If the resulting model becomes more recognisably like those of other, more effective and adjusted people, this would be a convenient by-product of a process directed more toward personal goals and purposes than toward consistency with some majority view.

### 1.2.6 Repertory grid technique

Repertory grid technique is a derivation of Kelly's (1955) Role Construct Repertory Test. It is essentially a structured interview procedure which allows the investigator to explore how an individual construes various aspects of their world, and to identify the interrelationship between constructs in their personal construct systems. Repertory grids (the end product of the technique) contain three components: "elements", which define the focus of the grid; "constructs", which are the ways an individual groups these elements and differentiates between them; and a "linking mechanism" which shows how each element is assessed on each construct. It is in the different permutations of these three components that allows for flexibility in the design of repertory grids (Easterby-Smith, 1980).

### 1.2.6.1 Elements

The choice of elements is determined by the area in which construing is to be investigated. Within a clinical context elements have included: relationships at different points in time (e.g. Ryle & Lunghi, 1970); situations (e.g. Parker, 1981); statements relating to death and dying (e.g. Warren, 1984; Warren & Beumont, 2000); aspects of the self and pertinent others (e.g. Clarke & Llewelyn, 1994; Clarke & Pearson, 2000; Houston & Adshead, 1993; Shorts, 1985). However, most often aspects of the self or people who figure prominently in the client's life have been the focus of grid work. A technique commonly employed is presenting the individual with a list of role titles e.g. 'a person I dislike', a person I get on with', to which they fit someone they know. Thereafter the individual thinks of that person when presented with the role title.

Easterby-Smith (1980) argues that a prime rule of grid construction is that all elements must be within the range of convenience of the constructs to be used. Therefore they need to be reasonably homogeneous i.e. be drawn from the same category. It is also important that elements chosen provide a representative coverage of the area under investigation. Easterby-Smith (1980) suggests that if the grid is to be subjected to computer analysis less than six or seven elements may distort the analysis, and proposes that twelve should provide adequate coverage of a chosen topic. Both Easterby-Smith (1980) and Houston (1998) recommend the inclusion of elements which will elicit both positive and negative ratings e.g. by including contrasting pairs of elements such as 'a person I like', 'a person I do not like'.

### 1.2.6.2 Eliciting Constructs

Numerous methods of construct elicitation have been described in the literature including procedures for special populations e.g. those with impaired hearing (Baillie-Grohman, 1975),

dysarthric or dysphasic individuals (Dalton, 1988) etc. Winter (1992a) provides a fuller discussion but only the most widely used techniques will be discussed in this thesis.

As described above, constructs are defined as being a way in which two or more things are alike and thereby different from a third or more things (Kelly, 1955/1991). Constructs manifest themselves directly in the most frequently adopted procedure developed by Kelly for eliciting constructs i.e. the triad method. This involves presenting an individual with sets of three elements, selected from the pool of elements being used in the grid, and asking them "In what important way are two of these people alike and different from the third?" (Fransella & Bannister, 1977). The characteristic which two of the elements share defines the emergent pole of the bi-polar construct. For example an individual, when presented with the elements 'wife', 'mother' and 'close friend', may construe their wife and mother as similar in being 'cautious' as opposed to their friend whose 'spontaneous'. The latter contrasting characteristic, which distinguishes the third element, defines the contrast pole of the construct. Alternatively the dyad method may be used. Here an individual is presented with two elements and asked to say in what way they are similar (the emergent pole). They are then asked what they consider the opposite of this characteristic to be (the contrast pole).

Whichever technique is adopted, the procedure is repeated with successive triads or dyads, either selected at random; or by the investigator deciding in advance which combinations may bring out the greatest contrast; or determined by the investigator wishing to explore a particular contrast (Easterby-Smith, 1980). Houston (1998) suggests that eventually the same constructs should be elicited by each method as an individual's construct system contains a limited number of their most important constructs. She also highlights the importance of ensuring that each element is given roughly equal chances of appearing in triads. Otherwise, she argues, some elements may dominate the type of constructs being produced which could result in the overall grid being distorted. Houston (1998) also recommends that two elements should

not be repeated in successive triads as this may result in the individual who is completing the grid having considerable difficulty in thinking of new constructs.

Alternative methods of construct elicitation can be used if the triad or dyad method proves difficult. For example, the emergent pole of constructs can be obtained by asking an individual to describe each element in turn (Spindler Barton, Walton, & Rowe, 1976). This technique has been used successfully with individuals with a learning disability and with children (Salmon, 1976). In all techniques the individual is asked to say what the opposite of the emergent pole is. Some authors have expressed concerns that the use of the word "opposite" leads to the resulting constructs tending to incorporate logical opposites, rather than opposites of meaning to the individual. However, Houston (1998) notes from her clinical experience this does not seem to be the case.

Constructs need not be elicited from an individual although this will endanger the personal relevance to them. Constructs can be supplied, or both elicited and supplied constructs can be used in conjunction. Supplying constructs has the advantage of being a quicker method than elicitation and can enable the investigator specifically to test hypotheses about an individual's way of construing. It may also be useful to supply constructs in cases where individuals have not produced constructs spontaneously where particular constructs are known to be representative and meaningful to the individual; or where elicited constructs fail to address the clinician's concerns.

Whilst there is empirical evidence to suggest that meaningful results are obtained by using supplied constructs (e.g. Nystedt, Ekehammar & Kusinen, 1976) and that these are significantly related to individuals' behaviour (e.g. Fransella & Bannister, 1967), it has been argued that supplying constructs reduces the repertory grid to a set of rating scales which eliminates most of the unique advantages of the grid as an idiosyncratic technique (Phillips,

1989). This author argues that in the type of grid where elements and constructs are all provided by the researcher there is very little that links into the original theory or any underpinning that resembles what Kelly (1955/1991) would acknowledge to be a repertory grid.

A number of types of constructs which may be of limited use in a grid and may require clarification or need to be avoided have been identified in the literature (Fransella & Bannister, 1977; Houston, 1998; Winter, 1992a). For example "situational constructs" where a situational characteristic of the element is described rather than the element itself e.g. 'lives in Edinburgh' or "excessively impermeable" constructs which are applicable to only a limited number of people e.g. 'good at motor bike racing versus not good at motor bike racing'. These are problematic when constructing repertory grids as they are highly specific and have a limited range of convenience. Equally, "excessively permeable" constructs are not helpful. These are constructs which have a wide range of applicability e.g. the construct 'men versus women' in a grid where most of the elements are men; or "vague or superficial" constructs e.g. 'They're alright versus Not alright'. These excessively permeable constructs can be applied so loosely that they rarely add much information to the elements. Repeated constructs can also be problematic and come in two forms (Houston, 1998). These are literal repetitions and the use of virtually or actually equivalent words. The difficulty with accepting repeated constructs is that whilst using repeated constructs may be a reflection of the restricted range of an individual's construct system it may also be an indication that the elicitation procedure for some reason has got 'stuck' with one construct that is being repeated. Consequently this may mean that the investigator is missing out on the actual diversity of the persons construct system. Houston (1998) observes that the literature suggests most clinicians and researchers reject literal repetitions and may reject similes too. However, she argues that in cases where constructs have the same emergent pole but different contrast poles e.g. 'quiet vs rowdy' and 'quiet vs sociable' it is important to determine if the two constructs have the same meaning for the individual, and

whether one can be excluded. "Peculiar" constructs where an unusual contrast pole is elicited to the emergent pole also require elucidation.

However whilst clarification may be required for these constructs, it is important to bear in mind that what is required is to elicit material that is meaningful to the individual. Thus, it would generally not be appropriate for the investigator to attempt to encourage the individual to clarify their constructs just so that it is easier to complete a repertory grid. In addition, if an individual persists in eliciting such constructs, this is an important source of information about the way in which they construe the world, which is likely to contribute to an understanding of their behaviour (Houston, 1998; Winter, 1992a).

#### 1.2.6.3 Linking constructs to elements

Eliciting constructs provides important information about the content of an individual's construct system. Further information about it's structure and how the individual differentiates between elements can be obtained by investigating how constructs are used in relation to elements. The final stage of the repertory grid technique, achieves this by linking constructs to elements.

Kelly's view of constructs being bi-polar distinctions made between elements enables a matrix of the pattern of interrelationships between constructs to be arrived at. This relationship can be recorded by regarding the two poles of the construct as the two ends of a scale along which each element is placed. The usual procedure in producing a repertory grid is to arrange the elements along the top of a piece of paper, and the constructs down the side with the emergent and contrast poles at opposite sides. Each element is then linked to each construct by means of either binary assignation, rankings, or ratings, and thus produces a data matrix. This procedure is depicted in Figure 1.

**Figure 1.** Example of a completed 8 element x 8 construct (8 x 8) repertory grid using a five-point rating scale

| | Self Now | Wife | Mother | Ideal Self | Father | Friend | Sister | Brother | |
|---|---|---|---|---|---|---|---|---|---|
| Caring | 2 | 3 | 1 | 1 | 4 | 1 | 2 | 5 | Uncaring |
| Trustworthy | 2 | 5 | 2 | 2 | 4 | 2 | 2 | 5 | Untrustworthy |
| Relaxed | 4 | 2 | 3 | 1 | 4 | 2 | 1 | 1 | Uptight |
| Ambitious | 3 | 5 | 3 | 3 | 5 | 2 | 1 | 1 | Lazy |
| Happy | 4 | 2 | 2 | 1 | 2 | 1 | 2 | 1 | Sad |
| Good sense of humour | 5 | 2 | 4 | 1 | 5 | 1 | 2 | 4 | Cannot laugh at self |
| Kind | 1 | 5 | 1 | 1 | 5 | 2 | 2 | 4 | Tight with money |
| Reliable | 3 | 5 | 1 | 2 | 5 | 1 | 1 | 5 | Never there when needed |

*Note.* 1 = Very much like the left pole of the construct; 2 = A little like the left pole of the construct; 3 = A bit like both poles/Like neither pole; 4 = A little like the right pole of the construct; 5 = Very much like the right pole of the construct.

Scales range along a continuum from dichotomous scoring, through ranking, to rating, involving increasingly fine differentiation. With dichotomous scoring the individual is asked to give each element a score of 1 or 0, depending on whether it is closer to the left or right pole of a construct. One of the difficulties with this method is that sometimes individuals may see few of the elements as being characterised by one pole of a construct, thus resulting in what (Landfield, 1971) described as a 'lopsidedness' in the grid. Ranking was first described in Bannister (1963), as an attempt to deal with this problem. Here the individual places elements in rank order in terms of each construct. This provides a degree of discrimination between them and enables the investigator to check that each construct is meaningful for each element. However, ranking has the disadvantage of forcing the person to indicate a difference where they may feel there is none. It also tends to be more time-consuming than other forms of scales. There is also a tendency for rankings to be made in relation to the emergent pole of the construct, without taking much account of the contrasting pole. This means that the construct may only be partially incorporated in the grid.

The use of rating scales has been the most commonly used method for linking elements with constructs, and is used in an estimated 70 per cent of published studies using repertory grids (Shaw, 1980). Each element is rated on a scale defined by the two construct poles, usually using a five- or seven-point scale (Easterby-Smith, 1980; Houston, 1998). This method allows for greater flexibility of response and more discrimination on each construct than ranking. Rating scales make it possible to check whether the elements are in the range of convenience of all the constructs, and thus if the grid has been correctly constructed. They also provide information about how often an individual uses extreme ratings, and with which elements, whilst providing the option of a mid-point score which can be used for non-applicable ratings. An alternative is to use an even number of points on the rating scale, so as the mid-point is not used as a way of avoiding apparent commitment to a view. Alternatively the mid-point is treated as a missing or unclassifiable value, and preserves distinctions.

Once elements and constructs have been linked the resulting grid can either be interpreted prior to, or after, statistical analysis. Useful qualitative information can be obtained from the grid prior to statistical analysis e.g. about the individual's choice of elements, constructs used, use of ratings etc. (e.g. Houston, 1998). Many computer programs specifically developed for the statistical analysis of repertory grids are now available, most of which use some form of factor analysis procedure for reducing the grid data.

### 1.2.7. Repertory grid technique as an idiographic alternative to self-report psychometric assessments and its application to measuring clinical change

As can be seen from the above description of the repertory grid technique, it is a technique which combines an idiographic approach to assessment with objectivity in scoring. This has many potential advantages:

(a) The grid allows for greater self expression than questionnaire methods as it affords an individual the opportunity to say how they view things, rather than forcing them to select or define themselves on dimensions supplied by the researcher or clinician as is the case on standardised questionnaires. On psychometric assessments it is assumed that the questions will have the same meaning to the individual being assessed as to the person administering the assessment (Houston, 1998) but this may not always be the case.

(b) Repertory grids sometimes have an added advantage in that the face validity of many grids is low (Winter, 1992a) and the procedure is quite complex. This makes the purpose of the grid less transparent. Consequently grids may be less susceptible to the socially desirable responding found using self-report psychometric assessments, and which has been discussed at some length above.

(c) Unlike many nomothetic procedures, the repertory grid has generally been reported to be acceptable to clients, who often remark that the procedure is an enjoyable, thought-provoking experience which is therapeutic in itself (Winter, 1992a), and Winter notes that this may mean that the grid can be therapeutic in its nature.

(d) Repertory grid technique is also a procedure which has great flexibility. It can allow for idiosyncratic variation in terms of administration and scoring so as to cater for an individual's level of ability. It can be modified to meet the interests of the researcher or clinician, or to allow for addressing issues which are particularly pertinent to an individual client. The nature of the repertory grid technique also makes it a useful assessment for monitoring therapeutic change.

The repertory grid technique is reported in research literature as an outcome measure for various types of therapeutic interventions. It has been used to investigate the construing of neurotic clients over the course of individual behaviour therapy (Caine, Wijesinghe & Winter,

1981); depressives during group psychoanalytic (Catina, Tschuschke & Winter, 1989); and personal construct psychotherapy (Sheehan, 1985); psychopathic clients in a therapeutic community (Norris, 1983); both female (Clarke & Llewelyn, 1994) and male (Clarke & Pearson, 2000) survivors of childhood sexual abuse receiving individual cognitive analytic therapy; alcoholics undergoing in-patient group therapy (Bailey & Sims, 1991; Heather, Edwards & Hore, 1975; Heather, Rollnick & Rollnick and Heather, 1980); sex offenders in out-patient cognitive-behavioural group therapy (Houston & Adshead, 1993), and couples attending marital therapy; (Ryle & Breen, 1972).

The repertory grid technique is particularly useful as it provides a range of possible indicators of change. Evidence of change may be found in both the content and the structure of the individual's personal construct system. For example, new constructs may be formulated. However this represents a fundamental change in an individual's construct system, even if they are not the most discriminative constructs the individual uses. New discriminative constructs may also be formulated, although this is viewed as one of the most difficult therapeutic changes to achieve, since it involves changing the whole way in which an individual perceives their world. To obtain this information, though, it is necessary for constructs to be re-elicited post-treatment. Other indicators of change include: changes in the interrelatedness of constructs; the tightness or looseness of the individual's construct system; changes in the construing of others; changes in construing the self in relation to others (Houston, 1998; Winter, 1992b). Houston (1998) suggests that initial changes usually consist of the way self and significant others are construed within the same overall structure. A decrease in the distance between self and ideal self is not uncommon in grid studies of therapy, and is often considered to represent an increase in self-esteem, or a lowering of ideals previously aspired to (Norris, 1977). One change in construing which tends to be more specific to group therapy is an increase in the construed similarity of the self and others. This has been found in analytic (e.g. Caine et al., 1981; Catina

and Tschuschke, 1991; Koch, 1983), personal construct (Button, 1987) and behavioural (Winter, 1988) group therapies.

Winter (1985, 1992b) argues that assessment instruments employed to measure change, and evaluate therapeutic outcome, should take into account the multi-dimensional nature of therapeutic change. They should ideally combine objectivity of scoring and sensitivity to psychological change with sufficient flexibility to devise both general measures and individualised outcome criteria relevant to a particular client, or group of clients. He suggests that they should also be relevant to the focus of the particular therapy under study and allow for investigation of both therapeutic process and outcome. Winter (1992a) states that although batteries have been developed for evaluating therapeutic interventions they have largely consisted of measures which are concerned with the client's degree of suffering, level of functioning, and behavioural goals, and pay relatively little attention to less conscious levels of awareness which, he argues, may be more pertinent to the focus of many forms of group psychotherapy. He concludes that the repertory grid technique seems to meet the above criteria particularly well.

### 1.2.8 Reliability and validity of repertory grid technique

A difficulty with investigating reliability in repertory grids is that the very nature of personal construct theory involves an attempt to allow the widest possible range of idiosyncratic responses. Accordingly, repertory grids would not necessarily be expected to produce the same result over repeated presentations (Fransella & Bannister, 1977). However, Sperlinger (1976) argues that if this technique elicits important aspects of an individual's construing then some degree of temporal stability should be expected. Such arguments raise two important questions. Firstly, which aspects of the grid might be expected to change and which show greater stability. Secondly, what degree of stability is desirable in repertory grids (e.g. Bannister & Mair, 1968;

Fransella & Bannister, 1977). In response to the second question it would seem that high temporal stability of the grid would demonstrate insensitivity to change while low stability would produce unreliability. Consequently, it has been suggested that moderate stability is desirable (Adams-Webber, 1979).

A review by Bonarius (1965), of studies investigating the stability of particular grid measures indicated considerable consistency in these overall, with test-retest correlations around 0.8 being cited. However, the maximum interval between administration of two grids in these studies was only two weeks and Fransella's (1981) subsequent review concludes that although average reliabilities tend to be quite high, there is a wide individual variation within samples. The general finding is that there is a moderate degree of content stability even when different elements are employed in the elicitation process (e.g. Sperlinger, 1976) with average test-retest shared content of 58% (Horley, 1996) and 64% (Sperlinger, 1976) being reported over periods from one week to eight months in samples drawn from clients presenting with psychological disorders, non-clinical, and forensic samples. However, there does appear to be a wide range of individual variation with most change being found for those who are more cognitively complex (Horley, 1996). Horley (1996) explains this by suggesting that more cognitively complex individuals have more options available for construing others in different ways and hence show a greater change in their grid when they are not required to use the same constructs on re-assessment.

A further finding is that varying the format of the grid appears to produce different results, which has lead Fransella & Bannister (1977, p.78) to conclude that 'grids of various forms cannot be considered identical either in terms of the perceived task or in terms of results.' Some research has focused on the effect of varying the type of constructs and elements employed in a grid e.g. comparing grids using supplied and elicited constructs and elements. Some studies have found little difference in the cognitive complexity scores of normal

individuals using elicited constructs and those using supplied constructs (Coleman, 1975; Metcalfe, 1974; Tripodi & Bieri, 1963;). However, Barbow (1969) reports that greater differentiation is exhibited when elicited constructs are used.

Winter (1992a) suggests that if psychological disorder is associated with an idiosyncratic pattern of construct organisation, a greater difference might be expected between the client's structuring of supplied and elicited constructs than would be observed with normal subjects. This has been found (Jaspars, 1963, cited in Winter, 1992a) in a study of neurotic and normal individuals. Also, neurotic clients have been found to apply elicited constructs more differentially than supplied constructs in a grid (Caine & Smail, 1967), and schizophrenic clients structure elicited constructs to a greater degree than they do supplied constructs (McFadyen & Foulds, 1972; Winter, 1975). Thus it would appear that at least with psychologically disturbed individuals, using a grid with elicited constructs will provide a more accurate indication of their personal construct system.

Research has also focused on the stability of different structural features (as opposed to content features) of construing across occasions. For example, one week test-retest reliabilities between .46 to .85 have been reported for the stability of cognitive complexity scores (Feixas, Moliner, Montes, Mari & Neimeyer, 1992; O'Keefe & Sypher, 1981; Spengler and Strohmer, 1994), and test-retest reliabilities for measures including percentage of variation accounted for by the first component from principal component analysis, self-ideal discrepancy and self-other discrepancy, for periods of up to one month, have a reported average modal reliability coefficient of 0.85 (Feixas et al., 1992). Similarly, Sperlinger (1976) reports correlations of 0.95 between the distances of the self from other elements on two occasions of testing. Also studies of the stability of the pattern of construct relationships over time found reliability coefficients ranging from 0.6 to 0.8 (Fransella & Bannister, 1977) although lowered correlations seem to be found with longer test-retest intervals (Lansdown, 1975).

A problem in drawing general conclusions from the way in which a particular element is construed in a grid has been highlighted by Leitner's (1988) finding that an individual may construe another person, or the self, very differently in different contexts. For example after recalling a time when he or she was relating well with the person or after recalling a time when they were relating badly. Yorke (1989) also notes the importance of taking contextual detail into account in understanding the particular meaning intended by an individual in applying a construct to certain elements. Leitner's (1988) suggests the use of more or multiple-self elements in grids (see Winter, 1992a).

High correlations between Bannister's Intensity score, and the size of the first component derived from principal component analysis of grid data (both of which are viewed as measures of cognitive complexity) have been reported (Fransella, 1965). Although, some researchers examining the convergent validity of different measures of cognitive complexity have generally found this to be low (Epting & Wilkins, 1974; O'Keefe & Sypher, 1981; Orford, 1974). Winter (1992a) suggests that some of this lack of correspondence between supposedly equivalent measures, is because some concern themselves with the extent to which constructs differentiate between elements, while others also concern themselves with the hierarchical relationships between constructs. This creates confusion. Additionally Honess (1976, cited in Winter, 1992a) notes that there does tend to be correspondence between measures of cognitive complexity but only when these are similarly computed.

It is assumed by personal construct theorists that an individual's choice of behaviour is rooted in the characteristics of their construct system (Kelly, 1955/1991) therefore it should be possible to predict the particular decisions and choices which a person is likely to make on the basis of their grid. This has been found to be the case, for example, in terms of predicting individuals' voting behaviour (Fransella & Bannister, 1967, cited in Fransella & Bannister,

1977); preferences for universities (Rowles, 1972, cited in Winter, 1992a) attitudes towards, and frequency of visiting, particular shops (Hudson, 1974; Stringer, 1976, cited in Winter, 1992a) and their religious attitudes and affiliations (Cannell, 1985).

To conclude, Fransella & Bannister (1977) and Winter (1992a) note that to talk about the reliability and validity of the repertory grid technique can be fairly meaningless given that there is no standard form of the repertory grid, nor is there a single score produced by it i.e. there is a lack of uniformity. However, Sperlinger (1976) suggests that one can examine the reliability of a particular form of grid, if the particular context, and specificity about what is being evaluated is clearly established. So long as the limitations of repertory grid technique are understood and addressed where possible, it appears to represent a valid stable and useful tool for the clinician and researcher.

### 1.2.9 Repertory grid technique and offending populations

Repertory grid technique has received interest from a small body of clinicians and researchers working with offenders. It has been suggested that grid based investigations with this population can assist with exploring issues such as the degree of justification for anger, or the degree to which offenders can see alternatives (Needs, 1988). Further, Howells (1983) suggests that repertory grid technique's main usefulness is that it provides the clinician with a useful insight into the intra-personal world of violent individuals, by allowing the investigator to explore their idiographic ways of perceiving, interpreting and construing their world. For example, Howells (1983) reports in detail on the construct system of a man admitted to a hospital following attempts to poison others. Howells (1983) suggests that his findings indicated that the individual's behaviour was associated with an 'alternative definition of social reality'. He notes that such a definition would have been extremely difficult to appreciate through other means of assessment.

Despite the clear relevance of personal construct theory for understanding the subjective world of individuals with anger-mediated problems, and the potential usefulness of the repertory grid technique with this client group, there has been little examination of the personal construct systems of such individuals. Further, the few investigations that have been conducted with offenders using this technique have, like psychometric studies, tended to be nomothetic in the sense that they have grouped the results of subjects together and compared them with other groups, e.g. rapists (Howells and Steadman-Allen, 1977), paedophiles (Howells, 1979), and psychopathic violent offenders (Widom, 1976). Minimal attention has been directed towards examining the personal construing of mentally disordered offenders, particularly in relation to personal construing which undergoes change over time, and treatment outcome. Shorts (1985) argues that given that many of these individuals are periodically considered for release into the community it would seem important to elucidate any possible changes of interpersonal construing which could be expected to influence their behaviour.

The limited literature utilising repertory grid technique with violent offenders suggests that they are likely to see their victims in different ways, depending on how they construe themselves and their behaviour (Houston, 1998). For example Howells' (1983) study of male mentally disordered violent offenders detained in a secure hospital (half of whom were mentally ill and the remainder were deemed to have a psychopathic disorder), found differences in the construing of those who were one-off violent offenders and those who were habitually violent. He found that one-off offenders tended to idealise their victims, and the negative poles of their constructs tended to be submerged. He provides two explanations of how one-off violent offenders may become violent. Firstly, the negatively evaluated poles of the one-off violent offender's constructs tend to be submerged but as severe interpersonal difficulties increase the individual's awareness of these construct poles increases resulting in threat. This threat may lead to a violent attempt to remove the person who is the source of threat. Alternatively, Howells

(1983) suggests that violence may occur in the confused state following the invalidation of established ways of construing. As the individual becomes aware that their positive constructions of others have been invalidated, they may shift their construing to the opposite pole of their construct and view their victim in very negative ways which legitimises violence. Houston (1998) also suggests that one-off offenders tend to see their behaviour as completely out of character i.e. it is inconsistent with their core constructs, and are therefore more likely to experience guilt.

Howells (1983) findings on habitually violent offenders by way of contrast suggests that these individuals tend more to construe their victims in such a way as to legitimise their behaviour. For example, they tended to construe their victims in a hostile way, and see their victims as less like themselves than one-off offenders do. Also Houston (1998) suggests that they may construe their victim as an equal opponent and themselves as responding to provocation. This validates their behaviour. Houston (1998) suggests that habitually violent offenders will in general tend to construe their behaviour in a way which minimises its seriousness and legitimises their actions. Also they may construe violence as a normal way of responding and consequently see themselves as no different from others. Houston (1998) also suggests that their pattern of construing is likely to have formed in childhood experiences, particularly if they had been the victim of violence, and that this may have become their primary means of predicting future events. Needs (1988) suggest that such individuals may be behaving in a way which is validating to their core constructs and thus unlikely to produce guilt.

Early research has also found an association between cognitive simplicity and violence in prisoners (e.g. Chetwynd, 1977) and psychiatric patients (e.g. Topcu, 1976). These findings suggest that individuals with simplistic and tightly organised construing may have a more restricted range of options with which to deal with interpersonal conflict. Landfield (1971) reports a case study of a woman who committed a single act of arson and noted a tendency to

deny feelings of hostility, and found her construct system to be extremely tightly structured. Further her constructs demonstrated themes of religion and morality, where religiousness represented all that was good. One construct which was particularly important for her was the construct 'Good, religious vs Too quiet, doesn't like children', which together with her other constructs, suggested that she must always like her children in order to be "good, smart, kind, unselfish and fun". Landfield (1971) suggests that when this woman experienced feelings of dislike for her children and was unable to play her usual 'good' role, this posed an extreme threat. Consequently she either had to resort to suppression of her feelings or act out her 'badness'.

In a further case study by Landfield (1971) of a male prisoner with a history of severe violence and alcoholism, he found that this individual's constructs mainly consisted of whether or not people were likeable, happy, kind and intelligent, and the positive poles of these constructs were all related to not being violent. However, although he did not construe violence in a positive way, most of the people on his grid were rated as being violent, including himself. He was unable to rate himself on the dimensions of 'likeableness' and 'intelligence', and saw himself as the 'most unsuccessful' element. Landfield suggests that these attributes were sensitive areas for him, and that his alcohol abuse may have served to help numb negative feelings about himself. Landfield also suggests that this individual was more vulnerable to violence when he was unable to 'block out' his negative feelings and overreacted to the behaviour or slights of others in uncontrolled ways.

Needs (1988) also describes the construct system of a prisoner with a history of violence. For this individual the only alternative to being 'wild' was for him to be 'soft' and for him to give up being 'wild' would result in him 'being taken advantage of'. Needs notes that this individual had tightly defined core constructs of himself as being 'tough', 'forthright' and 'the victim of a devious and uncaring world'. Needs suggests that for this individual to give up his hostility would be threatening to his sense of self.

Finally, it has been suggested that many clients with a history of very serious violence also have a sense of perceived self-isolation, which contributes to difficulties in developing and maintaining non-violent friendships with others. A number of such clients construe themselves as 'different', 'rejected' and 'alienated', fuelling urges to seek revenge in violence (Houston, 1998).

The use of violence and aggression can also be seen as part of a shared way of construing the world within a peer group thus demonstrating commonality between individuals. Houston (1998) suggests that with such clients, it is particularly important for the clinician to be able to understand their way of construing as this may help to make sense of why many violent offenders in treatment continue to minimise the significance of verbal, as opposed to physical, aggression. For many clients, engaging in treatment to control their violence involves a major reconstruction of their core role structure. However, the use of verbal aggression often remains part of their cultural way of viewing the world, shared by their peers, which would be less likely to change (Houston, 1998).

### 1.2.10 The use of repertory grids to assess change in forensic clients

To date few studies employing repertory grid technique to assess change in the construing of forensic clients undergoing therapeutic interventions have appeared in the published literature. However, some studies have investigated short and long-term change in individual clients undergoing treatment (Hoskyns, 1988; Shorts, 1985) or in a group of clients undergoing therapy (Houston & Adshead, 1993). Hoskyns' study however is of less direct relevance to the present research as the therapeutic intervention here was music therapy. Thus discussion will focus on Houston & Adshead's (1993) study of community based sex offenders, and Shorts (1985) single case study of a rapist in an English secure psychiatric hospital.

Houston & Adshead (1993) described the use of repertory grids to assess changes in the construing of eight men attending community-based cognitive-behavioural group therapy for child sex offenders, over a six month period. The authors were particularly interested in examining change in their ways of thinking about children and adults and thus the repertory grid was comprised of fixed roles including previous and current partners, victim, another child, and dimensions of self i.e. self now, ideal self, and self seen by others. Both elicited and supplied constructs were used. The triad method was used in the elicitation of constructs. Changes were observed for each of the men on one or more of a number of different measures from the repertory grids. Given that the repertory grid is an idiographic assessment measure changes were different for each individual. However, there were some similarities in terms of which constructs were found to be discriminative, and most changes in ratings of victims occurred on these constructs. Measures of change, or lack of it, from the repertory grids were also found to be consistent with the rating of progress in treatment by group leaders, and their recommendations at the end of treatment. Also retrospective examination of repertory grids revealed a number of indicators of likely progress.

However, this study was conducted with community-based child sex offenders, none of whom had a history of mental illness. Of more direct relevance to the present study is a single case study which examined changes in construing by a mentally disordered rapist following four years treatment (including individual counselling, occupational therapy, art and music therapies and education) in a high security forensic psychiatric hospital (Shorts, 1985). This study is of particular interest as it appears to be the only published study to date which compared the repertory grid technique with self-report psychometric assessments of hostility and aggression, and locus of control, with respect to their sensitivity to psychological change.

The repertory grid used in Shorts (1985) study, comprised twenty-nine elements including twelve people who fitted specific role titles, self dimensions i.e. past, current and ideal, and different social selves from the perspective of family members, rape victims, and others. Constructs were elicited using the dyad method, fourteen were included in the grid, plus two supplied constructs which the individual re-named. Shorts found that measures of hostility, and aggression levels, failed to show any significant overall changes, and were in fact well above the means for long-term prisoners and hospitalised psychiatric patients. Also this individual's high external locus of control failed to change. Further, results from behavioural rating scales were somewhat inconsistent with these showing an absence of verbal and physical aggression, and no evidence of impulsive behaviour or communication and perceptual abnormalities. This was a marked improvement on the disturbed and unstable behaviour which was characteristic of this individual during his early hospital admission period. In contrast, this individual's personal construing changed substantially in some important respects, and this did not affect the basic personality dimensions that were assessed. This case study demonstrated repertory grid technique to be more sensitive to psychological change than self-report questionnaires, and that this may be useful for detecting changes in patients undergoing therapy.

### 1.2.11 Using Repertory Grid Technique in association with Novaco's Anger Model

Howells, Watt, Hall & Baldwin (1999) note that the process of appraisal forms a major part of most contemporary theories of anger and other emotions. It has already been noted that Novaco's model of anger (1975, 1978) comprises of a major cognitive appraisal component which mediates between events and emotional state. Both Howells (1996) and Novaco (1978) view the cognitive appraisal of situations as being fundamental to whether an individual feels provoked and experiences anger as a result. Cognitive theorists in general stress the importance of understanding how individuals idiosyncratically represent and explain reality and how such representations determine their behaviour.

The Personal Construct perspective (Kelly, 1955/1991) therefore seems entirely consistent with current cognitive models of anger, but provides a unique form of investigative approach in the form of the repertory grid to examine an individual's mental construing and personal meaning in relation to other people and events. This approach takes a more idiographic approach in attempting to understand the personal meanings of anger or aggression to a particular individual. It would therefore seem likely that the repertory grid technique, which is directly derived from personal construct theory, would be a useful method of assessment to adopt with forensic populations. Particularly as it is likely to overcome some of the difficulties experienced when utilising self-report psychometric assessments (as discussed in section 1.2.2. above). In evaluating anger management, the assumption would be that clinical improvements would be mirrored by changes in construing as seen on repertory grids relating to this area of investigation.

### 1.2.12 Aims and Objectives of Research Project

In accordance with the literature discussed above, the objective of the present research was to use repertory grid technique as a method of assessing clinical change in forensic patients attending for anger management group therapy. This was also compared with results from a standardised psychometric anger self-report questionnaire.

### 1.2.13 Hypotheses

The research methodology was designed to test the following hypotheses.

Hypothesis 1: A self-report psychometric measure of anger will not show significant group mean positive changes in participants who have undergone anger management group therapy.

Hypothesis 2: A repertory grid measure will show significant observable change in constructs and elements in participants who have undergone anger management group therapy.

Hypothesis 3: A repertory grid measure will not show significant observable change in constructs and elements in participants on a waiting list control for anger management group therapy.

Hypothesis 4: A self-report psychometric measure of anger will not consistently show changes which are in keeping with therapist assessment of clinical change in participants who have undergone anger management group therapy.

Hypothesis 5: A repertory grid measure will show changes which are in keeping with therapist assessment of clinical change in participants who have undergone anger management group therapy.

# 2. METHOD

## 2.1 Clinical setting

The State Hospital, Carstairs, is a high security forensic psychiatric facility serving the populations of Scotland and Northern Ireland. To warrant detention within the hospital individuals, in addition to having a mental illness or mental impairment, must demonstrate dangerous, violent or criminal propensities. Therefore they will often have engaged in acts of serious interpersonal violence, and many will have previous criminal histories. The State Hospital currently caters for 243 patients, approximately 91 percent of whom are male and 9 percent female, with an average age of thirty-five years and five months. Patients are admitted primarily from hospitals (44%), courts (26%) or prisons (30%). The majority (83%) have a history of criminal activity, with an average of 12 previous convictions. Most of the patients have a diagnosis of schizophrenia (70%), almost 50 percent have multiple diagnoses, and co-morbidity is prevalent with approximately half of the patients having a history of alcohol and/or substance abuse. Patients have an average of five previous admissions to psychiatric facilities and ten years of in-patient treatment. They spend on average four years and five months at the State Hospital prior to transfer, however length of stay currently ranges from three months to thirty-one years.

## 2.2 Participants

Participants in this research study were male patients from the continuing care wards at the State Hospital. They had all been referred for anger group work by their clinical teams which had been provided with clear guidance and asked to follow selection criteria by those clinicians who would be running the group work. Following this, all participants who consented to be assessed with regard to their suitability for anger management were seen by the clinicians concerned. As

a result of this assessment, sixteen patients were selected as having an anger-mediated problem that was suitable for anger management group work. Because of the availability of resources within the Clinical Psychology Department at the State Hospital, eight of these participants began group therapy and act as the 'treatment' group in this thesis. The remaining eight patients who were waiting to begin their own course of anger group therapy, once the first group finished, therefore act as a 'waiting list control' group (control group) in the current thesis.

The treatment and control groups were matched as far as possible by the clinicians involved the therapy, in terms of age, degree of anger (as measured by self-report and staff-reported psychometric measures), type and severity of index offence, history of substance misuse, primary psychiatric diagnosis and literacy. One limit on this process was the fact that some of the participants were not allowed to be in the same group because of overriding security constraints. This was usually because participants had been involved in aggressive conflict with each other. It should be noted that because of this, allocation to the first or second treatment groups was not therefore an entirely random process.

## 2.3 Treatment

The anger management group work was essentially a cognitive-behavioural psycho-educational approach. It followed an innovative twelve session protocol written by Ramm (1999) which was based on the individual anger therapy protocol (Novaco, 1978) and its adapted use with mentally disordered offenders (Renwick et al, 1997). The treatment was consistent with established 'anger management' in that it addressed the four components of Novaco's anger model (1975) i.e. (i) environmental triggers; (ii) cognitive processes; (iii) physiological arousal; (iv) behaviour. The aim of treatment was to increase individuals' self-monitoring capacity and to promote new coping skills. The treatment approach involved (a) providing participants with information about anger, its determinants, signs, manifestations and consequences; (b) promoting arousal

reduction techniques of progressive muscle relaxation, breathing-focused relaxation, and guided imagery training; (c) cognitive restructuring by altering attentional focus, modifying appraisals, and using self-instruction; (d) gaining behavioural coping, communication, and assertiveness through role play. It attempted to meet the differing needs of a variety of State Hospital patients within a group context and making use of group dynamics interspersed the weekly group sessions with weekly individual meetings which were structured according to need.

The anger management group therapy was carried out over twelve two hour sessions across a thirteen week period from the end of March to the end of June, 2000. The individual between group sessions for each participant lasted between 30 minutes and one hour. The aim of these sessions was generally to support the individual and enhance their learning from the group material.

Of the eight participants involved in the treatment group, six attended every session while the others missed one and two sessions respectively. The reasons for failure to attend seemed more to do with external circumstances in each case rather than being related to the group process or issues of motivation. On these occasions they were provided with a long individual session by one of the group therapists to ensure that they fully covered all of the course material.

It should be noted that the eight control group participants who were waiting for their own treatment to begin, also received an individual session with one of the group facilitators each week. The purpose of these sessions was to provide general support and to maintain their motivation over the three month waiting period. No formal work to address anger-mediated problems was provided.

## 2.4 Therapists

Group sessions were facilitated by a Consultant Clinical Psychologist (the "therapist") with extensive experience of group work and working with mentally ill offenders with anger problems. He was also the author of the group protocol. He was accompanied during each session by a second Clinical Psychologist and a Psychology Assistant or nurse. External supervision of the anger group work was conducted by Professor Ray Novaco who took a particular interest in programme integrity. The individual between group sessions were carried out by the same clinicians according to patient needs. The author of the current research study had no input into either the group or individual sessions.

## 2.5 Assessment Measures

As part of the anger management group therapy a range of self-report and observational assessment data was collected. The author of the current study played no part in this process but was allowed free access to the self-report and staff-reported psychometric anger data reported on in this thesis. The author of the current study met with each of the participants in the treatment and control groups to ask them if they would be prepared to participate in the research reported here, and give their consent to complete repertory grid assessments. All repertory grid assessments were administered by the author.

### 2.5.1 Repertory Grid Technique

The repertory grid technique used was as that outlined by Fransella and Bannister (1977). The repertory grid was employed to examine how participants construed themselves in relation to others. It consisted of twelve elements and twelve constructs. The elements were fixed roles, and included six different self dimensions. These are outlined in Table 1. Constructs were

elicited using the triad, or dyad methods, depending on the ability of individual participants. The order of presentation and makeup of triads, and dyads, was standardised for each participant, and was determined by random selection prior to testing. A five-point scale was utilised to rate elements along each of the constructs.

**Table 1** Elements used in the repertory grids administered to both the treatment and control groups

| Other elements | Dimensions of self |
|---|---|
| Someone who makes me angry | Self Now |
| Someone who does not make me angry | Ideal Self |
| A typical member of staff | Self when in trouble |
| A friend who offends | Self as seen by others |
| Someone who drinks/takes drugs | Self when angry |
| A friend who does not offend | Self when not angry |

### 2.5.2 Self-Report Psychometric Assessments

#### 2.5.2.1 State-Trait Anger Expression Inventory (STAXI) (Spielberger, 1991)

The STAXI (Appendix 1) is a 44-item self-report questionnaire which provides a measure of anger experience and anger expression. Anger experience is measured on two scales: State Anger (S-Anger) and Trait Anger (T-Anger). The T-Anger scale has two sub-scales: Angry Temperament (T-Anger/T) and Angry Reaction (T-Anger/R). Anger expression is measured on four scales: Anger In (AX/In), Anger Out (AX/Out), Anger Control (AX/Con), and Anger Expression (AX/EX) which is based on the responses to the items in the AX/In, AX/Out and AX/Con scales. S-Anger measures the intensity of angry feelings at a particular time; T-Anger measures individual differences in the disposition to experience anger; T-Anger/T measures a general propensity to experience and express anger without specific provocation; T-Anger/R

measures individual differences in the disposition to express anger when criticised or treated unfairly by others; AX/EX provides a general index of the frequency that anger is expressed, regardless of the direction of expression; AX/In measures the frequency with which angry feelings are held in or suppressed; AX/Out measures how anger is outwardly expressed; AX/Control measures the frequency with which an individual attempts to control the expression of anger. All scales and sub-scales on the STAXI are rated on a four-point scale that assesses either the intensity of angry feelings, or the frequency that anger is experienced, expressed, suppressed or controlled.

The STAXI has been extensively developed and validated with adolescent and adult samples from both normal populations and clinical populations with physical health problems (Spielberger, 1991). Normative data are available for students, military recruits, and working adults, and for special reference groups including prison inmates. Spielberger (1991) cites an extensive literature providing evidence for the reliability and validity of the STAXI. This shows the internal consistency for the STAXI scales to be high, tending to be greater than .71. Test-retest reliabilities are modest, mostly being above .60 for a period of one to two weeks. Various studies cited by Spielberger (1991) provide support for the STAXI scales' construct validity, finding moderate correlations with psychopathology, blood pressure and aggressive behaviour; and showing the T-Anger scale to have significant concurrent validity with other self-report anger measures. Research by Spielberger (1991) tends to support the suggested factor structure of the STAXI, however, the T-Anger Scale as a unique dimension has been questioned (Fuqua, Leonard, Masters, Smith, Campbell & Fischer, 1991; Kroner & Reddon, 1992).

#### 2.5.2.2 Novaco Anger Scale (NAS) (Novaco, 1994a)

The NAS (Appendix 2) was developed primarily with hospitalised psychiatric patients, in line with Novaco's (1975) theoretical model of anger. It is a 100 item self-report questionnaire

which measures anger on three scales, each comprising four sub-scales: Cognitive Domain (justification, suspicion, rumination, and hostile attitude); Arousal Domain (intensity, duration, somatic tension, and irritability); Behavioural Domain (impulsivity, verbal antagonism, physical confrontation, and indirect aggression). A 'Total' score can also be computed by summing the scores obtained on these three scales. It is the NAS Total score which is used in the current research. Each item on the NAS is rated on a three point scale (never, sometimes or always true).

Novaco (1994a) reports on the development, reliability and validity for the NAS with both mentally disordered and normal populations. However, the NAS has been slightly modified subsequent to this and it was the 1998 version which was utilised in the present study. When used with psychiatric patients at the State Hospital the psychometric properties of this version of the NAS (n = 76) (Novaco & Ramm, 2000, personal communication) seem entirely consistent with a previous normative study involving the NAS (n = 115) (Renwick & Novaco, 1997). Further, the 1998 version of the NAS has been found to have equally sound psychometric properties when examined at two time points. It had reliability, with internal reliability for the NAS Total being .95 and .80 and was higher for the NAS sub-scales. With regard to convergent validity the NAS administered concurrently correlated .84/.82 with the STAXI T-Anger, and .81/.85 with AX/EX, and .44/.39 with STAXI S-Anger, .67/.64. Further its predictive correlation with STAXI T-Anger was .67, and with AX/EX .71 at approximately five weeks.

### 2.5.3 Staff-reported anger assessment measures

#### 2.5.3.1 Ward Anger Rating Scale (WARS) (Novaco, 1994b)

The WARS is a two part scale completed by each participant's nurse keyworker or primary ward based clinician who records judgements of the individual's behaviour over the previous

week. The part of the WARS measure used in the present study (Part B, Appendix 3) is a set of ratings in respect of seven affective-behavioural attributes semantically related to anger. Each is rated on a four-point scale (very little, sometimes, fairly often, very often). In the WARS validation study carried out at the State Hospital (Novaco & Renwick, 2000) this set of anger ratings was found to have an internal reliability of .88, and to be significantly related to patient self-report of STAXI State Anger and the NAS Total.

### 2.5.4 Therapist Assessment of Clinical Change

In addition to the above psychometric assessment instruments, a clinician impression of clinical change was obtained from the therapist conducting the anger management group therapy. He was asked to complete an assessment developed by the author, the Therapist Assessment of Clinical Change (Appendix 4) for each of the individuals in the treatment group. This measure consists of three items, each of which are rated on a four point scale (very much, quite a lot, a little, not at all). The rater was also given the option of saying that they were unable to comment on an item (although this proved unnecessary). Item one involves an estimation as to whether the participant's level of anger has decreased. Item two involves an estimation as to the acquisition of new anger control skills by the participant. Item three involves an estimation of the participants overall clinical progress i.e. progress overall rather than just improvements in anger expression or anger control. Ratings on each of the items are summed to provide a measure of overall clinical change. The therapist was also asked to provide a short verbal account regarding his impressions on each participant's progress in therapy.

## 2.6 Procedure

Approval to carry out this study was sought, and obtained, from the following sources: (i) ethical approval from Lothian Psychiatry and Clinical Psychology Research Ethics Sub-Committee

(Appendix 5); (ii) management approval from Lothian Primary Care NHS Trust (Appendix 6); The State Hospital Anger Management Steering Committee, from whom verbal permission was obtained.

In conjunction with this, the Anger Treatment & Research Programme Manager at the State Hospital was approached (i) to consider whether it was therapeutically appropriate to approach individual participants and to consider their ability to give informed consent; (ii) to give formal permission to assess participants who had consented on a repertory grid; (iii) for permission to use self-report psychometric data regarding participants which was being collected as part of the parallel evaluation research at the State Hospital; (iv) to supervise the author in relation to patient contact.

Permission to approach participants was also sought from five Registered Medical Officers (RMOs) (Consultant Psychiatrists) with responsibility for the patients' care (Appendix 7). Written permission was received from two RMOs (Appendix 8). The remaining three RMOs gave verbal permission.

Once permission to approach participants had been received, all patients were approached by the author approximately one week prior to the commencement of the study. At this time she provided each with a copy of the Participant Information Sheet (Appendix 9). The author then discussed the contents of the information sheet with each patient, and addressed any concerns they had. The author met again with patients immediately prior to the commencement of the treatment when they were asked if they would be prepared to participate. Those who had any further concerns at this time were given the opportunity to discuss these with the author. Those who agreed to participate (all eight of the treatment group and six of the control group) were asked to complete a consent form (Appendix 10). The mental health status of the two

individuals in the control group who did not wish to participate was judged by ward staff to have deteriorated at that time and they were not approached again.

All discussions with patients, and assessments, were conducted on a one to one basis in a private room on the ward. Where nursing staff recommended that a member of the ward team be observing directly this was strictly followed. This was only considered necessary with two patients, but on both occasions the nurse remained outside of the room.

Only once consent was obtained were repertory grids administered to participants. On each occasion repertory grid data was collected during one session with each individual participant. The first repertory grid took approximately 45 minutes to one hour to complete, and the second approximately 20 to 25 minutes. Each individual was told that the repertory grid was not a test and that there were no right or wrong answers. The twelve elements (outlined in Table 1) were presented to each participant and identities were established for the six non-self fixed roles. Constructs were then elicited using either the triad or dyad method depending on the ability of each participant. Where the triad method was used (n = 9) triads were presented and the participant was asked "In what important way are two of these people alike and different from the third?" When the dyad method was adopted with those participants who found the triad method difficult (n = 5), they were asked to say in what way the two elements were alike or different. This elicited the emergent pole of the construct. The contrast pole was elicited by asking participants to name the opposite of the emergent pole. These procedures yielded a number of bi-polar constructs, which were subsequently reduced to twelve. The twelve constructs selected for inclusion in the repertory grid were those which each participant identified, through discussions with the author, as being the most important to them.

The elements and constructs were then entered into a 12 x 12 repertory grid and participants were asked to rate each of the elements along each of the constructs using a five

point scale where 1 = 'Very much like this' (the left pole of the construct); 2 = 'A little like this' (the left pole of the construct); 3 = 'Like neither or both' poles; 4 = 'A little like this' (the right pole of the construct); 5 = 'Very much like this' (the right pole of the construct) (as described in Figure 1 above). All participants in the control group (n = 6), and seven of the eight participants in the treatment group completed the 12 x 12 grid. One individual in the treatment group refused to rate three of the elements ('Someone who makes me angry', 'Someone who does not make me angry', 'Self when angry') on the initial administration although rated 'Self when angry' on the subsequent administration.

Repertory grids were re-administered with both groups within one week of completion of the anger management group therapy. On this occasion repertory grids consisted of the same elements and constructs as used in the first grid and participants were required only to re-rate each of the elements on each of the constructs using the same five-point scale as used in the initial assessment. At this stage, two participants in the control group did not wish to participate further in the study. Thus grids from the second administration were obtained from all of the treatment group (n = 8) and four of the control group.

All participants were also assessed using the STAXI at the same time points. However, these data were not collected by the author but routinely collected as part of a parallel evaluation research project. STAXI data collected from non-identified individuals who had previously undergone anger management group therapy at the State Hospital (n = 11) was also provided by the Anger Programme Manager. These data were utilised for the group data analysis conducted in this study.

At the end of treatment the 'therapist' was asked to complete the Therapist Assessment of Clinical Change for all the eight participants who had taken part in the anger management

group. This was done prior to the therapist examining the post-group psychometric assessments and they also had no knowledge of the repertory grid data.

# 3. RESULTS

## 3.1 Statistical analyses

### 3.1.1 Analyses of group demographic data, and data obtained from psychometric assessments

Statistical analysis of demographic data and data obtained from psychometric assessments was carried out utilising the Statistical Package for Social Sciences (SPSS) Version 9.0 for Windows 98. Exploratory data analyses, including the Kolmogorov-Smirnov test, revealed that these data could not be assumed to be normally distributed. Therefore consideration was given to either using non-parametric statistics, or alternatively to transform the data. As analysis of data using both non-parametric and parametric statistics revealed comparable results, for consistency with analyses carried out on repertory grid data using parametric statistics (see section 3.1.3 below), results from parametric statistics conducted on the above data will be reported.

### 3.1.2 Analysis of individual repertory grids

Repertory grids were analysed individually using a program developed by Dr Chris Evans for S+ which emulates exactly the analyses carried out by INGRID (Slater, 1972). The version used was INGRID version 2 (Evans, 2000, personal communication). INGRID was developed specifically for the analysis of repertory grid data, and has, along with subsequent versions of it, been one of the most commonly adopted methods of analysing grids (Houston, 1998). It uses principal component analysis to summarise the grid data in its minimum number of dimensions of variation, such that the new dimensions reflect the major components of variation in the data and are each perpendicular to the others. INGRID analyses of grids in the present study were carried out for the author by Dr Chris Evans. The following quantitative indices from INGRID

analysis were considered in the present study: (a) the percentage of variance accounted for by the first two principal components, (b) inter-element Euclidean distances. Two-dimensional visual representations of the data obtained from repertory grids were produced by the author using Statistica.

### 3.1.3 Comparison of repertory grids obtained from treatment and control participants pre- and post-anger management

The two repertory grids obtained from individual participants in the treatment and control groups at the same time points pre- and post-therapy were analysed. This was done using a computer programme written by Dr Paul Barrett which carried out the following analyses. Firstly, Tucker's congruence coefficient was used as a measure of similarity between the two repertory grids. This provides a dimensional measure of similarity. The congruence coefficient varies between –1.0 and +1.0, with no relationship indicated by 0.0. The congruence coefficient is used mainly in exploratory factor analytic work for comparing the similarity of factors. However, given factor loadings are also "co-ordinates" in the sense of the grid analysis co-ordinates the congruence coefficient seems ideally suited to assessing overall degree of dimension similarity Barrett (2000, personal communication). Normalised Euclidean distance coefficients were also calculated to express the dissimilarity between the first and second occasion constructs, elements, and entire grid solutions.

## 3.2 Characteristics of the sample

The treatment and control groups were compared in terms of age, literacy, type and severity of index offence, primary psychiatric diagnosis, history of substance misuse, and degree of self-reported, and staff-reported anger (as measured by the NAS Total and STAXI S-Ang and T-Ang scales; and WARS respectively).

Participants in the treatment group were slightly younger with a mean age of 29.63 years (SD = 8.33), compared to the control group who had a mean age of 33.75 years (SD = 7.85). However, independent sample t-tests revealed the difference to be non-significant (t = 1.019, df = 14, p = .325 two-tailed significance). One individual in each group was non-literate.

Participants' primary diagnoses are summarised in Table 2, and as can be seen from this, there were no differences between groups. It should be noted that although two participants had a legal diagnosis of 'Mental retardation', they both had been assessed within the 'normal range' on measures of intelligence.

**Table 2** Summary of primary psychiatric diagnosis of the treatment and control groups

| Primary Diagnosis | Treatment Group N | Control Group N |
|---|---|---|
| Psychotic Illness | 6 | 6 |
| Affective Disorder | 1 | 1 |
| Mental Retardation | 1 | 1 |
| Total | 8 | 8 |

With respect to alcohol and drug misuse, both groups appeared to be similar. One in each group had a history of alcohol abuse and three in each group had a history of drug misuse. More participants in the treatment group (n = 3) than in the control group (n = 2) had misused both alcohol and drugs, and more participants in the control group (n = 2) compared to the treatment group (n = 1) had no significant alcohol or drug history.

The degree of self-, and staff-reported anger, at the outset of the present study, for both the treatment and control groups is summarised in Table 3 along with the results of independent

samples t-tests performed on them. As can be seen, these analyses revealed no significant differences between the groups in terms of either self-reported or staff-reported anger.

**Table 3** Degree of self- and staff-reported anger at the outset of the study for the treatment (n = 8) and control (n = 8) groups and results of independent sample t-tests performed on them

| Assessment | Treatment Group M (SD) | Control Group M (SD) | t | df | Sig. (2-tailed) |
|---|---|---|---|---|---|
| STAXI Sub-scales: | | | | | |
| State Anger | 11.88 (3.04) | 10.5 (1.41) | 1.159 | 14 | .266 |
| Trait Anger | 20.13 (8.87) | 20.75 (9.13) | 0.139 | 14 | .892 |
| NAS Total | 94.50 (20.52) | 92.00 (17.55) | 0.262 | 14 | .797 |
| WARS Total | 8.75 (3.62) | 7.38 (6.7) | 0.511 | 14 | .574 |

With regard to type of and severity of index offence seven in both the treatment and control groups were considered to have committed severe acts of violence. Four in the treatment group, and three in the control group had been convicted of murder. One in each group had committed violent sexual offences. The remaining two participants had not been convicted of offences but had a history of serious acts of violence towards family members, care staff or fellow patients.

From the above, it would appear that apart from minor differences between the treatment and control groups in terms of alcohol and substance misuse history these groups were comparable.

### 3.3 Analysis of group mean pre- and post-treatment treatment psychometric data

It was anticipated that a self-report psychometric measure of anger would fail to show significant group mean positive changes in participants who have undergone anger management group therapy. To investigate this, pre-treatment mean scores obtained on the sub-scales of the STAXI (for the treatment group, n = 8 and individuals who had previously undergone anger management group therapy at the State Hospital, n = 11) were compared with post-treatment mean scores. Group mean scores obtained on these psychometric assessments pre- and post-treatment are presented in Table 4 along with the results of paired sample t-tests performed on them. A two-tailed analysis of significance was used because both a positive or negative change following treatment were potentially possible given the contradictory nature of previous research findings (see introduction to this thesis for discussion). The results show that no significant differences were found between pre- and post-treatment self-reported anger on psychometric assessments, thus supporting Hypothesis 1.

This analysis was done to demonstrate that no strong evidence of improvement would be provided simply by examining pre- and post-group psychometric data. This fact was established but it should be noted that a power analysis conducted in relation to this showed a lack of power. It indicated that to achieve the convention of 80 percent power, with a 0.05 Type I error level, and a medium within-participants effect size of 0.5, 25-30 participants would be required for sufficient power to detect a difference where one existed. A retrospective power analysis revealed that, with 19 participants, the power to detect a medium within-participants main effect is 0.67. This therefore suggests that the present study had insufficient power to discern medium within-participants main effects.

**Table 4** Degree of anger reported on sub-scales of the STAXI by individuals pre- and post-anger management group therapy (n = 19), and results of paired sample t-tests performed on them

| STAXI Sub-scale | Pre-treatment M (SD) | Post-treatment M (SD) | t | df | Sig. (2-tailed) |
|---|---|---|---|---|---|
| S-Anger | 13.89 (6.38) | 12.37 (6.27) | 1.982 | 18 | .063 |
| T-Anger | 19.42 (6.50) | 19.47 (6.75) | .047 | 18 | .963 |
| AX/In | 16.42 (4.53) | 16.26 (5.36) | .20 | 18 | .843 |
| AX/Out | 15.95 (4.06) | 15.79 (5.06) | .174 | 18 | .864 |
| AX/Con | 21.63 (5.29) | 21.89 (5.75) | .282 | 18 | .781 |
| AX/EX | 26.95 (10.23) | 26.16 (12.96) | .475 | 18 | .640 |

### 3.4 Analysis of repertory grid data

The expectation of the research in relation to Hypotheses 2 and 3 was that repertory grid measures would show significant change in idiographic ways of construing in participants who had undergone anger management group therapy but not in those in the waiting list control group. This would indicate that change in the repertory grids was due to the treatment condition. Because a definite relationship or "direction of change" was predicted, based on the work of Shorts (1985) and Houston & Adshead (1993), a one-tailed analysis of significance was used.

To test for this, Tucker's congruence coefficients were calculated as a dimensional measure of similarity between repertory grids obtained from participants in the treatment group pre- and post- treatment, and from participants in the control group at the same time points. Results of these calculations are presented in Table 5. A coefficient of .70 or below was taken to represent change.

**Table 5** Tucker's congruence coefficients indicating dimensional similarity of repertory grid data obtained across two occasions from participants in the treatment and control groups

| Participant | Constructs | | Elements | |
|---|---|---|---|---|
| | Dimension 1 | Dimension 2 | Dimension 1 | Dimension 2 |
| Treatment Group | | | | |
| 1 | .981 | .734 | .928 | .693* |
| 2 | .925 | .215* | .812 | .538* |
| 3 | .431* | .412* | .486* | .538* |
| 4 | .971 | .497* | .949 | .240* |
| 5 | .830 | .552* | .699* | .446* |
| 6 | .612* | .234* | - | - |
| 7 | .932 | .089* | .852 | .429* |
| 8 | .892 | .736 | .909 | .842 |
| Control Group | | | | |
| 9 | .903 | .567* | .742 | .469* |
| 10 | .977 | .537* | .975 | .627* |
| 11 | .958 | .393* | .816 | .570* |
| 12 | .754 | .302* | .715 | .020* |

*Note.* (1) A coefficient of 0 represents maximal change and a coefficient of 1 equals no change. A cut-off coefficient of .70 or below has been taken to indicate change. Where significant changes have occurred these are indicated by an asterisk
(2) It was not possible to calculate overall normalised Euclidean distance coefficients for Participant 6 with respect to elements as he had different numbers of elements in his pre- and post-treatment repertory grids.

The results indicate that six of the participants in the treatment group and all of the control group showed dimensional change with respect to both constructs and elements loading on to dimension two (i.e. component two extracted from INGRID analysis). However none of the control group and two of the treatment group showed dimensional change with respect to constructs loading on to dimension one (i.e. component one extracted from INGRID analysis).

Normalised Euclidean distance coefficients were also calculated to express the dissimilarity between the first and second occasion constructs, elements, and entire grid solutions. The normalised Euclidean distance coefficients measuring overall dissimilarity

between first occasion constructs and elements for both the treatment and control groups are presented in Table 6. Normalised Euclidean distance coefficients measuring dissimilarity between first and second occasion constructs and elements for each of the participants in the treatment and control groups are presented in Tables 7 and 8 respectively. For normalised Euclidean distance coefficients a cut-off point of .2 was used in determining dissimilarity, where observed coefficients of .2 or above indicate dissimilarity.

These results together show that there are a number of participants in both the treatment and control groups showing change on some constructs and elements. However, given that only the treatment group seemed to change on dimension/component one (which has been argued is the most resistant to change), this may represent a treatment effect. Unfortunately, it is difficult to say how significant some of these specific changes are clinically, given that overall only two participants in each of the groups showed an overall significant dissimilarity between their first and second occasion grids in relation to constructs or elements.

**Table 6** Normalised Euclidean distance coefficients measuring overall dissimilarity between first occasion and second occasion constructs and elements for both the treatment and control groups

| Participant | Constructs | Elements |
|---|---|---|
| Treatment group | | |
| 1 | .094 | .126 |
| 2 | .167 | .150 |
| 3 | .297* | .273* |
| 4 | .167 | .150 |
| 5 | .190 | .215* |
| 6 | .173 | - |
| 7 | .155 | .165 |
| 8 | .167 | .137 |
| Control group | | |
| 9 | .148 | .187 |
| 10 | .167 | .150 |
| 11 | .170 | .220* |
| 12 | .250* | .280* |

*Note.* (1) A coefficient of 1 equals maximal change and a coefficient of 0 equals no change. A cut-off coefficient of .20 and above has been taken to indicate significant change. This is indicated by an asterisk.
(2) It was not possible to calculate a coefficient for participant 7 with respect to elements as his grids contained different numbers of elements across occasions.

**Table 7** Normalised Euclidean Distance coefficients measuring dissimilarity between first and second occasion constructs for both the treatment and control groups

| | Treatment group participants | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Construct | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 1 | .119 | .091 | .155 | .116 | .136 | .220* | .182 | .280* |
| 2 | .092 | .115 | .440* | .041 | .394* | .116 | .045 | .053 |
| 3 | .083 | .222* | .281* | .018 | .131 | .122 | .331* | .102 |
| 4 | .192 | .199 | .380* | .038 | .141 | .249* | .053 | .127 |
| 5 | .198 | .158 | .129 | .026 | .221* | .132 | .140 | .200* |
| 6 | .004 | .060 | .265* | .142 | .219* | .174 | .029 | .107 |
| 7 | .102 | .174 | .370* | .087 | .136 | .090 | .303* | .254* |
| 8 | .121 | .020 | .243* | .090 | .117 | .289* | .156 | .062 |
| 9 | .031 | .177 | .444* | .055 | .162 | .209* | .216* | .221* |
| 10 | .014 | .464* | .200* | .141 | .224* | .189 | .108 | .207* |
| 11 | .049 | .119 | .450* | .231* | .149 | .130 | .248* | .268* |
| 12 | .118 | .204* | .206* | .074 | .247* | .152 | .049 | .128 |

| | Control group participants | | | |
|---|---|---|---|---|
| Construct | 9 | 10 | 11 | 12 |
| 1 | .062 | .065 | .023 | .104 |
| 2 | .150 | .082 | .118 | .212* |
| 3 | .137 | .260* | .324* | .165 |
| 4 | .273* | .094 | .149 | .274* |
| 5 | .087 | .096 | .120 | .157 |
| 6 | .243* | .086 | .052 | .107 |
| 7 | .084 | .108 | .056 | .326* |
| 8 | .079 | .375* | .243* | .293* |
| 9 | .334* | .172 | .051 | .534* |
| 10 | .106 | .045 | .072 | .387* |
| 11 | .109 | .148 | .123 | .235* |
| 12 | .117 | .178 | .202* | .207* |

*Note.* A coefficient of 1 equals maximal change and a coefficient of 0 equals no change. A cut-off coefficient of .20 and above has been taken to indicate significant change. Where significant change has occurred this is indicated by an asterisk.

**Table 8** Normalised Euclidean Distance coefficients measuring dissimilarity between first and second occasion elements for both the treatment and control groups

| | Treatment group participant | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Element | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 1 | .231* | .296* | .198 | .081 | .038 | .420* | .179 | .054 |
| 2 | .044 | .120 | .085 | .141 | .150 | .083 | .187 | .107 |
| 3 | .144 | .049 | .327* | .034 | .258* | .566* | .309* | .074 |
| 4 | .075 | .131 | .284* | .068 | .202* | .146 | .074 | .201* |
| 5 | .141 | .112 | .283* | .120 | .153 | .172 | .158 | .292* |
| 6 | .102 | .033 | .161 | .132 | .324* | .105 | .129 | .080 |
| 7 | .081 | .321* | .300* | .269* | .425* | .126 | .269* | .110 |
| 8 | .223* | .108 | .257* | .107 | .104 | .094 | .037 | .117 |
| 9 | .210* | .491* | .535* | .182 | .191 | .164 | .192 | .273* |
| 10 | .106 | .041 | .228* | .064 | .370* | - | .269* | .236* |
| 11 | .098 | .074 | .361* | .069 | .289* | - | .043 | .052 |
| 12 | .060 | .018 | .258* | .104 | .080 | - | .129 | .042 |

| | Control group participant | | | |
|---|---|---|---|---|
| Element | 9 | 10 | 11 | 12 |
| 1 | .189 | .103 | .085 | .232* |
| 2 | .024 | .226* | .102 | .208* |
| 3 | .083 | .098 | .102 | .379* |
| 4 | .155 | .101 | .115 | .246* |
| 5 | .089 | .064 | .111 | .210* |
| 6 | .138 | .140 | .398* | .242* |
| 7 | .294* | .283* | .352* | .571* |
| 8 | .028 | .154 | .190 | .425* |
| 9 | .400* | .176 | .099 | .292* |
| 10 | .177 | .089 | .217* | .341* |
| 11 | .501* | .199 | .109 | .126 |
| 12 | .166 | .060 | .102 | .082 |

*Note.* (1) A coefficient of 1 equals maximal change and a coefficient of 0 equals no change. A cut-off coefficient of .2 and above has been taken to indicate significant change. Where significant change has occurred this is indicated by an asterisk.
(2) It was not possible to calculate coefficients for participant 7 for elements 10, 11 and 12 as only elements 1-9 were used in both his pre-treatment and post-treatment grids.

## 3.5 Analyses of individual participant's results obtained on pre- and post-treatment self-report psychometric data

In relation to hypothesis 4, it had been predicted that a self-report psychometric measure of anger would consistently fail to show changes in the eight treatment group participants, that were in keeping with therapist assessment of clinical change. To test this, difference scores between pre- and post- treatment STAXI sub-scale scores for each of the participants in the treatment group were calculated and compared with the clinician ratings on the Therapist Assessment of Clinical Change. This was to determine whether clinician impression of change was consistent with change indicated in psychometric assessment results. Pearson's correlation coefficients were calculated for this purpose. Difference scores and clinician ratings of change are shown in Table 9. Calculated Pearson's correlation coefficients, and significance levels are presented in Table 10.

**Table 9** Difference scores between pre- and post-treatment STAXI sub-scale scores obtained for each of the participants in the treatment group along with clinician ratings on the Therapist Assessment of Clinical Change

| | Difference score | | | | | |
|---|---|---|---|---|---|---|
| Participant | S-Ang | T-Ang | AX-In | AX-Out | AX-Con | Clinician Rating |
| 1 | -5 | 0 | -3 | 9 | -4 | 11 |
| 2 | 1 | 4 | -1 | 2 | -2 | 11 |
| 3 | -1 | 1 | 10 | -6 | -1 | 6 |
| 4 | 0 | 1 | 0 | 3 | -4 | 6 |
| 5 | -9 | 9 | 1 | 6 | -2 | 9 |
| 6 | 0 | 6 | 3 | -1 | 5 | 11 |
| 7 | 0 | -9 | -1 | -3 | 5 | 4 |
| 8 | -2 | -6 | -6 | 2 | 7 | 6 |

*Note.* (1) a negative score indicates a reduction in STAXI scores post-treatment relative to pre-treatment.
(2) A lower score on the clinician ratings of change indicates greater improvement and higher scores indicate less improvement.

**Table 10** Pearson's correlation coefficients (Corr. Coef.) obtained from the comparison of clinician ratings on the Therapist Assessment of Clinical Change with difference scores between pre- and post-treatment STAXI sub-scale scores obtained for each participant in the treatment group, plus significance levels obtained (1-tailed)

| | Clinician Ratings | |
|---|---|---|
| | Pearson's Corr. Coef. | Sig. (1-tailed) |
| STAXI Sub-scales: | | |
| S-Ang | -.22 | .297 |
| T-Ang | .71 | .025* |
| AX/In | -.06 | .440 |
| AX/Out | .53 | .091 |
| AX/Con | -.33 | .212 |

*Significant

Against what had been predicted, these analyses revealed a significant positive correlation between clinician ratings and STAXI T-Ang. However no significant correlations between clinician ratings and the other STAXI sub-scales were found.

### 3.6 Correlations between change on repertory grid measures and therapist assessment of clinical change

Experimental hypothesis 5 stated that repertory grid measures would show change in individual participants who have undergone anger management group therapy which were in keeping with therapist assessment of clinical change. To test this hypothesis the clinician ratings of the participants in the treatment group on the Therapist Assessment of Clinical Change were correlated with the normalised Euclidean distance coefficients calculated to express the overall dissimilarity between the first and second occasion constructs and elements, for these individuals. These data are re-presented in Table 11 for ease of

reference. Pearson's correlation coefficients, and significance levels are presented in Table 12, and as can be seen from these, no significant correlations were found.

**Table 11** Clinician ratings of treatment group on the Therapist Assessment of Clinician Change and normalised Euclidean distance coefficients expressing overall dissimilarity between the pre- and post-treatment constructs and elements

| Participant | Clinician Ratings | Normalised Euclidean Distance | |
|---|---|---|---|
| | | Constructs | Elements |
| 1 | 12 | .094 | .126 |
| 2 | 11 | .167 | .150 |
| 3 | 6 | .297 | .273 |
| 4 | 6 | .167 | .150 |
| 5 | 9 | .190 | .215 |
| 6 | 11 | .173 | - |
| 7 | 4 | .155 | .165 |
| 8 | 6 | .167 | .137 |

*Note:* (1) A lower score on the clinician ratings of change indicates greater improvement and a higher score indicates less improvement.
(2) A lower normalised Euclidean distance indicates less change and a higher normalised Euclidean distance coefficient indicates greater change.
(3) It was not possible to calculate overall normalised Euclidean distance coefficients for Participant 6 with respect to elements as he had different numbers of elements in his pre- and post-treatment repertory grids.

**Table 12** Pearson's correlation coefficients obtained from the comparison of clinician ratings on the Therapist Assessment of Clinical Change with normalised Euclidean distance coefficients expressing overall dissimilarity between the pre- and post-treatment constructs and elements

| | Clinician Ratings | |
|---|---|---|
| | Pearson's Corr. Coef. | Sig. (1-tailed) |
| Normalised Euclidean Distance coefficients | | |
| Constructs | -.35 | .198 |
| Elements | -.25 | .295 |

A correlation was calculated between difference scores obtained by the treatment group on STAXI sub-scales and the normalised Euclidean distance coefficients measuring overall dissimilarity between first occasion and second occasion constructs and elements was conducted. The results of this analysis is presented in Table 13, and revealed a significant correlation between normalised Euclidean distance coefficients for constructs and AX/Out and between normalised Euclidean distance coefficients for elements and AX/In. All other correlations were non-significant.

**Table 13.** Pearson's correlation coefficients for correlation between difference scores obtained by the treatment group on STAXI sub-scales and the normalised Euclidean distance coefficients measuring overall dissimilarity between first and second occasion constructs and elements.

| | Normalised Euclidean distance coefficients | | | |
|---|---|---|---|---|
| | Constructs (n = 8) | | Elements (n = 7) | |
| | Pearson's Corr. Coef. | Sig. (1-Tailed) | Pearson's Corr. Coef. | Sig. (1-Tailed) |
| STAXI Sub-scales: | | | | |
| S-Ang | .13 | .378 | -.164 | .362 |
| T-Ang | .18 | .334 | .346 | .224 |
| AX/In | .83 | .005 | .918 | .002* |
| AX/Out | .73 | .021* | .59 | .081 |
| AX/Con | .03 | .474 | -.11 | .408 |

*Significant

### 3.7 Idiographic grid analyses

Further analyses of the repertory grids completed by each participant in the treatment and control groups on two occasions was carried out using INGRID analysis (as described in section 3.1.3 above). The results obtained from these analyses are now presented for each of the participants separately. Plots of the elements in construct space on the first two principal components extracted from INGRID analysis are provided for each of the participant's pairs of grids in

Appendix 11. In all cases the first component is represented by the horizontal axes, while the vertical axes represents the second component. The constructs defining these components are listed on either side of the axes with those constructs loading most heavily on the component higher in the list. For those participants where further components were significant (Participant 3 and Participant 12) these components are not represented on their plots as the computer package used to produce these plots did not allow for this. However they are discussed in the text.

Inter-element Euclidean distances, which were used to determine how close or distant elements were to each other in construct space, are not given in the text which follows, but these can be found in Appendix 12 for each of the participants' pre- and post-treatment grids.

Following a discussion of the findings from repertory grid analyses the therapist's verbal account of his impression of each participant's progress in therapy is reported for participants in the treatment group. It is important to note that the interpretation of repertory grid data was carried out by the author and is subjective. Further, it was done without prior knowledge of either the therapist's ratings on the Therapist Assessment of Clinical Change or his verbal accounts.

### 3.7.1 Treatment group

#### 3.7.1.1 Participant 1

The analysis of Participant 1's repertory grids revealed a significantly high percentage of variance being accounted for by the first principal component (70.51% pre-treatment and 54.68% post-treatment). The literature suggests a high percentage of variance on a single component is indicative of a relatively simple construct system, which is tightly organised,

and where an individual construes events in a uni-dimensional way (see e.g. Houston, 1998; Winter, 1992a for a fuller discussion). Thus Participant 1 would appear to have few alternative options open to him for construing others.

Figures 2 and 3 (Appendix 11) provide a visual representation illustrating the different ways in which Participant 1 construed elements pre- and post-treatment respectively. The two dimensions on which he appears to judge people seem to be related to people being trustworthy, down to earth and tough or pleasant. As can be observed, those constructs which were identified as his main discriminative constructs pre-treatment remained important, ways in which Participant 1 construed others post-treatment.

Inter-element Euclidean distances suggested that pre-treatment Participant 1 identified his 'Self Now' as being most similar to his 'Self when in trouble', 'Self seen by others', 'Self when angry', 'Self when not angry', 'Someone who drinks and takes drugs', a 'Friend who offends' and his 'Ideal Self'. The way in which Participant 1 construes these individuals and dimensions of himself pre-treatment suggests he holds a positive view of them i.e. he reports them as having negative characteristics e.g. 'use folk', would 'offend at any chance', are 'hard', 'intimidating', 'mad', 'violent', and a 'thief', but sees people like this as being 'sound' and 'cool' and people he 'can trust'. It could be tentatively hypothesised that given Participant 1's 'Self Now' and 'Self seen by others' are clearly related others' views in part may influence his own self constructs and/or behaviour. Having such a simple uni-dimensional construct system with few alternatives open to him for re-construing, suggests that it may be difficult for Participant 1 to change as the consequences of doing so may not be welcome i.e. to change would mean that he would have to see himself in a more negative way e.g. as being someone who would 'grass you', and who is a 'dafty', 'bam' and a 'sap'. Further, given that he perceived himself and his 'Ideal Self' so similarly pre-treatment may be an indication that he believes that he does not need to change.

Post-treatment Participant 1 continued to view himself in largely the same way as pre-treatment, but was beginning to see himself as being more pleasant and less intimidating. He continued to see his 'Self Now' as most similar to those he had viewed himself similar to pre-treatment. However, with the exception of 'Self when not angry', there was some increase in the distance between himself and these elements. His 'Self Now' was also slightly more distanced from his 'Ideal Self'. Pre-treatment Participant 1 viewed himself as least similar to his 'Friend who does not offend', 'Someone who makes him angry', and 'A typical member of staff', all of whom had been somewhat isolated from other elements in his grid, and placed at the opposite pole of his constructs from himself. Post-treatment the distance between his 'Self Now' and these elements had decreased. His grid ratings showed that these changes were more attributable to changes in his ratings of himself rather than in how he was rating these other elements. The greatest change being that he was now saying that he was non-intimidating, pleasant, more of a sap, and more friendly than pre-treatment.

Together these findings suggest that Participant 1 may have gained greater self-awareness from being in the group, and may be interpreted as him having made some, albeit, minor, positive change. He appears to be beginning to see himself in a less ideal way, and sees himself as having changed slightly in a socially desirable direction. Interestingly, the therapist's verbal account of his impressions of Participant 1's progress in therapy would seem to be somewhat consistent with these findings. He stated:

> "Participant 1 began the group reporting high levels of anger. He appeared to benefit from the group by becoming engaged and interacting well. However, it would be my impression that in spite of being able to recall most of the group material he would have changed little in terms of his reaction to provocation. This is because he continues to see himself as justifiably in

opposition to others and therefore remains lacking motivation to use new approaches."

### 3.7.1.2 Participant 2

The first two principal components derived from the analysis of Participant 2's pre-treatment grid were found to account for 69.82 percent of the variance, the first component accounting for 50.42 percent and the second 19.41 percent. These two components similarly accounted for 70.01 percent of the variance post-treatment with the first and second components accounting for 57.15 and 12.86 percent respectively. This suggests that Participant 2 had a somewhat tightly organised and uni-dimensional construct system. A visual representation of how Participant 2 construed elements pre- and post-treatment, and how elements were plotted in construct space, can be found in Figures 4 and 5 respectively (Appendix 11).

As can be seen from these figures, the two dimensions on which he tends to view people seems to relate to being settled and hardworking. Further, many of Participant 2's most discriminative constructs pre-treatment remained important ways in which he construed people post-treatment. However, the constructs 'Can't settle down and stay out of jail vs Can settle down' and 'Trusting vs Don't like them' were no longer important ways in which he judged people. Further, the constructs 'Violent vs Cool and calm' and 'Has a lot of friends-Doesn't have a lot of friends' became more important to him post-treatment.

Pre-treatment Participant 2 identified himself as being most similar to the elements 'Self as seen by others', 'Self when not angry' and 'Someone who drinks and takes drugs'. These elements were all seen as being similar to his 'Ideal Self', and were viewed very positively. For example they were mainly seen as being people who 'could settle down',

were 'not annoying', were 'helpful', had a 'good attitude', were 'quiet', could be 'trusted', 'don't get into trouble', and are 'kind and generous'.

At this time he tended to distance himself from his 'Self when in trouble' and his 'Self when angry', both of whom were viewed in a similar, and negative way i.e. as being people who 'can't settle down and stay out of jail', 'annoying', 'not very helpful', with a 'bad attitude', who 'shout and scream', who are 'constantly in trouble, don't care about life', and 'wouldn't give you anything'. These were also people whom he did not like. These findings could suggest that for Participant 2 to change would mean him having to become someone who would be negatively construed and, perhaps more importantly, someone who he did not like. Further, the results also suggest that Participant 2 has some insight into his difficulties, specifically, he is aware that when he is angry he is also someone who gets into trouble, and he believes that he has changed from when he was getting in trouble. However, it is also possible that he saw himself pre-treatment as someone who had little change to make.

Post-treatment Participant 2 saw himself as even more similar to his 'Self when not angry' and was closer to his 'Ideal Self'. He continued to view himself in a positive way post-treatment, and as can be seen from his post-treatment plot (Figure 5, Appendix 11) this was much in the same way as pre-treatment. However one construct which emerged as an important way in which he was now construing people was in terms of whether they were 'Violent vs Cool and calm'. He was now recognising that his Self when in trouble' and his 'Self when angry' were in fact people who were violent, perhaps reflecting increased self-awareness.

In summary, given the above findings, it seems that Participant 2 made little change post-treatment relative to pre-treatment. This would appear to be somewhat consistent with the therapist's verbal account of Participant 2's progress: He stated:

> "Participant 2 was very enthusiastic about the group-work and actively participated. However, my impression would be that he had very fixed black and white thinking and found it hard to take on new concepts or skills. Overall I feel he will have changed little in terms of his levels of anger or ability to employ anger control skills."

#### 3.7.1.3 Participant 3

Analysis of Participant 3's grid revealed that the first three components accounted for 76.6 percent of the variance, with the first component accounting for 39.41 percent, the second 22.58 percent, and the third 14.6 percent. Similarly post-treatment these three components accounted for 77.37 percent of the variance with the first, second and third principal components accounting for 33.47, 31.73 and 12.17 percent respectively. Thus suggesting a more multi-dimensional construct system, offering this individual more alternative ways of construing others.

As can be seen from his pre- and post-treatment plots (Figures 6 and 7 respectively, Appendix 11) the first two components appear to suggest he views people as being wound up and angry or manipulative. His third component is more related to being relaxed. Further those constructs which had been identified at pre-treatment as being the most important ways in which he was perceiving others, remained important constructs post-treatment. However, there was change in terms of the components on to which some of them loaded e.g. 'Tensed up-Relaxed' had been loading heavily on component one pre-treatment but was loading

heavily on component three post-treatment and 'Harmless-Dangerous' had moved from component one to component two. Thus suggesting that these constructs had become less important ways of judging people for Participant 3. The construct 'Alcoholic-Teetotaller' post-treatment had moved from component three to one, suggesting that this may now be an more important way for him to construe others.

Pre-treatment Participant 3 identified himself most closely with his 'Self as seen by others', 'Self when not angry', and 'Self when in trouble'. This appears somewhat confusing but one hypothesis is that he perceives himself as getting into trouble at times when he is not overtly angry with others. The finding that he saw himself as least like 'Someone who drinks and takes drugs' was surprising given that he also construed himself as being an alcoholic. Although, this may be explained by the fact that since his detention within the State Hospital he has had no access to alcohol and therefore sees himself as being very different from those who do drink. He also saw himself pre-treatment as being quite distant from his 'Ideal Self' and construed himself as being somewhat 'dangerous', 'tensed up', and someone who was 'a complier' and who 'gets upset'. This may be an indication that he is someone who is emotionally unsettled but very much aware of restraining and controlling the expression of these feelings.

His 'Ideal Self' pre-treatment was most similar to his 'Friend who did not offend' whom he viewed as being 'relaxed', 'happy', 'cool', and people who 'don't get upset'. Post-treatment his view of himself was closer to his 'Ideal Self', although they did still remain quite distant. This may indicate an increase in his self-esteem. His grid ratings suggested that he was rating himself more favourably, although he was also viewing his Ideal Self in a less idealistic way. Further his ratings of himself also revealed that he had begun to see himself as being less dangerous and more relaxed.

It would appear from the above that Participant 3 made a significant degree of improvement. Further, these results are largely consistent with the therapist's verbal report of progress:

> "From being very cautious Participant 3 became more enthusiastic as the group progressed. By the end he seemed to be admitting to more feelings of anger and claimed to be finding the arousal control techniques in particular very useful. Overall I think he benefited a great deal from being in the group and made some gains in relation to anger and anger control."

#### 3.7.1.4 Participant 4

Analysis of Participant 4's pre-treatment grid suggests that his construct system is very tightly organised and uni-dimensional as the first two principal components accounted for 86.08 percent of the variance, with the first and second components accounting for 80.28, and 5.80 percent respectively. Post-treatment the first two principal components again accounted for most of the variance (76.67 percent) with the first accounting for a substantial amount of this (62.74 percent) and the second 13.93 percent.

It can be seen from his plots (Figures 8 and 9, Appendix 11) that both pre- and post-treatment the dimension on which he judged people tended to be related to impulsiveness, and post-treatment boisterousness appeared to be a further dimension on which he judged people. Pre-treatment he tended to see himself as only being dissimilar to his 'Self when angry', 'Someone who drinks and takes drugs', Self when in trouble' and 'Someone who makes him angry'. These elements were all viewed in a negative way being seen as people who have 'no scruples', are 'chaotic', 'non-triers', 'boisterous', 'desperate', 'uptight' and 'worriers'. This was in contrast to his view of himself as being someone who 'has scruples',

has 'got themself together', 'tries to succeed in life', is 'quiet', 'not desperate', 'laidback' and 'rationalises things'. Post-treatment, he continued to make these distinctions between these two groups of elements and still construed those elements dissimilar to him in a similarly negative way. Interestingly, though, he was now beginning to recognise more 'negative' aspects of himself, seeing himself as more 'boisterous' than as being 'quiet' as he had done pre-treatment, and viewed himself as more similar to his 'Self when angry' and 'Someone who drinks and takes drugs' than he had done pre-treatment. It could be argued that Participant 4 began treatment with a view of himself as being someone who had little change to make. He was already seeing the negative dimensions of himself in a negative way, and seeing himself as being different from these. Thus, with such a view, it was likely that he would make few treatment gains. However, he did appear to make some gains, in that he appeared to have either developed an increased self-awareness of how he is, or alternatively was now being more open in his reporting. Again this seems largely consistent with the therapist's verbal account of Participant 4's progress:

> "Participant 4 had already made some progress in terms of controlling his anger prior to starting the group and considered that he had no longer any problems in this area. However, in the course of participating he found that much of the material was extremely relevant to him and became a lot more interested than he had been expecting. He made good progress in terms of gaining greater awareness and learning new skills to apply."

#### 3.7.1.5 Participant 5

Pre-treatment the first two principal components derived from INGRID analysis of Participant 5's repertory grid accounted for 77.01 percent of the variance with the first accounting for 63.66 percent and the second 13.35 percent. Post-treatment the first two principal components still

accounted for a significant proportion of the variance (67.83 percent) with the first accounting for 41.57 percent and the second 26.26 percent. This would suggest that some loosening of his construct system occurred during the course of therapy. His plots (Figures 10 and 11, Appendix 11) show that the dimensions on which he judged people appeared to relate to hostility and admiration. Further, the construct 'Good natured vs Rough and would do you harm' became a less important way to him of judging people post-treatment. Moreover, some constructs emerged as new discriminative constructs e.g. 'Trustworthy vs Not trustworthy', Honest vs Dishonest and a liar'.

Pre-treatment Participant 5 saw himself as being more like people who 'don't set out to hurt people', who are 'good nature', 'nice to be around', 'responsible', 'quiet', 'happy', and 'at peace with themselves', as opposed to people who were 'violent', 'rough and would do you harm', 'annoying', 'irresponsible', 'hooligans', 'rebels' and 'dislike themselves'. Despite this rather positive view of himself, he also saw himself as someone who he has 'disdain for'. This may, however, be understood in the context of his personal circumstances. Participant 5 murdered someone known to him whilst ill, and had recently begun to find it difficult to accept that he could do such a thing. He was also finding it difficult accepting 'mental illness' as being an adequate explanation for his actions.

His "Self when angry' was most closely related to 'Someone who drinks and takes drugs' and were viewed at the opposite poles of the constructs he used to view himself, suggesting the he was being aware of some of the inter-relationships between drinking, taking drugs and being angry. For example, he could be recognising that when he drinks and takes drugs he becomes angry or alternatively, that when he becomes angry he drinks and takes drugs.

Post-treatment Participant 5 continued to see himself as 'somebody who doesn't set out to hurt people', 'good natured', and was 'nice to be around', was 'quiet', and 'happy'. Also, whilst he disliked himself more, he also had more admiration for himself. Further, he had moved closer to his 'Ideal Self'. Analysis of his ratings of his 'Self Now' and 'Ideal Self' pre- and post-treatment suggests that he is more able to recognise both positive and negative aspects of himself and becoming more realistic about his Ideal Self in the sense that he gave this element less extreme ratings. Thus, it could be hypothesised that this change may in part be attributable to an acceptance of different parts of himself and a lesser pre-occupation with being perfect before his situation becomes acceptable.

Thus it would appear that Participant 5 made considerable progress during the course of therapy. This again was largely consistent with the therapist's verbal report of this participant:

> "Participant 5 was quite cautious about participating in the group but once involved took an active part and engaged conceptually at a very high level. My feeling would be that he benefited a lot from taking part in the group, understood all aspects of it, and developed greater insight. However, he will probably make few if any, changes to his immediate behaviour. This is because for personal reasons, he has made an active decision to do things his own way."

#### 3.7.1.6 Participant 6

The first two principal components derived from analysis of Participant 6's repertory grids pre- and post-treatment accounted for 73.99 percent and 78.68 percent of the variance respectively, with the first accounting for 50.77 percent pre-treatment and 52.45 percent

post-treatment, and the second 23.21 percent pre-treatment and 16.23 percent. As can be seen from his plots (Figures 12 and 13, Appendix 11) all of the most discriminative constructs loaded on to the first principal component. Thus suggesting that Participant 6 had developed a uni-dimensional, tightly organised construct system. Pre-treatment the dimension on which he judged people seemed to be related to goodness, whilst post-treatment it was more related to being wound up and sociable. Pre-treatment he tended to see people either as being 'unhuman and monsters', 'anti-social', people who he 'can't trust', who are 'hard to get on with' and who 'don't get on with life as opposed to being 'Godly', people who 'get on well with people', whom he 'can rely on', who are 'easygoing' and who 'get on with life'.

On both occasions there was an obvious "splitting" of elements with most clustering more towards the positive ends of the poles of the constructs he was using to judge them. This was more pronounced post-treatment, although his grid ratings suggested that his views of people had become slightly less extreme. Pre-treatment he tended to isolate both 'A typical member of staff' and his 'Self Now' from the other elements both of whom he saw in a very negative light. His ratings from his repertory grid indicated that the main ways in which these two elements differed was that he saw himself as being very 'easygoing' and someone 'who gets on well with people', and who people 'can rely on'. This was as opposed to 'A typical member of staff' whom he viewed as being someone who is 'hard to get on with', 'anti-social', and someone he 'can't trust'. On the construct 'Unhuman vs Godly' he rated 'A typical member of staff' as being neither.

Post-treatment most of the constructs which were most discriminative pre-treatment remained so post-treatment although one new construct 'Thick vs Clever' emerged as being discriminative. Interestingly, Participant 6 both pre-treatment and post-treatment refused to rate the elements 'Someone who makes me angry' and 'Someone who does not make me

angry'. This was mainly because he had chosen someone whom he referred to as a 'paedophile' to fit the first role and his daughter for the second, whom he alleged had been sexually abused. Consequently he said he found it too distressing to discuss both these people. Of particular interest was that pre-treatment he also refused to rate the element 'Self when angry' stating that he never got angry, but post-treatment did rate this element. During assessment Participant 6 was somewhat suspicious of the repertory grid technique refusing to supply names for some of the elements, and frequently asking why I kept asking him if people were 'Godly' and 'Special' (one of his other elicited constructs was 'Very special vs Unspecial'). Post-treatment he demonstrated no signs of suspiciousness. As can be seen from his plot, the element of 'Self when angry' was the only one which was isolated from all the other elements, and was viewed as someone who got 'uptight', was 'anti-social', 'hard to get on with' and 'thick'. Also the fact that at post-treatment he perceives being angry in these negative terms would suggest that he would wish to avoid being in this state and perhaps explains his reluctance to admit to it pre-treatment. In addition it suggests that the process of having gone through therapy may have increased his awareness of his difficulties or made him happier to share them. Being optimistic one might hope that these changes would indicate better motivation to engage in therapy, but it cannot be discounted that from a situation of mental instability or being more ill he simply became a little more well and therefore less paranoid. The fact that his construct 'Unhuman and a monster vs Godly', which had been one of the most important ways he judged people pre-treatment, was now no longer so gives further weight to this explanation.

To conclude, it would appear that Participant 6 made a good deal of progress, however it is difficult to say whether this was attributable to the therapeutic process or an improvement in his mental health. The therapist's verbal account of his progress would appear to be somewhat consistent with this conclusion:

"Participant 6 is difficult to assess because he says little about his internal world and his mental state sometimes seemed poor. Although he appeared to participate in the group enthusiastically, my impression would be that at the end of the process he had taken in very little and will probably make negligible change in relation to his anger-mediated problems at this time."

#### 3.7.1.7 Participant 7

The first two components extracted from principal component analysis of Participant 7's pre-treatment grid accounted for 78.94 percent of the variance with the first accounting for 69.59 percent and the second 9.39 percent. The percentage of variance accounted for by the first two components post-treatment was comparable at 78.38 percent, as was the percentage accounted for by the first component (67.31 percent). There was however an increase in the percentage accounted for by the second component (25.92 percent), however, his most discriminative constructs continued to load most heavily on only the first component. This suggests that Participant 7's construct system was more tightly organised pre-treatment than post-treatment when some loosening of his construct system would appear to have occurred. Although he still continued to be quite uni-dimensional in his thinking. Participant 7's plots (Figures 14 and 15, Appendix 11) show that the dimension on which he mainly judged people was related to being ignorant and insular.

Pre-treatment Participant 7 saw himself as being most like a 'Friend who offends' and his 'Self as seen by others' both of whom were most like his 'Ideal Self'. These elements were all viewed favourably, being seen as being 'easygoing', 'loving', 'good', 'generous', 'caring', 'fair', 'relaxed' and 'a good laugh'. He saw his 'Self Now' as being distant from his 'Self when angry' and quite dissimilar to his 'Self when in trouble', with these two elements being seen as similar. These elements being judged in a more negative

way i.e. 'ignorant', 'holds back love', 'trouble', 'greedy', 'uncaring', 'unfair', 'uptight and stressed' and 'sad'. This suggests that he saw himself and other friends who offend as having many positive characteristics but considered individuals when angry to be very different and to have many negative characteristics. Anger as opposed to offending per se, seems to be more associated with getting into trouble. This positive view of himself pre-treatment remained relatively similar post-treatment. However, the constructs 'Loving vs Holds back love' and 'Sad vs Good laugh' were now replaced by 'Friendly vs Unfriendly' and 'Fair vs Unfair' both of which he placed himself at the positive poles of.

It is difficult to know quite how to interpret these results without more knowledge of the individual. One explanation, is that this participant is denying that he is a person who gets angry (which he perceives as a bad thing) and he continues to deny that anger has anything to do with him across the course of therapy. However, an alternative explanation, may be that as he already recognises 'Self when angry' as being undesirable and potentially problematic pre-treatment, he is already well motivated for therapy. Depending on which was correct, a therapist would either hope to see change in cognitions, or be happy with no change in his cognitions. Either way they would hope he developed better anger coping skills as a result of therapy. The therapist's verbal account of Participant 7's progress could be seen as being more in line with the latter interpretation. He stated:

> "Participant 7 was quite open about his anger problems and engaged well in the group process. My feeling is that he enjoyed it a great deal and learned a great deal which will have direct effects on his behaviour."

### 3.7.1.8 Participant 8

The analyses of Participant 8's pre-treatment grid showed that the first two principal components, extracted by principal component analysis, accounted for 70.8 percent of the variance with the first accounting for 42.21 percent and the second 28.6 per cent. Post-treatment the first two components accounted for 79.94 percent of the variance with the first accounting for 63.25 percent and the second 16.69 percent. Suggesting that some tightening of his construct system occurred post-treatment. His plots (Figures 16 and 17, Appendix 11) show that the main dimensions on which he judged people seem to relate to being stressed and anti-social or being remorseful.

Participant 8 saw himself as being similar to all dimensions of his self with the exception of his 'Self when in trouble' which was most like his 'Self as seen by others' and 'Self when angry'. This suggests that he has an awareness that there are positive and negative aspects to himself. Further, one could tentatively speculate that other's perceptions of him may be influencing his self-perception and may be impacting on his behaviour i.e. he acts in a way which validates others' perceptions of him.

The more positive aspects of himself were viewed as being more 'relaxed', people who 'achieve things', are 'gentle', 'honest', 'happy', and people who 'respect others', as opposed to being more 'stressed', people who 'waste good time', are 'violent', 'dishonest', 'anxious', and have 'no respect for others'. On the second component he discriminated between people who were 'quiet' and 'remorseful' (like himself) as opposed to 'likes to be heard' and 'doesn't care what they've done' (like 'A typical member of staff').

Post-treatment his primary component (essentially 'relaxed', 'gentle' etc vs 'stressed', 'violent' etc) no longer seemed to be the exact way in which he perceived people

and slightly new constructs emerged. His most important ways of discriminating between people became essentially 'warm', 'kind' and 'hardworking' etc vs 'digging people out', 'cold' and 'not very nice'. His second component stayed essentially the same. Participant 8 also began to see himself as being less like his 'Ideal Self', his 'Self when angry', or 'Someone who takes drink and drugs'. Instead he began to see himself more like his 'Self when not angry' and his 'Self as seen by others', with these aspects of his self being seen in more favourable than negative terms. It would therefore seem that he had perhaps developed greater insight into the inter-relatedness of being angry and getting into trouble and offending.

It is also interesting to note that Participant 8 was someone from whom the repertory grid procedure elicited few constructs. In other words he found it hard to think of many ways in which people might be similar or different to each other. This could in part be explained by his non-literacy which could have made it more difficult for him to provide verbal labels for constructs, or alternatively that he only had a limited range of constructs available to make discriminations. He was also, pre-treatment, suspicious about the author's use of demographic information. Although this was understandable given that there was an ongoing legal case related to alleged inaccuracies in information reported in his medical file. He also would not provide names for the roles 'A typical member of staff' and a 'Friend who offends' which again may be accounted for by this legal case, and accordingly a distrusting attitude towards authority figures. He appeared less guarded post-treatment. He disclosed names for these elements and had no difficulties with the author reporting demographic information. This would be consistent with the degree and types of changes that have already been described with participant 14 on his pre- and post-treatment repertory grids.

To conclude, Participant 8 appears to have made some progress despite his distrusting and suspicious attitude pre-treatment. The therapist's verbal account of him is to some extent in line with this conclusion. He stated:

> "Participant 8 was very cautious guarded and suspicious and had difficulties in the group because of his illiteracy. However, he gradually increased his participation and by the end of the process appeared to have benefited a considerable amount. He appeared to be thinking about situations differently and employed a number of anger control techniques."

### 3.7.2 Control group

#### 3.7.2.1 Participant 9

The first two principal components extracted from Participant 9's grids accounted for similar percentages of the variance on occasions one (73.83 percent) and two (72.99 percent). The first component accounted for 58.41 percent on the first occasion and 62.35 percent on the second, and the second component accounted for 15.41 and 10.64 percent on occasions one and two respectively. Further, his most discriminative constructs loaded most heavily on to component one. These findings together suggest that Participant 9 had a tightly organised and uni-dimensional construct system. His plots (Figure 18 and 19, Appendix 11) show that the dimension on which he tended to view people seems to relate to taking responsibility.

On occasion one he construed himself in a rather positive way, seeing himself as being someone who was quite 'responsible', 'has values', is 'sensible', 'mature', 'intelligent', 'hardworking', 'funny' and 'relaxed'. He saw his 'Self as seen by others', 'Self Now' and 'Ideal Self' all in a similar way. He was most distant from his 'Self when in

trouble' whom he regarded to be like his 'Self when angry'. The 'less desirable' dimensions of his self were viewed more negatively being seen as 'irresponsible', 'immature', 'silly', 'lazy', 'sad' and having 'no regard for others'. His view of himself remained positive on occasion two although the constructs 'responsible vs irresponsible', 'mature vs immature' and 'relaxed vs bad tempered' were no longer important ways of construing people. Instead 'sophisticated vs unsophisticated' emerged as a new discriminative construct on which he saw himself as being sophisticated. The 'splitting' of groups of elements remained largely the same, as did his positive or negative views of them. Although he was viewing himself slightly less like his 'Self as seen by others', which his ratings of these two elements suggested, he was beginning to view his 'Self as seen by others' slightly more negatively. The elements which changed the most across occasions were 'Friend who offends' who became more similarly construed as his 'Self when in trouble'; and 'Someone who drinks and takes drugs' and 'Friend who does not offend' who were both now being construed in a more negative way.

Thus it would appear from the above that Participant 9 changed little across occasions.

#### 3.7.2.2. Participant 10

On occasion one the first two principal components extracted by principal component analysis accounted for 70.28 percent of the variance with the first component accounting for 51.34 percent and the second accounting for 18.94 percent. The first two principal components extracted from Participant 10's grid obtained on occasion two accounted for 63.96 percent of the variance with the first accounting for 41.18 percent and the second 22.78 percent. His plots (Figures 20 and 21, Appendix 11) show that the main dimensions on which he judged people appeared to be related to being irritating and embarrassing or

sociable. Further, there would appear to have been no change in the constructs which emerged as his most discriminative across occasions, although the construct 'Understands you vs Doesn't understand you' emerged as an important way in which he judged people on occasion two.

He saw himself as being most like his 'Ideal Self', 'Self when in trouble' and 'Self as seen by others' and this remained the case on occasion two, although some distancing from his 'Self when in trouble' had occurred. All were viewed more towards the positive ends of the constructs loading on the first component i.e. 'not embarrassing', 'not irritating', 'guides you', 'doesn't argue', 'listens to people', and is 'cheerful', although 'Self when in trouble was slightly closer to the more negative poles. He tended to see himself, on both occasions, as least like 'Someone who makes him angry', 'Friend who offends' and 'Someone who drinks and takes drugs'. In fact the distance between his 'Self Now' and all the other elements changed little across occasions with the exception of 'Friend who does not offend' whom he began to see himself as more similar to on occasion two.

These findings would suggest that Participant 10 has a somewhat idealised view of himself when in trouble and sees that this dimension of his self has not changed. Although the finding that he considers himself to be different from 'Someone who drinks and takes drugs' might suggest that he views this dimension of his self to have changed. However this could be more related to the fact that since his detention in the State Hospital he does not have access to alcohol and illicit drugs and thus no longer views himself as similar to those who do drink and take drugs. Further, one could tentatively speculate that other's perceptions of him may be influencing his self-perception and are possibly impacting on his behaviour i.e. he acts in a way which validates others' perceptions of him.

To conclude, it would appear from the above that Participant 10 made little change across occasions.

### 3.7.2.3 Participant 11

The first two components extracted from Participant 11's grid data on occasions one and two accounted for 78.45, and 78.21 percent of the variance respectively. Most of the variance was accounted for by component one on both occasions (65.52 and 63.72 percent respectively) with 12.93 percent of the variance on occasion one and 14.49 percent of the variance on occasion two being accounted for by component two. This suggests that his construct system is tightly organised and uni-dimensional. Also during the elicitation phase of the repertory grid technique this participant tended to generate few constructs and many were repetitive. This may be indicative of a very restricted range of constructs available to him from which to make discriminations about people.

As can be seen from his plots (Figures 22 and 23, Appendix 11) the dimensions on which he appears to be judging people seem to relate to ignorance and intransigence. All those constructs which derived as his most discriminant constructs were the same on both occasions although the degree to which individual constructs loaded on to the first component changed somewhat across occasions. Participant 11 on occasion one perceived his 'Self Now' as being most similar to many of the more 'positive' elements in his grid i.e. his 'Ideal Self' and 'A typical member of staff', 'Self when not angry', and 'Someone who does not make me angry'. This view of himself changed little across occasions except in that he viewed himself as even closer to all these people. All of these elements were construed in a positive way i.e. 'funny', 'playful', 'trustworthy', 'sound', 'someone I do like' 'brainy', 'sticks up for you', 'talks to you', is 'sensitive', 'feels good' and is 'clever'. He saw himself as most dislike the more 'negative' elements i.e. 'Someone who makes him angry', 'Self when in trouble', 'Friend who offends' and

'Self when angry', and again this view did not change across occasions, except in that he saw himself even less like the latter three elements. His way of construing these individuals suggests he holds a positive view of those elements to which he sees himself as similar, and a negative view of those to which he is distanced. It could be that he sees his 'Self Now' as having changed or possibly that he is denying these less desirable aspects of his self. Alternatively he may have little insight into his difficulties other than that there is a link between him being angry and getting into trouble.

Participant 11's uni-dimensional construct system means that few alternative ways of construing are available for him, suggesting that it may be difficult for him to change, especially as the consequences of doing so would seem less desirable i.e. to change would mean that he would see himself less favourably e.g. as being 'stubborn', 'boring', someone who 'lies', an 'arsehole', 'daft', and more importantly, as someone whom he 'doesn't like'.

It would therefore seem from the above that Participant 11 changed little across occasions.

#### 3.7.2.4 Participant 12

The analysis of Participant 12's occasion one grid data revealed that the first five components accounted for most of the variance (87.66 percent) with the first accounting for 34.2 percent, the second 23.43 percent, the third 12.1 percent, the fourth 11.36 percent and the fifth 6.56 percent. Suggesting a more loosely organised, and multi-dimensional construct system. Most of the components loaded heavily on components one and two, none loaded heavily on component three and one loaded heavily on each of components four and five. Participant 12's plots (Figures 24 and 25, Appendix 11) do not reflect this and only show the first two components (for reasons discussed in section 3.6). However these are discussed in

the text below. It would appear that Participant 12 tended to use dimensions related to independence, self-control, regretfulness and uselessness to judge people on occasion one and being non-communicative on occasion two.

Interestingly, analysis of Participant 12's second occasion plot revealed a more tightly organised, and uni-dimensional construct system, with the first two components now accounting for 78.76 percent of the variance, with the first accounting for 68.02 percent and the second 10.74 percent. Participant 12 is someone with a psychotic illness, and such individuals have been reported in the literature as having more loosely organised construct systems (e.g. Bannister, 1963, 1965). One hypothesis to account for the dramatic change in the organisation of his construct system might be that his construct system became more tightly organised with improvement in his mental health across occasions. Support for this explanation comes from two sources. Firstly, the nursing staff judged Participant 12 to be unstable on the first occasion but judged him to have become more settled on the second occasion. Secondly, the author observed a marked difference in his presentation across occasions. On the first occasion he found it difficult to concentrate and showed pressured speech and 'flight of ideas', whereas on the second occasion, whilst still showing pressured speech, his concentration had improved and there was no evidence of 'flight of ideas'. Further, on the first occasion Participant 12 did not wish to provide names for the role titles presented to him and referred to them as 'Mr A', 'Mr F' etc but on the second occasion referred to these individuals by their full names. This may also be a reflection of his deteriorated mental state on the first occasion.

As can be seen from Participant 12's first occasion plot, his view of himself was positive, seeing himself as being 'independent', 'ethical', 'cheerful', someone who 'can hold down a job', who is 'rational and can put hold on their temper', and has an 'organised state of mind'. In addition to this on the constructs 'Regretful vs Wants to forget' and 'Useless vs Can

do things and hold down a job' (which were the two constructs which loaded heavily on the fourth and fifth principal components respectively) he perceived himself as being someone who 'could do things and hold down a job' and who was 'regretful'. On the second occasion some of the constructs which had previously been discriminative constructs were no longer important ways in which he judged himself and others. However he still continued to perceive himself in a positive manner.

On the first occasion he saw himself most like all the more 'positive' elements and most distant from the 'negative' ones. He also saw his 'Self as seen by others' as being dissimilar to him. These patterns were also evident in his second grid. Further, on the first occasion, he judged his 'Self when angry' to be most like his 'Self when in trouble' and his main way of viewing these elements was as being 'crowd followers', 'bigots' and 'apathetic'. He also saw them as being 'volatile' and as having a 'disorganised state of mind and unable to see reality'. It could be hypothesised that Participant 12 is showing good insight into his difficulties in that he is able to see that the more negative dimensions of his self are in some way related, and that they are less socially desirable and more potentially dangerous. Further, it would seem that he is aware that his being angry and being in trouble are related to his illness. It could, however, also be hypothesised that Participant 12 is reluctant to admit to still being like the more negative dimensions of his self, and thus lacks sufficient insight in this respect.

To conclude, whilst analysis of Participant 12 's grids revealed some consistencies across occasions, it also revealed many marked changes particularly in the way he was organising his construct system. It is likely that these changes are attributable to a change in his mental status.

### 3.8 Participant's comments on the repertory grid technique

On using the repertory grid with participants in the research, their comments would suggest that this technique may be a more client-friendly method of assessment than self-report psychometric assessments. It may overcome some of the difficulties experienced by clinicians using self-report psychometric anger assessments, as highlighted in the introduction to this thesis. For example, when asked what they thought of the assessment their comments included:

"It's alright" or "It's interesting, makes a change". One said that he found it "quite hard but interesting", and it made him realise "the people I hang around with are quite sad". He also commented that "It's hard to get away from how people perceive you. You act in the same way."

Another participant commented that "It [repertory grid] makes a change from the rest of them [questionnaires], it felt like there was an attempt being made to make it interesting.... I can't say I enjoyed it, but it was one of the better ones I've done. It gets you thinking... Makes you use your mind more." He went on to state that usually when completing questionnaires he is "thinking how did I answer last time. Is there a right or wrong answer. On this [repertory grid] you can't do that. There's no time to think how you answered". He also said that with questionnaires "You're always thinking better not say that or they'll Shanghai me". He added that he did not answer questionnaires truthfully, and expressed his opinion that "Lots of people answer questionnaires for certain reasons", and were thinking "What would be the right answer/end result?, would it get them a good report from the psychologist or get them out of here" [State Hospital]. He said that he felt "Split between answering truthfully and lying."

Another participant commented that he found the repertory grid technique to be "pretty good" as "it gets you thinking". He also said that he found it to be better than questionnaires as

it allowed for "more expansion" which gave him the "opportunity to say a bit more, and say how I was feeling".

Repertory grid technique was not well received by all participants however. For example, one felt that it was "boring", and a further said that it was "shite" although qualifying this with 'they're [all assessments] all shite." This latter participant was one of the participants in the control group who refused to complete the repertory grid on the second occasion.

A further participant said that he found the repertory grid technique to be "stupid" specifically when he was asked to rate all the elements on one of his constructs i.e. "Alcoholic vs Teetotaller". He said that this was because irrespective of what dimension of his self he was rating he would still be an alcoholic. Perhaps this is a fair criticism of the author for having included this construct in his grid. From the discussion in the introduction of this thesis the author had highlighted a number of types of constructs which the literature suggests might best be excluded from a grid. This included various types of constructs which are only applicable to a small number of people i.e. with a more limited range of convenience. 'Alcoholic vs Teetotaller' may be one such construct. However, the decision to include constructs was based on the participant identifying them as important to him. It seemed important to include this construct in this participants grid not only because he identified it as being an important way he viewed people, but also because during assessment this construct was repeated on a number of occasions, thus, supporting the idea that this was an important construct to him. It's inclusion seems to have been justified as it emerged as one of his most discriminative constructs.

# 4. DISCUSSION

## 4.1 Introduction

The objective of this research was to use a self-report repertory grid method to assess clinical change in forensic patients attending for anger management group therapy and to compare its use with a psychometric self-report assessment of anger. Personal Construct Theory would predict that aspects of both the structure and content of an individual's construct system will determine the likelihood of their response to therapy and corresponding changes in this structure will parallel clinical change. The underlying assumptions behind this research were that repertory grids might (a) provide useful clinical information, (b) be less susceptible to some of the response bias problems identified in this population when completing psychometric assessments, and (c) changes in construing from pre- to post- therapy might be better associated with therapist impressions of group participants' change than psychometric data.

The repertory grid and psychometric approaches were compared directly in relation to a cohort of forensic patients before and immediately after an anger management group intervention. As is common in research of this nature the amount and complexity of the results mean that it is not possible to comprehensively consider every aspect of the data in a limited report. The research results will first be considered in relation to the experimental hypotheses, then the author will make comment on the use of repertory grids with this client group. This is seen as important because there are so few reports in the literature relating to the use of repertory grids with forensic patients.

## 4.2 Consideration of the experimental hypotheses

Before considering the hypotheses in detail, it should be noted that psychometric data resulting from the STAXI were analysed using a two-tailed test of significance while data from repertory grids were analysed using a one-tailed test. Because it is easier to obtain a level of significance using a one-tailed test there was a potential for this to have unfairly weighted significant findings in relation to repertory grid as opposed to in relation to psychometric assessment. This was done for the important theoretical reasons given in the results section, and the author looked at this closely in relation to how the results might have been affected. It was found that only the effects of state anger would have been strengthened by a one-tailed analysis. However, it is emphasised that the analysis may have underestimated the significance of the change in state anger.

**Hypothesis 1: A self-report psychometric measure of anger will not show significant group mean positive changes in participants who have undergone anger management group therapy.**

**Evidence:** For 19 patients who had taken part in anger management group-work there were no group mean pre- and post-treatment differences on a self-report psychometric assessment of anger. Although a lack of power means conclusions are very limited this provides support for Hypothesis 1.

**Comments:** As previously stated, many anger evaluation studies have principally looked at group mean changes in anger scores and psychometric measures to measure efficacy. However, forensic patients' initial reluctance to report anger or other response bias problems have been reported to cloud results. For these reasons it was predicted that no significant improvements would be found with forensic patients on self-reported anger after therapy.

The analysis was primarily conducted to establish whether there was, or was not, a large and easily identifiable group change on the psychometric measure before commenting on the comparative performance of repertory grids. However, it must be clearly stated here that few other conclusions can be made from this result. This is because the failure to detect significant differences between pre- and post-treatment group psychometric data may be attributable to there being too few participants involved in the study as reported in the power analysis. However, it could be that there was genuinely no change on anger indices. Research with larger samples is necessary before any further conclusions can be made about the utility of psychometric self-report assessments to detect change in this client population. This question may therefore be addressed by the larger study currently being conducted at the State Hospital.

It is also possible that a clear and positive change was simply delayed and would have become apparent later (Edmondson & Conger, 1996). Examining both the psychometric and repertory grid data following group work it should be noted that from other research there is some evidence that individuals can continue to improve. The current study assessed participants over a thirteen week period, and perhaps longer than this is required to pick up on change. Certainly the changes observed by Houston (1998) and Shorts (1985) were over a longer period of time i.e. six months and four years respectively. Thus it would seem necessary for future research to conduct long-term follow up studies in order to determine whether clients continue to improve after treatment.

**Hypothesis 2: A repertory grid measure will show significant observable change in constructs and elements in participants who have undergone anger management group therapy.**

**And**

**Hypothesis 3: A repertory grid measure will not show significant observable change in constructs and elements in participants on a waiting list control for anger management group therapy.**

**Evidence:** Both treatment and control group participants showed some change in individual constructs and elements and two in each group showed a significant overall change. This raises questions about any "treatment effect" but equally there are indications that the treatment group is showing a greater and more frequent level of change in dimension/component one.

**Comments:** Firstly, it should be noted that the therapist's verbal account of the amount of positive improvement likely to be found in many of the anger management group participants was very conservative. This immediately suggests that significant differences in the number of individuals making change in the treatment as opposed to the control group will be harder to find, particularly with such a small number of participants.

Further, conclusions are clouded by the fact that the control group, whilst not receiving anger management therapy did receive weekly sessions from a therapist. This may have led to the observable change seen on their repertory grids. However, Winter (1985) and Koch (1983) have noted in the literature that although repertory grids used in outcome studies have shown a high degree of stability, changes have also occurred in untreated control groups. Future research would perhaps need to ensure a more valid control group to establish whether changes on repertory grids take place in patients who are receiving no psychological input. Also, in a largely mentally ill population it could be that changes in mental health, resulted in some observable changes in repertory grids.

In examining the data, it should be noted that the amount of variance accounted for by the first principal component (component one) in this client group was extremely high and this

may also account for high inflexibility in personal construct organisation. In relation to this, the observation that participants in the treatment as opposed to the control group appeared to be making more change in relation to component one derived from the repertory grid analysis also needs comment.

The percentage of variance accounted for by each of the components extracted on the Principal Components Analysis is a useful piece of information about an individual's construct system. Principal component analysis identifies the individual's major groups of interrelated constructs, and the variances accounted for by these groups, or components, indicate the extent of interrelatedness. This gives a rough guide as to the complexity or simplicity of an individual's construing and the degree of 'tightness' or 'rigidity' of their construing.

This indicates the extent to which the individual discriminates between elements with the constructs concerned. A more cognitively complex system is reflected in a wider spread of variance across the earlier components. The higher the percentage of variance accounted for by the first component, the more tightly organised and uni-dimensional the person's construct system appears to be. Bannister (1960) has developed a measure of the tightness of organisation in an individual's construct system, which he called the Intensity Score.

The relationship between construing and subsequent group therapy outcome has been examined in a few grid studies. These have shown, for example, that a tightly organised construct system (Orford, 1974; Morris, 1977; Winter, 1983), or tightening of the system over the course of therapy (Bailey & Sims, 1991) is predictive of poor response to group psychotherapy, perhaps because the group is likely to invalidate its members' constructs to some extent, and because a tightly organised system may be so brittle as to be

vulnerable to structural breakdown following invalidation of any of its constituent constructs (Lawlor and Cochran, 1981). This may lead the person who construes tightly to be particularly threatened by, and therefore resistant to, group psychotherapy. A symptom-focused treatment may be less threatening for such an individual, which may explain findings indicating that the relationship between tight construing and treatment outcome in behaviour therapy is the converse of that in group-analytic therapy (e.g. Winter, 1983; McKain, Glass, Arnkoff, Sydnor-Greenberg & Shea, 1988).

Landfield (1971) suggests that polarization on construct ratings is also important. He considers that both high and low polarisation indicate problems of adjustment, with the former being associated with extreme anxiety and personality disorder and the latter with withdrawal and depersonalisation. Many offenders tend to show more use of the extremes than the midpoints, which often reflects a uni-dimensional view of the world in terms like "Good vs Bad".

**Hypothesis 4: A self-report psychometric measure of anger will not consistently show changes which are in keeping with therapist assessment of clinical change in participants who have undergone anger management group therapy.**

**Evidence:** Although there were no significant correlations between Therapist Assessment of Clinical Change and the difference pre- and post-treatment scores on STAXI sub-scales other than the Trait Anger sub-scale, this latter finding goes against the theoretical prediction made in Hypothesis 4. Consequently Hypothesis 4 is not supported.

**Comments:** The Hypothesis 4 prediction was made because the literature suggested that many patients would be unlikely to accurately admit to anger pre-treatment on psychometrics because of contextual factors particularly associated with compulsory detention. However, although

there was no significant change in STAXI scores between pre- and post-treatment on t-test, there was a significant correlation between the therapist's rating of improvement and trait anger as measured on the STAXI. This is interesting because although the low number of participants prevents firm conclusions, it is suggestive that clinician's estimates of positive change were linked in some way to the participant's assessment of their own anger. This finding does not support Hypothesis 4 and suggests that counter to expectation, enough of the participants were reporting this aspect of anger in a meaningful way. This may have the confounding influence of those who were not i.e. an effect remained because it was strong enough to overcome any interference.

**Hypothesis 5: A repertory grid measure will show changes which are in keeping with therapist assessment of clinical change in participants who have undergone anger management group therapy.**

**Evidence:** No significant correlations were found between any change on repertory grid assessment in the treatment group participants and therapist ratings of change. Looking at the raw data some good matches were found, but overall no clear pattern emerged. However, a significant correlation was found between change by treatment group participants on repertory grid assessment and the Anger In and Anger Out sub-scales of those participants on self-report psychometric STAXI assessment. These results suggest that the repertory grid measure is in fact more associated with some aspects of patient self-report than with clinician ratings of anger.

**Comments:** Given that these results initially appear to be so contradictory to what was predicted by the author, they require some close inspection. In retrospect the author was perhaps too optimistic in predicting that change on repertory grids would be a variable so closely linked with the clinician's impression of change as a result of therapy. With such a small sample of participants, 'change in a participant's way of construing' and 'clinical improvement' would

need to be extremely closely linked or virtually synonymous for a significant effect to be found. There are several reasons why this might not have been the case.

Firstly, as already indicated, it is possible that the same self-report and bias problems that affect self-report psychometric assessments also had a confounding effect on the validity of the repertory grids. Although the 'correct' answer might be more difficult to work out on a repertory grid, participants trying to say the 'right thing' might have compromised its accuracy. From participants' comments it would appear that they saw repertory grids as user friendly. Some reported that it was more interesting than completing psychometric questionnaires, however these participants may have been simply trying to please the author. Equally some participants did make negative comments.

A more fundamental influence effecting the results however, would seem to be the fact that the therapist was using a different or a wider set of criteria to judge clinical improvement which may not have necessitated a change in participant construing.

It should be noted that during the largely psycho-educational group process spanning twelve sessions, the therapist had little opportunity to investigate the detailed intrapsychic changes that might have been taking place within the participants. Greater changes in construing might have been achieved if the participants had been undergoing more in-depth therapy over a longer period of time. It would have been interesting to have asked the therapist to complete a repertory grid for each client in the treatment group as he imagined the client would complete it, as has been done by Norris (1977). However, the therapist's lack of detailed knowledge about the participants' construing at the end point of therapy suggests that such individualised grid predictions would have had little more convergence. The clinician made his ratings of change without knowledge of the psychometric or repertory grid data and so must have been basing his impressions on behavioural observations such as engagement in the group

or increased ability to use self-control skills. For some participants it may be that such changes are not always associated with a degree of change in construing which has fundamental implications for the hypothesis. This might be best indicated by giving two theoretical examples. Individual 'A' may have negative cognitions or construe themselves and others in a way which has a fundamental relationship to their anger problem, and change in this area may therefore be a prerequisite for clinical change. For this individual their constructs would need to change to allow clinical improvement and the experimental hypothesis would be upheld. However, individual 'B' may already have clinically desirable cognitions and ways of construing (e.g. recognising that he has a problem and seeing the results of therapy as desirable) that will already allow change to take place. These constructs would hopefully stay the same over the course of therapy for individual B, and it is possible that other constructs would not be affected as a result of therapy. However, the clinician would still observe and rate clinical improvement. Thus clinician ratings of clinical improvement will not always be in accordance with level of change in repertory grids. The clinician is using a wider perspective.

The theoretical assumptions underlying the current research may therefore be correct for a sub-set of participants for whom change in construing is important before they can make clinical improvement. Future research would need to be able to firstly identify such potential individuals on the basis of careful analysis of their personal constructs before then examining their response to therapy.

## 4.3 Practical and methodological considerations in the use of repertory grids with forensic patients

A difficulty for those interested in utilising repertory grids to evaluate clients is that statistical packages for the analysis of grids are difficult to obtain, and the author found some to be conceptually flawed. Furthermore, another disadvantage of using repertory grids is that a

clinician or researcher can feel quite overwhelmed by the volume of data produced from statistical analyses. However, as Houston (1998) points out valuable information can be derived purely from the construct elicitation phase of the procedure. From this the clinician may still gain important insights into the content of their client's construct system.

Kelly (1955) advocated and devised a non-parametric procedure for grid analysis and which could be performed by hand. The non-parametric method meets criticisms that repertory grids of all types have increasingly come to be analysed by over-sophisticated techniques (Fransella & Bannister, 1977) involving a positivistic or hard science approach, as opposed to what Kelly probably envisaged as a softer, more humanistic framework (Phillips, 1989). Phillips suggests that psychologists need to ensure appropriate use of the repertory grid technique and statistical methods associated with it.

Although repertory grid technique can produce valuable information for the clinician it does have disadvantages. One of the main disadvantages is that it is a time consuming venture. To use this technique regularly as part of a battery of assessments would perhaps prove too much even for the most motivated of clients. However, the forensic patients in this research appeared to engage well in this procedure, and from their comments, seemed to find it an interesting and a positive experience. Smaller grids have been suggested for patients with poorer concentration, however, smaller grids may fail to capture a representative picture of the person. Even when using larger grids the rules of statistics remain very important when interpreting grid results. For example, where all correlations in a rank grid with eight elements are no higher than .4, no meaningful interpretation of construct relationships should be made. It is suggested that although such findings can be of psychological interest, one can only make some general statement about the structure e.g. that the person seems confused about life. An important area for future research is to

identify more clearly the levels of statistical significance which would represent significant psychological significance.

One of the difficulties of exploring construct systems using repertory grids is that we are forced to focus heavily on verbalised and easily accessible constructs. However, we should never assume that a construct is the same as its verbal label. A construct is a discrimination not a verbal label. Further, Kelly (1955/1991) recognised that some constructs are pre-verbal or non-verbal and thus difficult to access by these methods. Further such methods might be of less usefulness when used with individuals who are inarticulate. It should be noted that in using repertory grids we are also singling out sets of constructs from what is a very complex network. Our focus is on a construct sub-system which is inter-related to many other sub-systems. The value and meaning of these constructs can only be ultimately assessed in terms of their location within this entire network.

A particular methodological issue which should be considered in relation to the present study is that the same elements and constructs were used pre- and post-treatment to assess change. Without eliciting constructs both before and after treatment, it is not possible to assess whether an individual has formulated new constructs, which is considered a reflection of a more fundamental change by some authors. It may therefore have been better to have re-elicited constructs to see whether changes in the content of participants' construct systems changed. However, this procedure takes more time and some of the participants were less co-operative on the second occasion. Therefore to repeat the complete elicitation procedure may have been met with reluctance to complete the task.

## 4.4 Summary and Conclusions

To conclude, it was possible to employ the use of repertory grid technique with forensic patients participating in anger management group work and this exercise provided a lot of useful clinical data. In conducting this exercise it was particularly noteworthy how uni-dimensional the construct systems of these forensic patients were which may have clinical implications. Superficial examination of participant responding suggests that repertory grids were valid but they still may not have overcome some of the difficulties associated with conscious or sub-conscious 'impression management' by patients when completing psychometric questionnaires. This requires considerable further research.

Change on repertory grids was not clearly correlated with clinician ratings of improvement which means they do not provide a self-report indicator which 'magically' parallels clinicians' impressions of change as was hoped. It seems likely that this is because therapists are using other indices of 'positive change' in their evaluations which may not be dependent on the participant modifying their construct systems. Change in construing on repertory grids may only be an important aspect of overall clinical change for some individuals. Larger carefully designed research studies may lead to more significant effect sizes showing that repertory grid changes will be a significant corollary of clinical improvement in at least some sub-groups of anger patients. However, because the meaning of change on repertory grids remains elusive, it may be that interpretation of change is only understandable at an individual level. For example, a patient moving further away from 'Self when angry' could be judged to have improved as they perceive themself as having a less angry identity. However, a patient moving towards 'Self when angry' could also be judged as having improved if it was felt that they had been a person who had previously lacked insight into their problem. Therefore, knowing the individual participant well seems the key to making valid interpretation of their grid and size and type of movement on personal constructs may only have clear meaning at this

individual level. Certainly use of the repertory grid assessment seemed useful in providing detailed and meaningful data when the results of repertory grids were compared with the comments made by the therapist about patients completing group work. Observations from the clinician and from the repertory grids seemed to make sense in relation to each other and were mutually supportive and consistent.

Finally, it should be noted that, like psychometric assessment, repertory grid technique has both advantages and disadvantages and much research remains to be done in this area to establish what exactly repertory grids can contribute more fully to the area of anger assessment and evaluation. Given the current difficulties involved in knowing what change on a repertory grid actually means and therefore the reliance on skilful individual 'interpretation', it would seem that repertory grids are currently at their most useful in keeping with Kelly's original intention, as an idiographic tool.

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# APPENDIX 1

## State-Trait Anger Expression Inventory (STAXI)

# Self-Rating Questionnaire

STAXI Item Booklet (Form HS)

Name _____ Sex _____ Age _____ Date _____

Education _____ Occupation _____ Marital Status _____

## Instructions

In addition to this Item Booklet you should have a STAXI Rating Sheet. Before beginning, enter your name, sex, age, the date, your education and occupation, and your marital status in the spaces provided on this booklet and at the top of the Rating Sheet.

This booklet is divided into three Parts. Each Part contains a number of statements that people use to describe their feelings and behavior. Please note that each Part has *different* directions. Carefully read the directions for each Part before recording your responses on the Rating Sheet.

There are no right or wrong answers. In responding to each statement, give the answer that describes you best. DO NOT ERASE! If you need to change your answer, make an "X" through the incorrect response and then fill in the correct one.

*Examples*

1. ① ✕ ● ④
2. ① ● ③ ④

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## Part 1 Directions

A number of statements that people use to describe themselves are given below. Read each statement and then fill in the circle with the number which indicates how you feel *right now*. Remember that there are no right or wrong answers. Do not spend too much time on any one statement, but give the answer which seems to *best* describe your *present feelings*.

| | |
|---|---|
| Fill in ① for *Not at all* | Fill in ③ for *Moderately so* |
| Fill in ② for *Somewhat* | Fill in ④ for *Very much so* |

## How I Feel Right Now

1. I am furious.
2. I feel irritated.
3. I feel angry.
4. I feel like yelling at somebody.
5. I feel like breaking things.
6. I am mad.
7. I feel like banging on the table.
8. I feel like hitting someone.
9. I am burned up.
10. I feel like swearing.

---

## Part 2 Directions

A number of statements that people use to describe themselves are given below. Read each statement and then fill in the circle with the number which indicates how you *generally* feel. Remember that there are no right or wrong answers. Do not spend too much time on any one statement, but give the answer which seems to *best* describe how you *generally* feel.

| | |
|---|---|
| Fill in ① for *Almost never* | Fill in ③ for *Often* |
| Fill in ② for *Sometimes* | Fill in ④ for *Almost always* |

## How I Generally Feel

11. I am quick tempered.
12. I have a fiery temper.
13. I am a hotheaded person.
14. I get angry when I'm slowed down by others' mistakes.
15. I feel annoyed when I am not given recognition for doing good work.
16. I fly off the handle.
17. When I get mad, I say nasty things.
18. It makes me furious when I am criticized in front of others.
19. When I get frustrated, I feel like hitting someone.
20. I feel infuriated when I do a good job and get a poor evaluation.

---

Continued ▶

## Part 3 Directions

Everyone feels angry or furious from time to time, but people differ in the ways that they react when they are angry. A number of statements are listed below which people use to describe their reactions when they feel *angry* or *furious*. Read each statement and then fill in the circle with the number which indicates how *often* you *generally* react or behave in the manner described when you are feeling angry or furious. Remember that there are no right or wrong answers. Do not spend too much time on any one statement.

| | |
|---|---|
| Fill in ① for *Almost never* | Fill in ③ for *Often* |
| Fill in ② for *Sometimes* | Fill in ④ for *Almost always* |

## When Angry or Furious...

21. I control my temper.
22. I express my anger.
23. I keep things in.
24. I am patient with others.
25. I pout or sulk.
26. I withdraw from people.
27. I make sarcastic remarks to others.
28. I keep my cool.
29. I do things like slam doors.
30. I boil inside, but I don't show it.
31. I control my behavior.
32. I argue with others.
33. I tend to harbor grudges that I don't tell anyone about.
34. I strike out at whatever infuriates me.
35. I can stop myself from losing my temper.
36. I am secretly quite critical of others.
37. I am angrier than I am willing to admit.
38. I calm down faster than most other people.
39. I say nasty things.
40. I try to be tolerant and understanding.
41. I'm irritated a great deal more than people are aware of.
42. I lose my temper.
43. If someone annoys me, I'm apt to tell him or her how I feel.
44. I control my angry feelings.

## APPENDIX 2

## Novaco Anger Scale (NAS)

# NAS

*The statements below describe things that people think, feel, and do. To what extent are they true for you? For each iter indicate whether it is (1) never true, (2) sometimes true, or (3) always true. Use the scale on the right side by puttin a circle around the number (1, 2, or 3) that fits your response to the statement.*

| | | Never True | Sometimes True | Always True |
|---|---|---|---|---|
| 1. | When something is done wrong to me, I am going to get angry | 1 | 2 | 3 |
| 2. | Once something makes me angry, I keep thinking about it | 1 | 2 | 3 |
| 3. | Every week I meet someone I dislike | 1 | 2 | 3 |
| 4. | I know that people are talking about me behind my back | 1 | 2 | 3 |
| 5. | When something makes me angry, I put it out of my mind and think of something else. | 1 | 2 | 3 |
| 6. | Some people would say that I am a hothead | 1 | 2 | 3 |
| 7. | When I get angry, I stay angry for hours | 1 | 2 | 3 |
| 8. | My muscles feel tight and wound-up | 1 | 2 | 3 |
| 9. | I walk around in a bad mood | 1 | 2 | 3 |
| 10. | If I feel myself getting angry, I can calm myself down | 1 | 2 | 3 |
| 11. | My temper is quick and hot | 1 | 2 | 3 |
| 12. | When someone yells at me, I yell back at them | 1 | 2 | 3 |
| 13. | I have had to be rough with people who bothered me | 1 | 2 | 3 |
| 14. | I feel like smashing things | 1 | 2 | 3 |
| 15. | When I am frustrated by a problem, I try to find a solution | 1 | 2 | 3 |
| 16. | I get angry because I have a good reason to be angry | 1 | 2 | 3 |
| 17. | I can't sleep when I have been done wrong | 1 | 2 | 3 |
| 18. | If I don't like someone, it doesn't bother me to hurt their feelings. | 1 | 2 | 3 |
| 19. | People can be trusted to do what they say | 1 | 2 | 3 |
| 20. | I try to see positive things in other people | 1 | 2 | 3 |
| 21. | When I get angry, I get really angry | 1 | 2 | 3 |
| 22. | When I think about something that makes me angry, I get even more angry. | 1 | 2 | 3 |
| 23. | I feel agitated and unable to relax | 1 | 2 | 3 |
| 24. | I get annoyed when someone interrupts me | 1 | 2 | 3 |
| 25. | I am able to stay cool in the face of pressure | 1 | 2 | 3 |
| 26. | If someone bothers me, I react first and think later | 1 | 2 | 3 |
| 27. | If I don't like somebody, I'll tell them off | 1 | 2 | 3 |



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| | | Never True | Sometimes True | Always True |
|---|---|---|---|---|
| 28. | When I get mad, I can easily hit someone | 1 | 2 | 3 |
| 29. | When I get angry, I throw or slam things | 1 | 2 | 3 |
| 30. | When I have a conflict with someone, I speak to the person about the problem. | 1 | 2 | 3 |
| 31. | If I loose my temper with someone, it's because they deserved it | 1 | 2 | 3 |
| 32. | When someone makes me angry, I think about getting even | 1 | 2 | 3 |
| 33. | If someone cheats me, I'd make them feel sorry | 1 | 2 | 3 |
| 34. | People act like they are being honest when they really have something to hide. | 1 | 2 | 3 |
| 35. | If someone says something nasty, I can swallow my pride and let it go. | 1 | 2 | 3 |
| 36. | When I get angry, I feel like smashing things | 1 | 2 | 3 |
| 37. | Some people get angry and get over it, but for me it takes a long time. | 1 | 2 | 3 |
| 38. | I have trouble sleeping or falling asleep | 1 | 2 | 3 |
| 39. | A lot of little things bug me | 1 | 2 | 3 |
| 40. | When I get agitated, I can relax by taking deep breaths | 1 | 2 | 3 |
| 41. | I have a fiery temper that arises in an instant | 1 | 2 | 3 |
| 42. | Some people need to be told to "get lost" | 1 | 2 | 3 |
| 43. | If someone hits me first, I hit them back | 1 | 2 | 3 |
| 44. | When I get angry at someone, I take it out on whomever is around. | 1 | 2 | 3 |
| 45. | If I disagree with someone, I try to say something constructive | 1 | 2 | 3 |
| 46. | The more someone bothers me, the more I'll get angry | 1 | 2 | 3 |
| 47. | I feel like I am getting a raw deal out of life | 1 | 2 | 3 |
| 48. | When I don't like somebody, there's no point in being nice to them. | 1 | 2 | 3 |
| 49. | When someone does something nice for me, I wonder about the hidden reason. | 1 | 2 | 3 |
| 50. | If someone is bothering me, I try to understand why | 1 | 2 | 3 |
| 51. | It makes my blood boil to have someone make fun of me | 1 | 2 | 3 |
| 52. | When I get mad at someone, I give them the silent treatment | 1 | 2 | 3 |
| 53. | My head aches when people annoy me | 1 | 2 | 3 |
| 54. | It bothers me when someone does things the wrong way | 1 | 2 | 3 |
| 55. | I can get rid of tension by imagining something calm and relaxing | 1 | 2 | 3 |
| 56. | When I get angry, I fly off the handle before I know it | 1 | 2 | 3 |
| 57. | When I start to argue with someone, I don't stop until they do | 1 | 2 | 3 |
| 58. | Some people need to get knocked around | 1 | 2 | 3 |
| 59. | If someone makes me angry, I'll tell other people about them | 1 | 2 | 3 |
| 60. | I can walk away from an argument | 1 | 2 | 3 |

## APPENDIX 3

### Ward Anger Rating Scale Part B

# WARD ANGER RATING SCALE

**PATIENT'S NAME**..... **WARD**.....

**RATER'S NAME**..... **DATE**.....

**DIRECTIONS: Please rate the patient during the past week for each of the items below:**

**Part A;**

**During the past week, has the patient:**

| | | | |
|---|---|---|---|
| **Expressed suspicion of others** | | **YES** | **NO** |
| **Blamed someone else for his/her difficulties** | | **YES** | **NO** |
| **Acted impulsively, without self restraint** | | **YES** | **NO** |
| **Had a temper tantrum** | | **YES** | **NO** |
| **Shouted or yelled** | | **YES** | **NO** |
| **Verbally abused someone** | | **YES** | **NO** |
| **Verbally threatened to attack someone** | **Staff** | **YES** | **NO** |
| | **Patient** | **YES** | **NO** |
| **Physically attacked someone** | **Staff** | **YES** | **NO** |
| | **Patient** | **YES** | **NO** |
| **Slammed, threw or deliberately broke something** | | **YES** | **NO** |
| **Talked of suicide** | | **YES** | **NO** |
| **Attempted suicide** | | **YES** | **NO** |
| **Talked of injuring self** | | **YES** | **NO** |
| **Attempted to injure self** | | **YES** | **NO** |
| **Expressed delusional beliefs** | | **YES** | **NO** |
| **Expressed command hallucinations to do harm** | **To self** | **YES** | **NO** |
| | **To others** | **YES** | **NO** |

**Part B:**

**During the past week, to what extent was the patient:**

| | **Not at All** | **Very little** | **Some times** | **Fairly often** | **Very often** |
|---|---|---|---|---|---|
| **Angry or annoyed** | **0** | **1** | **2** | **3** | **4** |
| **Irritable or grouchy** | **0** | **1** | **2** | **3** | **4** |
| **Resistant to suggestions or requests** | **0** | **1** | **2** | **3** | **4** |
| **Impatient or frustrated** | **0** | **1** | **2** | **3** | **4** |
| **Tense or uptight** | **0** | **1** | **2** | **3** | **4** |
| **Agitated or restless** | **0** | **1** | **2** | **3** | **4** |
| **Bitter or resentful** | **0** | **1** | **2** | **3** | **4** |

## APPENDIX 4

## Therapist Assessment of Clinical Change

## THERAPIST ASSESSMENT OF CLINICAL CHANGE

Please rate the patient on each of the following:

1. To what extent do you think this individual's level of anger will have decreased as a result of undergoing anger management group therapy?

| 1 | 2 | 3 | 4 | ☐ |
|---|---|---|---|---|
| very much | quite a lot | a little | not at all | unable to comment |

2. To what extent do you think this individual has gained anger control skills that they will be able to adopt as a result of being in the anger management group?

| 1 | 2 | 3 | 4 | ☐ |
|---|---|---|---|---|
| very much | quite a lot | a little | not at all | unable to comment |

3. To what extent do you think this individual benefited from the anger management group in terms of making overall clinical progress i.e. progress overall rather than just improvements in anger expression or anger control?

| 1 | 2 | 3 | 4 | ☐ |
|---|---|---|---|---|
| very much | quite a lot | a little | not at all | unable to comment |

## APPENDIX 5

**Letter from Lothian Psychiatry and Clinical Psychology Research Ethics Sub-Committee granting ethical approval**

LOTHIAN health

OUR REF: LREC/2000/7/3
PLEASE QUOTE IN ALL CORRESPONDENCE

Pauline Thomson
Marine View
East Links Brae
Dunbar
East Lothian, EH42 1LT

9 March 2000

Dear Ms Thomson,

**Research Protocol LREC/2000/7/3 – The application of repertory grid technique to assess clinical change in forensic patients undergoing anger management group work.**

Thank you for submitting the amendments or additional information requested for the amendment to the above study. The chairman of the Psychiatry and Clinical Psychology Research Ethics Sub-Committee has now agreed to confirm its approval under delegated authority. This approval encompasses all aspects of the application including the Patient/Subject Information Sheet and other accompanying documentation.

Under the terms of the Scottish Office Home and Health Department Guidelines on Local Research Ethics Committees this decision has been notified to the NHS body under the auspices of which the research is intended to take place. It is that NHS body which has the responsibility of deciding whether or not the research should go ahead taking account of the advice of the Research Ethics Sub-Committee.

A condition of this approval is that you are required to notify the Sub-Committee, in advance, of any significant proposed deviation from the original protocol. Reports to the Sub-Committee are also required once the research is underway if there are any unusual of unexpected results which raise questions about the safety of the research.

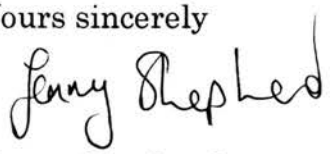
In addition, researchers are required to report on success, or difficulties, in recruiting subjects in order to provide useful feedback on perceptions of the project among patients and volunteers.

LOTHIAN HEALTH BOARD
LOTHIAN RESEARCH ETHICS COMMITTEE
DEACONESS HOUSE
148 PLEASANCE EDINBURGH EH8 9RS
TELEPHONE: 0131 536 9000 DIRECT DIAL: 0131 536 9050 FACSIMILE: 0131 536 9346

The Psychiatry and Clinical Psychology Research Ethics Sub-Committee is fully compliant with the International Committee on Harmonisation/Good Clinical Practice (ICH) Guidelines for the Conduct of Trails Involving the Participation of Human Subjects as they relate to the responsibilities, composition, function, operations and records of an Independent Ethics Committee/Independent Review Board. To this end it undertakes to adhere as far as is consistent with its Constitution, to the relevant clauses of the ICH Harmonised Tripartite Guideline for Good Clinical Practice, adopted by the Commission of the European Union on 17 January 1997. The following documents were included on the computer disk containing the guidelines and application form and are available on request:

- Membership List
- Standing Orders
- Statement of Compliance

Yours sincerely



Jenny Shepherd
Secretary
Psychiatry and Clinical Psychology
Research Ethics Sub Committee

## APPENDIX 6

**Letter from Lothian Primary Care NHS Trust granting management approval**

***Chairman:*** Mr Garth Morrison C.B.E.
***Chief Executive:*** Mr David Pigott

LOTHIAN
PRIMARY CARE
NHS TRUST

**Headquarters**
St Roque Astley Ainslie Hospital
133 Grange Loan Edinburgh EH9 2HL
Tel: 0131 537 9000 Fax: 0131 537 9500
Reception: 0131 537 9525

| | |
|---|---|
| ***Your Ref:*** | 99/064 |
| ***Our Ref:*** | JEW/AMH |
| ***Enquiries to:*** | Jackie Warburton |
| ***Ext. No:*** | 0131 537 9522 |
| ***Date:*** | 10 March 2000 |

Ms Pauline Thomson
Trainee Clinical Psychologist
Dept of Psychiatry
Kennedy Tower
Royal Edinburgh Hospital
Morningside Park

Dear Ms Thomson

**Research Proposal: Change in forensic patients attending for anger management**

A copy of the above research proposal has recently been submitted to me for management approval. I would like to confirm that the Lothian Primary Care NHS Trust approves your proposal subject to the written approval of the Research Ethics Sub-Committee.

A condition of this approval is that you advise me, in advance, of any significant proposed deviation from the original protocol including significant changes to the dates when this research will be active.

Details of your research will be forwarded to the National Research Register in about six months time. Therefore, if for any reason this research does not go ahead I would be grateful if you could advise me.

With best wishes.

Yours sincerely

**D J PIGOTT**
**CHIEF EXECUTIVE**

Simon Fawcett
Jenny Shepherd

## APPENDIX 7

**Letter to Registered Medical Officers seeking permission to approach participants**

**LETTER TO CONSULTANTS RESPONSIBLE FOR THE CARE OF PARTICIPANTS**

DEPARTMENT *of* PSYCHIATRY

The University of Edinburgh
Kennedy Tower
Royal Edinburgh Hospital
Morningside Park
Edinburgh EH10 5HF

Fax 0131 447 6860
Telephone 0131 537 6000

or direct dial 0131 537

Dear Dr

**Assessing change in forensic patients attending for anger management**

I am a final year student on the Doctorate in Clinical Psychology course at Edinburgh University. A requirement of this course is that I carry out a significant piece of research in my final year. In this respect I hope to evaluate the use of Repertory Grid Technique for assessing clinical change in patients undergoing anger management groupwork at The State Hospital. This would involve me (i) reading patients' records to obtain demographic data; (ii) meeting with patients on two separate occasions to complete a repertory grid. It is anticipated that each session will last approximately forty-five minutes. Prior to commencement of the research I would meet with each patient to provide them with information relating to the study and to discuss this, and any concerns they may have with them. Only those patients who give their consent to take part in the research will be invited to participate.

As the following patient(s) who are currently under your care have agreed to undergo anger management groupwork I am writing to seek your permission to approach them:

[Insert name of patient(s) and ward]

I have discussed this with those conducting the anger management groupwork and have obtained permission from the Multidisciplinary State Hospital Anger Steering Group.

If you require any further information or wish to discuss any of the above with me please do not hesitate to contact me via the psychology department at The State Hospital.

Yours sincerely

Pauline Thomson
Trainee Clinical Psychologist

## APPENDIX 8

**Letter from RMOs granting permission to approach participants**

# THE STATE HOSPITALS BOARD FOR SCOTLAND

**Please Note: Safe Haven Fax No: 01555-840112**

JD/BH

22 March 2000

Pauline Thomson
Trainee Clinical Psychologist
Department of Psychiatry
University of Edinburgh
Kennedy Tower
Royal Edinburgh Hospital
Morningside Park
EDINBURGH
EH10 5HF

Dear Ms Thomson

**Re: Assessing change in forensic patients attending for anger management**

Thank you for your letter of 17 March 2000.

The Responsible Medical Officer for the patients noted in your letter are Dr Janice Duncan and Dr Robert Gibb. Both Consultants have given their permission for you to approach these patients with respect to your research. I have noted below the patients you wish to approach and their Responsible Medical Officer.

[redacted] Dr Janice Duncan
[redacted] Dr Robert Gibb
[redacted] Dr Robert Gibb
[redacted] Dr Robert Gibb

Yours sincerely

Barbara Hutchison

Barbara Hutchison
Secretary to Dr Janice Duncan

The State Hospital,
Carstairs, Lanark, ML11 8RP
Tel: 01555 840293 Fax: 01555 840024
E-mail: info@tsh.org.uk
*Part of the National Health Service in Scotland*

THE STATE HOSPITALS BOARD FOR SCOTLAND

**Please Note: Safe Haven Fax No: 01555-840112**

LDGT/CW

20th March, 2000

Ms Pauline Thomson
Trainee Clinical Psychologist
The University of Edinburgh
Kennedy Tower
Royal Edinburgh Hospital
Morningside Park
Edinburgh. EH10 5HF

Dear Pauline,

**Re: Assessing change in forensic patients attending for anger management**

I am happy for you to approach the six named patients regarding the above research project. I am assuming that you have ethical approval, but would be grateful if you would confirm this.

Best wishes with your research. It would be very interesting to see the results of this.

Yours sincerely,

Dr Lindsay DG Thomson
Consultant Forensic Psychiatrist
Senior Lecturer in Forensic Psychiatry

The State Hospital,
Carstairs, Lanark, ML11 8RP
Tel: 01555 840293 Fax: 01555 840024
E-mail: info@tsh.org.uk

## APPENDIX 9

## Participant Information Sheets

**PARTICIPANT INFORMATION SHEET (TREATMENT GROUP)**

DEPARTMENT *of* PSYCHIATRY

The University of Edinburgh
Kennedy Tower
Royal Edinburgh Hospital
Morningside Park
Edinburgh EH10 5HF

Fax 0131 447 6860
Telephone 0131 537 6000

or direct dial 0131 537

## Assessing change in forensic patients attending for anger management

I am training as a clinical psychologist and as part of my course I shall be carrying out the above research at The State Hospital. This research is trying to understand how patients respond to anger management groupwork.

The research would involve (i) me reading your hospital records to gather background information on you; (ii) meeting with you on two occasions. The first time will be just before you begin the anger management group. The second time will be twelve weeks later when the group has finished. On each occasion I will ask you to complete an assessment asking you about how you see yourself in relation to other people. This will take about 45 minutes.

All information you give me will be treated as "strictly confidential". Your name will not appear on any of the information you give me. Instead you will be given a number. This will prevent other people from being able to identify the information as relating to you.

Once I have completed my research the results will be written into a report for my university. Again your name will not be used in this report.

I may also wish to share my results with other psychologists working with patients with similar problems to you by publishing my results or presenting them at conferences. However, if this does happen I will ensure that all your personal details will be treated as "strictly confidential" and your name will not be used.

I will give you some time to think about whether you would be prepared to take part in this research. If you decide that you would be prepared to I will ask you to sign a consent form. If you do not wish to take part in this research this will in no way affect your participation in the anger management groupwork or any other treatment that you receive.

If at any time during my research you change your mind about taking part in it you are free to do so.

Pauline Thomson
Principal Researcher

**PARTICIPANT INFORMATION SHEET (CONTROL GROUP)**

DEPARTMENT *of* PSYCHIATRY

The University of Edinburgh
Kennedy Tower
Royal Edinburgh Hospital
Morningside Park
Edinburgh EH10 5HF

Fax 0131 447 6860
Telephone 0131 537 6000

or direct dial 0131 537

## Assessing change in forensic patients attending for anger management

I am training as a clinical psychologist and as part of my course I shall be carrying out the above research at The State Hospital. This research is trying to understand how patients respond to anger management groupwork.

The research would involve me (i) reading your hospital records to gather background information on you; (ii) meeting with you on two occasions. The first time will be about twelve weeks before you begin the anger management group. The second time will be just before this starts. On each occasion I will ask you to complete an assessment asking you about how you see yourself in relation to other people. This will take about 45 minutes.

All information you give me will be treated as "strictly confidential". Your name will not appear on any of the information you give me. Instead you will be given a number. This will prevent other people from being able to identify the information as relating to you.

Once I have completed my research the results will be written into a report for my university. Again your name will not be used in this report.

I may also wish to share my results with other psychologists working with patients with similar problems to you by publishing my results or presenting them at conferences. However, if this does happen I will ensure that all your personal details will be treated as "strictly confidential" and your name will not be used.

I will give you some time to think about whether you would be prepared to take part in this research. If you decide that you would be prepared to I will ask you to sign a consent form. If you do not wish to take part in this research this will in no way affect your participation in the anger management groupwork or any other treatment that you receive.

If at any time during my research you change your mind about taking part in it you are free to do so.

Pauline Thomson
Principal Researcher

**APPENDIX 10**

**Consent form**

**ASSESSING CHANGE IN FORENSIC PATIENTS ATTENDING FOR ANGER MANAGEMENT**

**CONSENT FORM**

1. I have read/heard the information sheet about the above study and what I will need to do. I have had the opportunity to discuss this with the researcher (Pauline Thomson).

2. I understand that this research is intended to help understand how patients respond to the anger management programme.

3. I have been guaranteed that all my personal details will be treated as "strictly confidential" and that my name will not be used in any reports written by the researcher.

4. I understand that this research is part of the researcher's clinical psychology course and that her general results will be written in a report that will be kept at her university.

5. As the researcher also wishes to improve ways of assessing others with similar problems to me, I understand that she may wish to publish results from her research. However, if this does happen I have been guaranteed that my name will not be used.

6. I understand that I can refuse to take part, or withdraw from the research at any time with no negative result for me.

I have understood what is written above and would like to take part in this research. I know that I can withdraw from this research at any time if I change my mind.

Signed .....
(Participant)

Date .....

Signed .....
(Researcher)

Date .....

## APPENDIX 11

**Two-dimensional plots of elements in construct space**

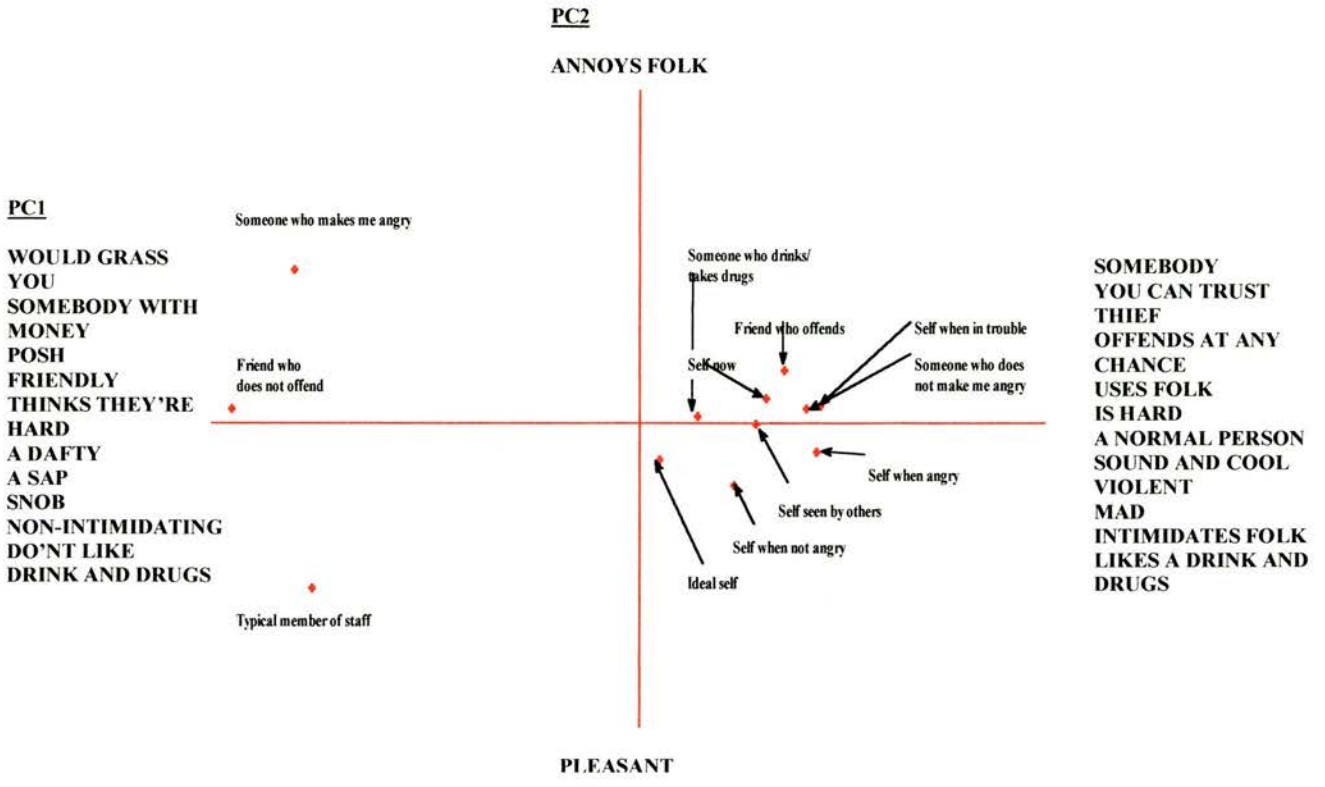



**Figure 2.** Plot of elements in construct space from Participant 1's pre-treatment grid, with constructs loading most heavily on the first two principal components (PC1 and PC2) presented in descending order of importance

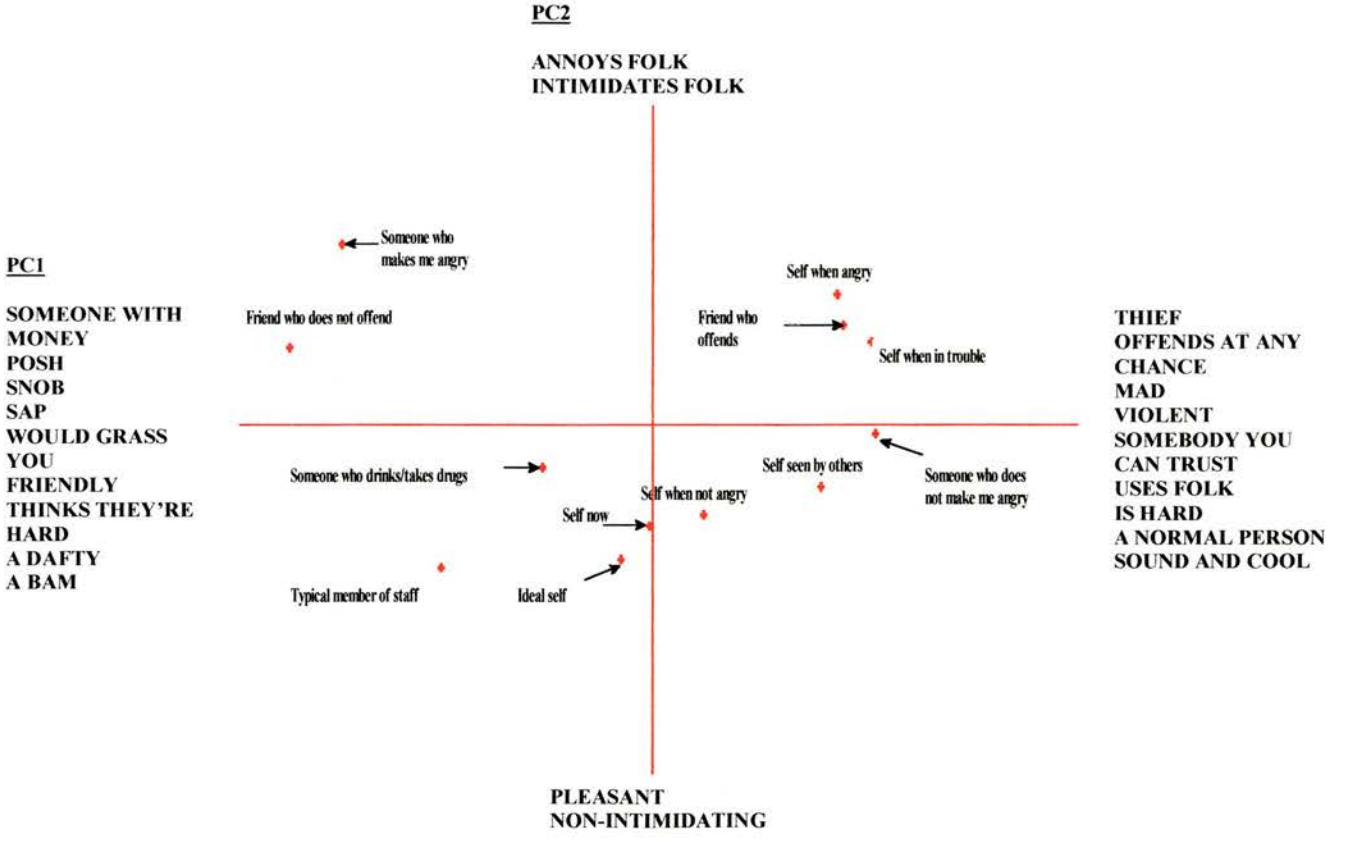



**Figure 3.** Plot of elements in construct space from Participant 1's post-treatment grid, with constructs loading most heavily on the first two principal components (PC1 and PC2) presented in descending order of importance

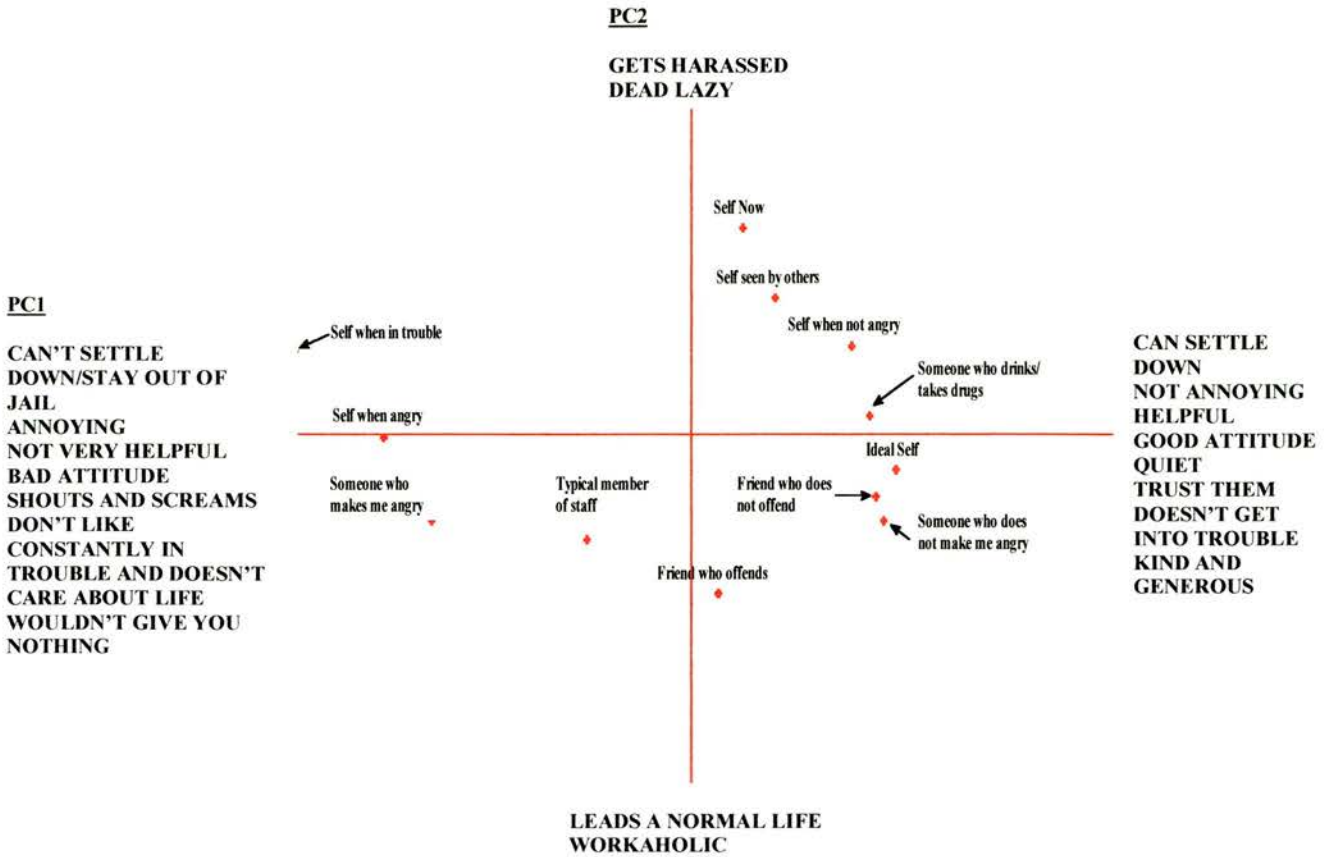



**Figure 4.** Plot of elements in construct space from Participant 2's pre-treatment grid, with constructs loading most heavily on the first two principal components (PC1 and PC2) presented in descending order of importance

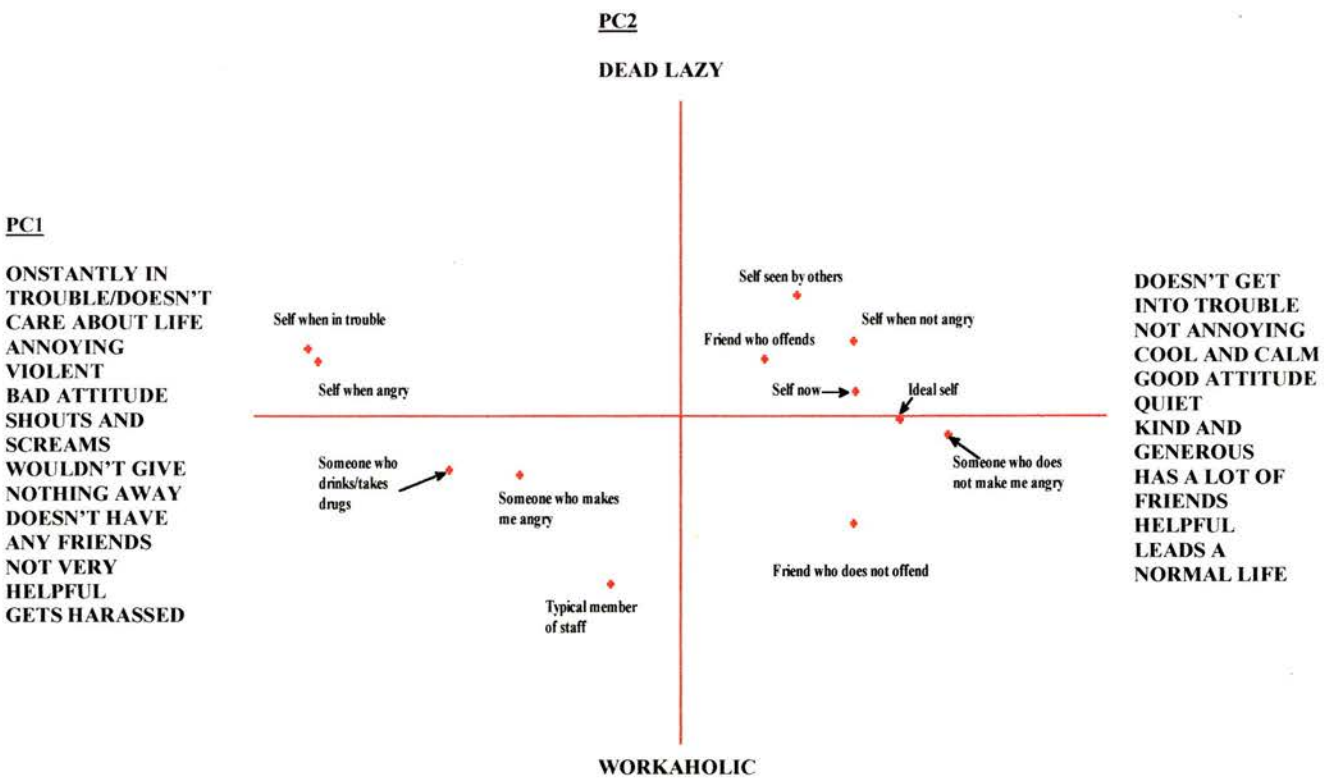



**Figure 5.** Plot of elements in construct space from Participant 2's post-treatment grid, with constructs loading most heavily on the first two principal components (PC1 and PC2) presented in descending order of importance

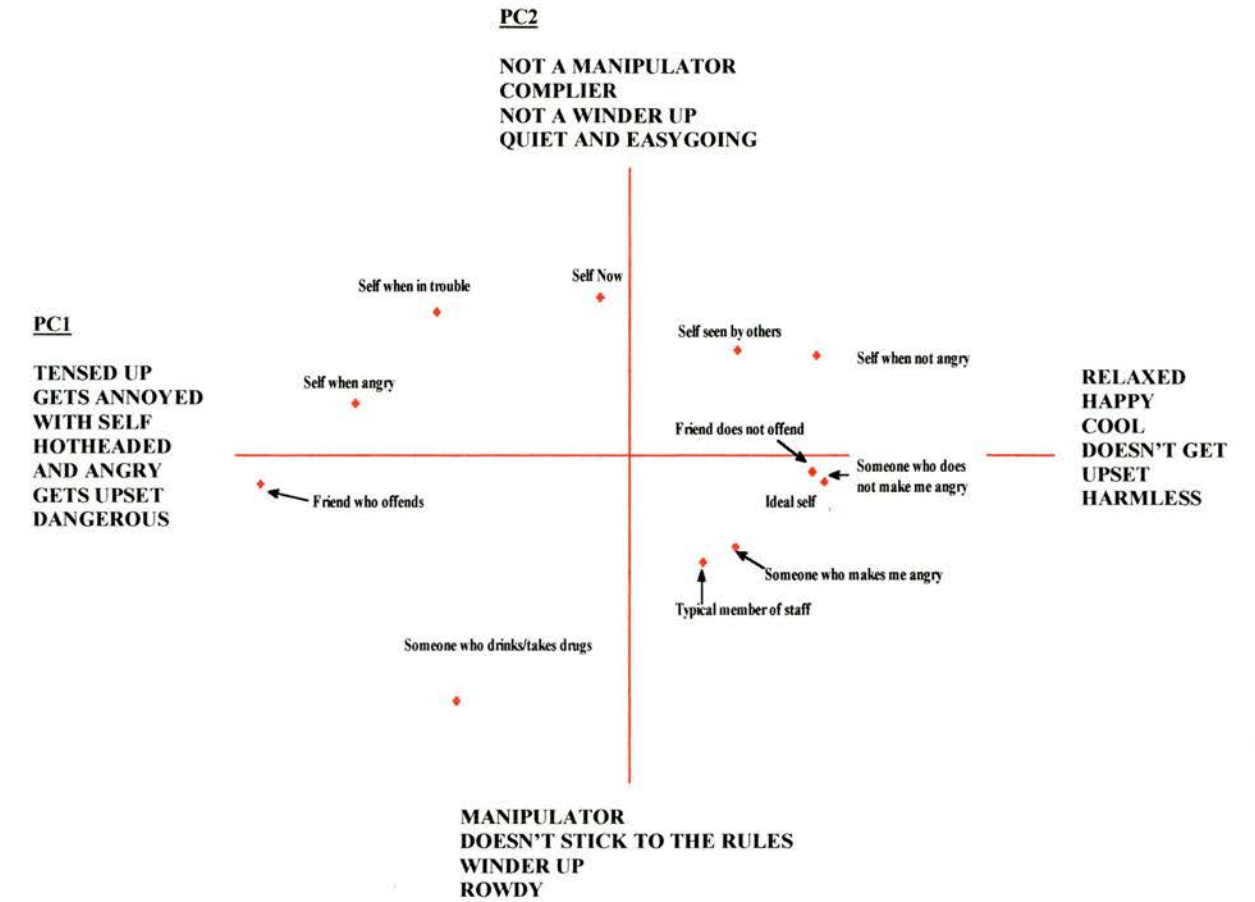



**Figure 6.** Plot of elements in construct space from Participant 3's pre-treatment grid, with constructs loading most heavily on the first three principal components (PC1, PC2 and PC3) presented in descending order of importance

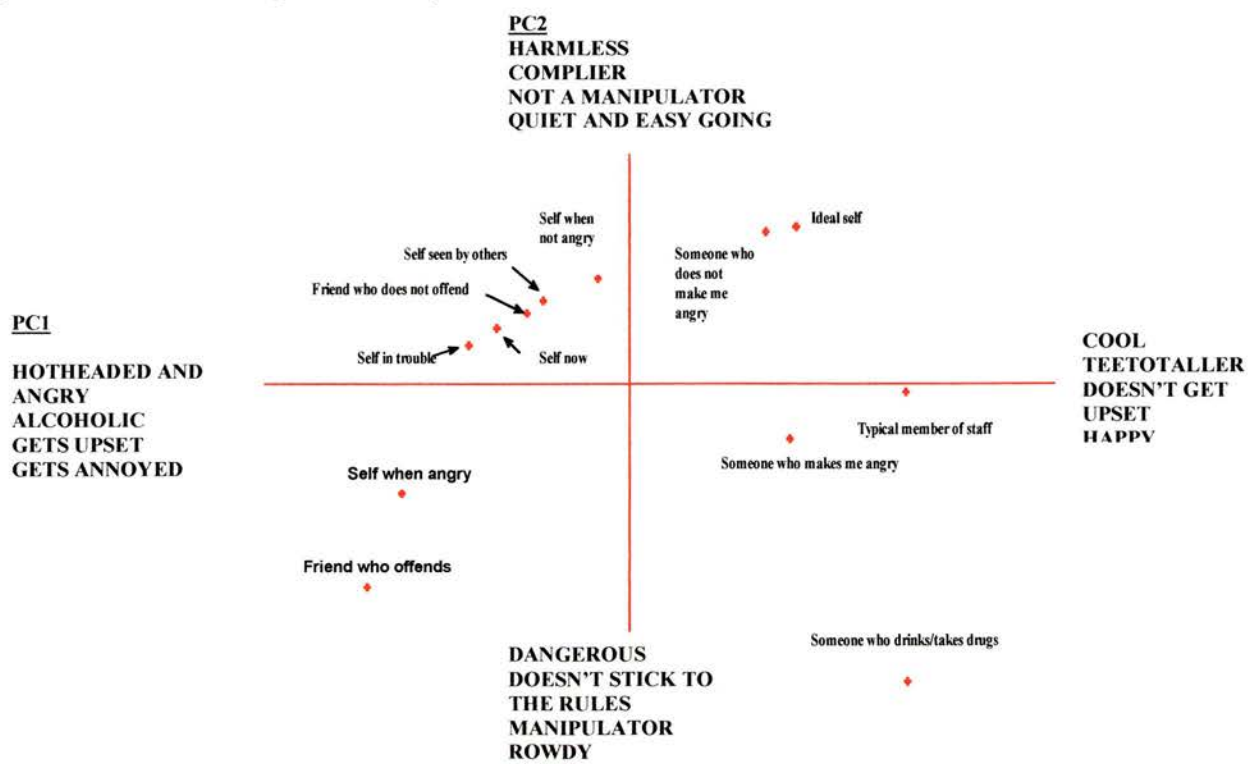



**Figure 7.** Plot of elements in construct space from Participant 3's post-treatment grid, with constructs loading most heavily on the first three principal components (PC1, PC2 and PC3) presented in descending order of importance

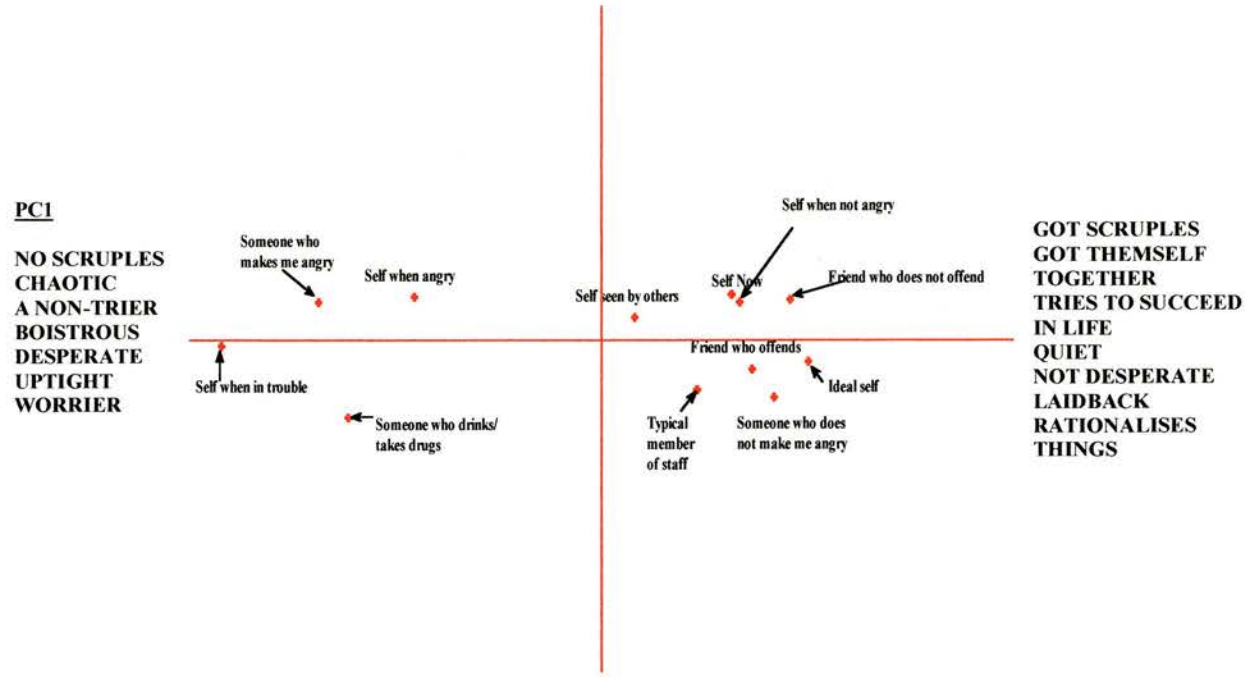



**Figure 8.** Plot of elements in construct space from Participant 4's pre-treatment grid, with constructs loading most heavily on the first two principal components (PC1 and PC2) presented in descending order of importance


**Figure 9.** Plot of elements in construct space from Participant 4's post-treatment grid, with constructs loading most heavily on the first two principal components (PC1 and PC2) presented in descending order of importance

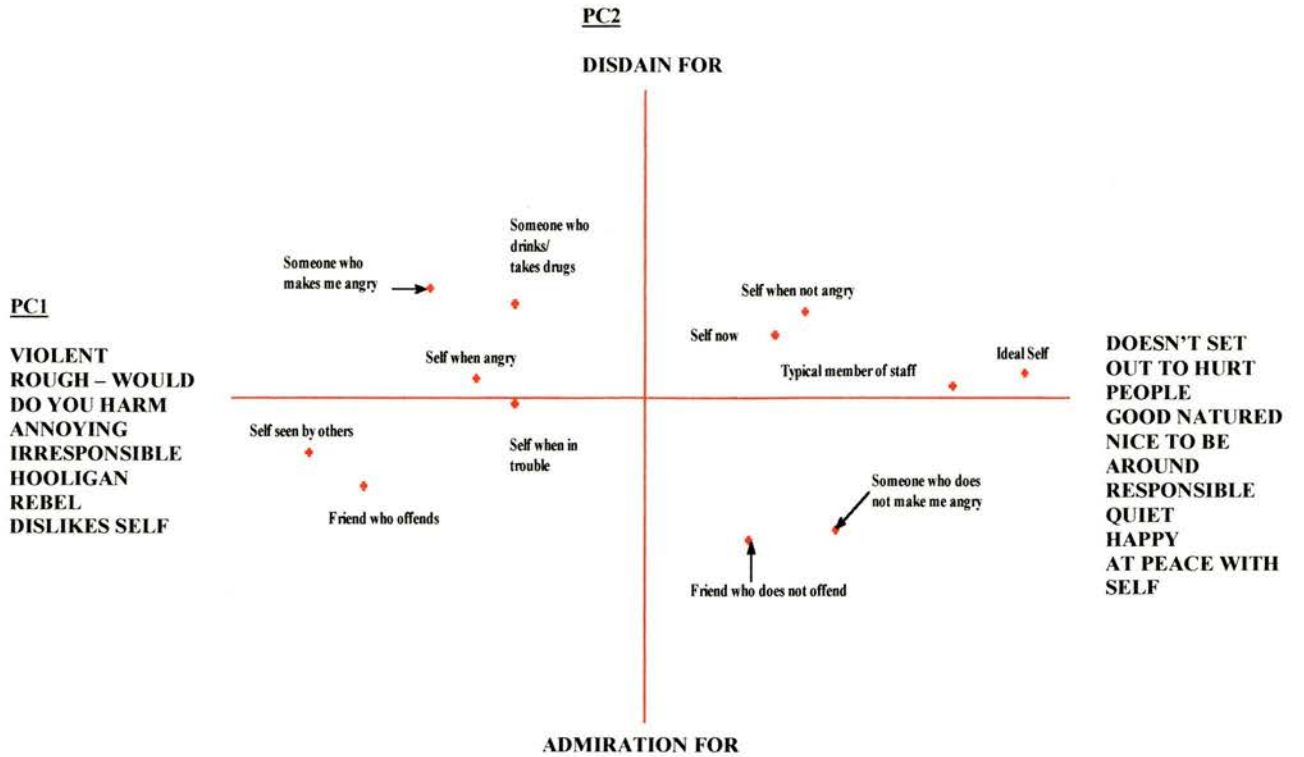



**Figure 10.** Plot of elements in construct space from Participant 5's pre-treatment grid, with constructs loading most heavily on the first two principal components (PC1 and PC2) presented in descending order of importance

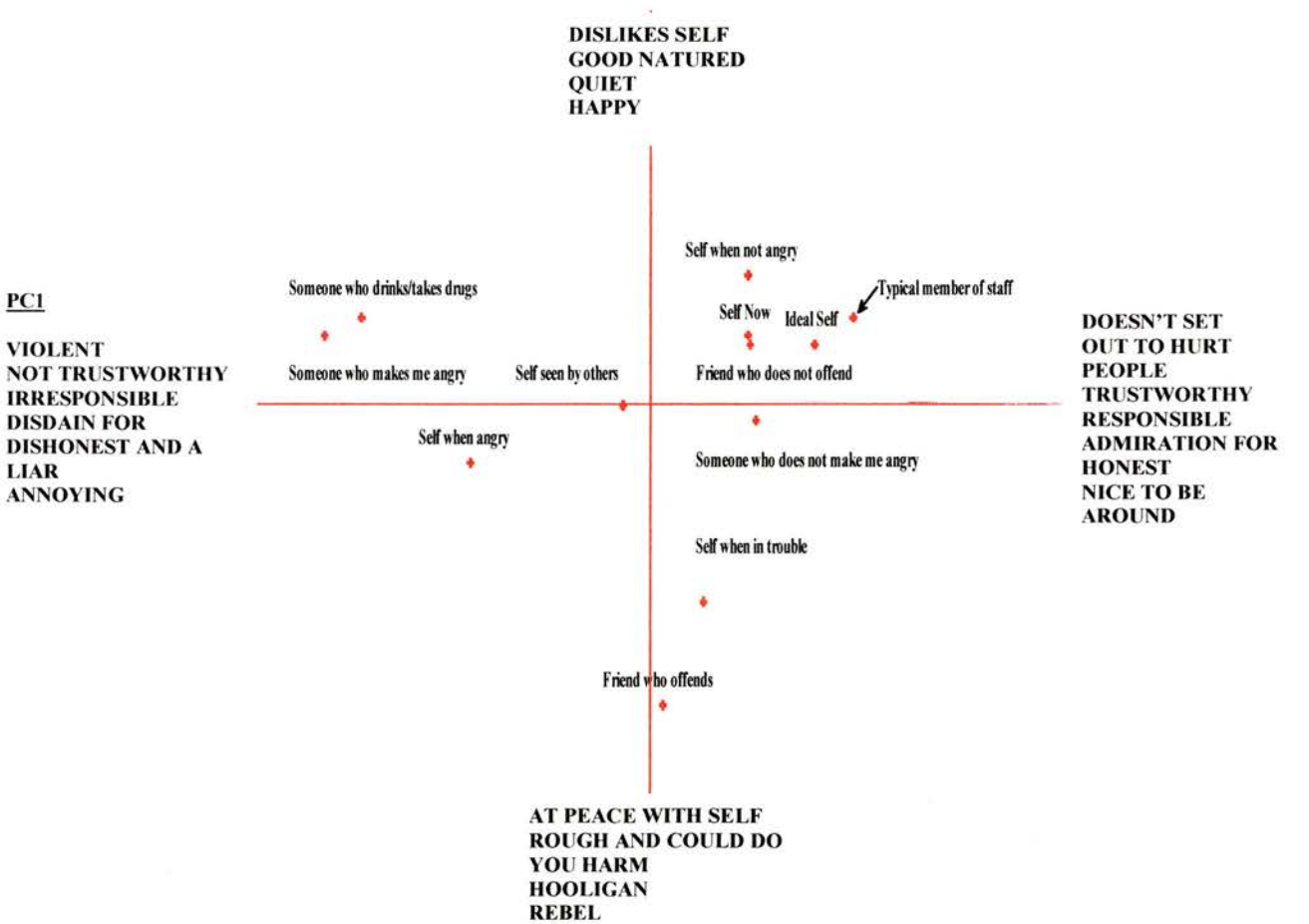



**Figure 11.** Plot of elements in construct space from Participant 5's post-treatment grid, with constructs loading most heavily on the first two principal components (PC1 and PC2) presented in descending order of importance

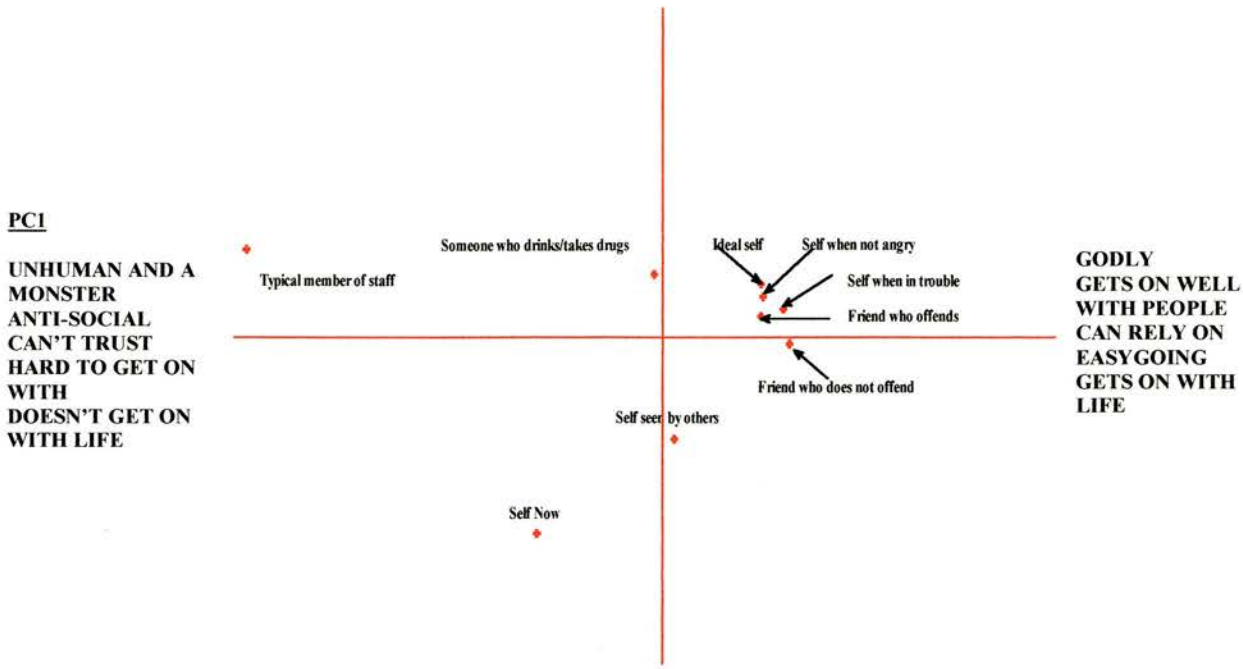



**Figure 12.** Plot of elements in construct space from Participant 6's pre-treatment grid, with constructs loading most heavily on the first two principal components (PC1 and PC2) presented in descending order of importance

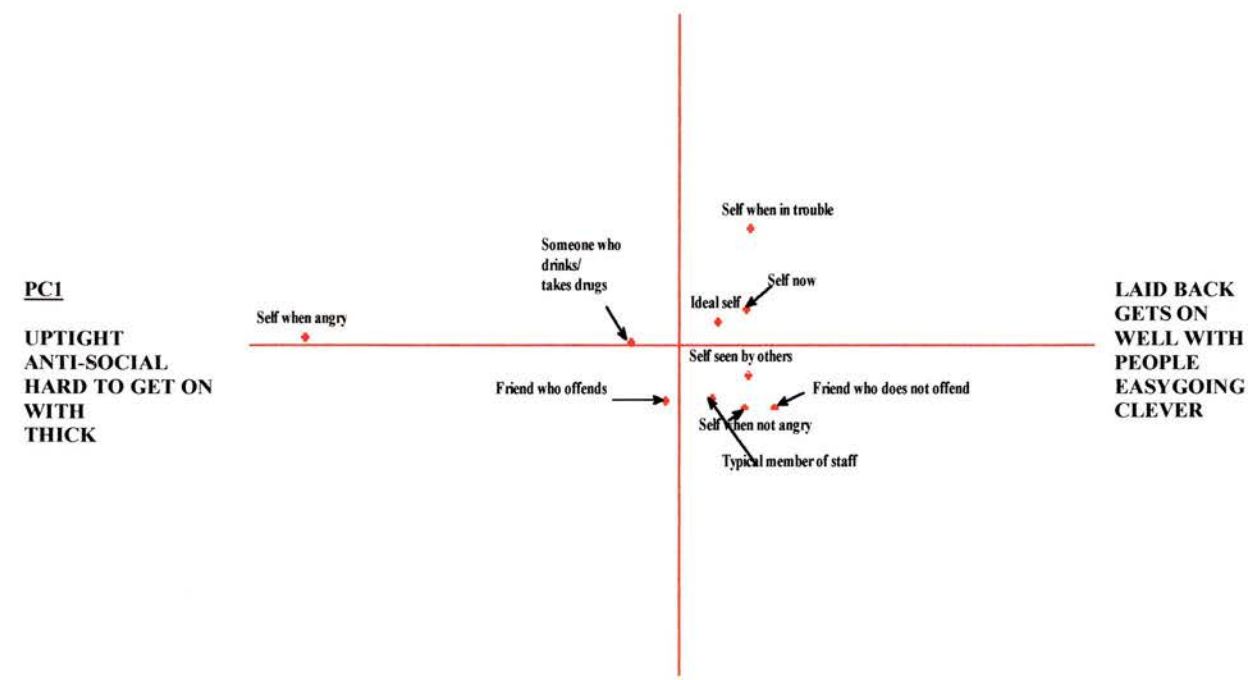



**Figure 13.** Plot of elements in construct space from Participant 6's post-treatment grid, with constructs loading most heavily on the first two principal components (PC1 and PC2) presented in descending order of importance

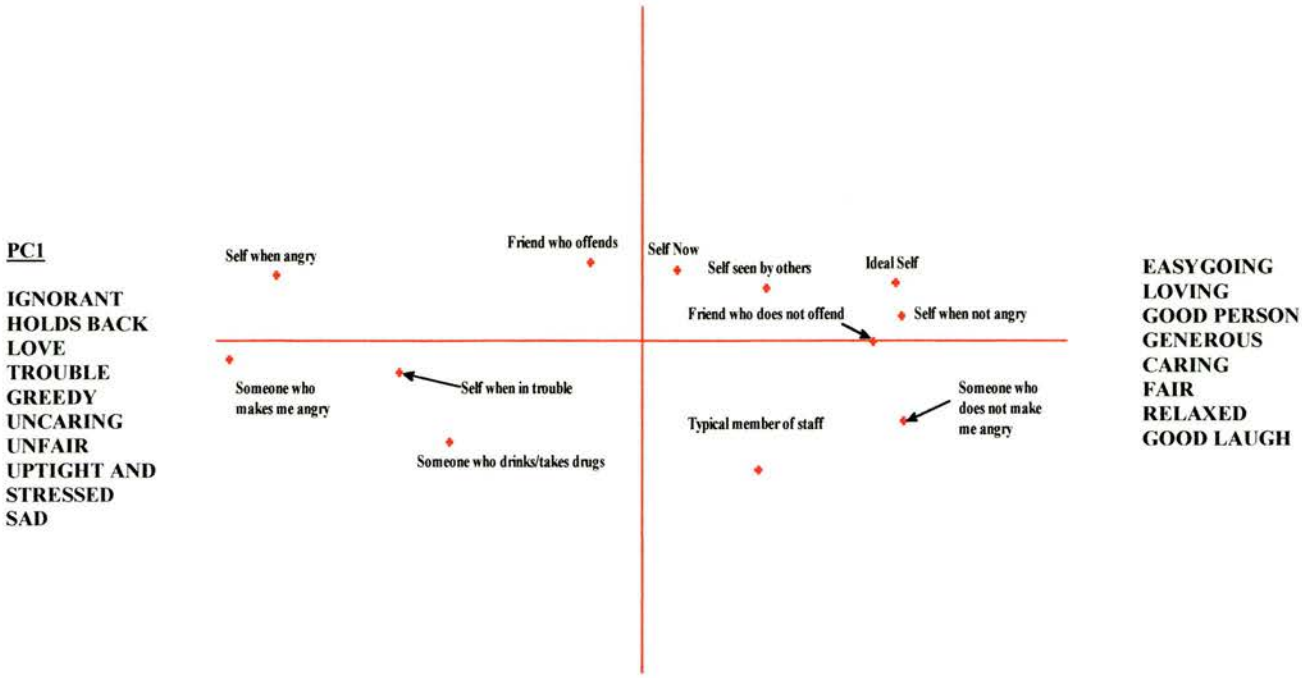



**Figure 14.** Plot of elements in construct space from Participant 7's pre-treatment grid, with constructs loading most heavily on the first two principal components (PC1 and PC2) presented in descending order of importance

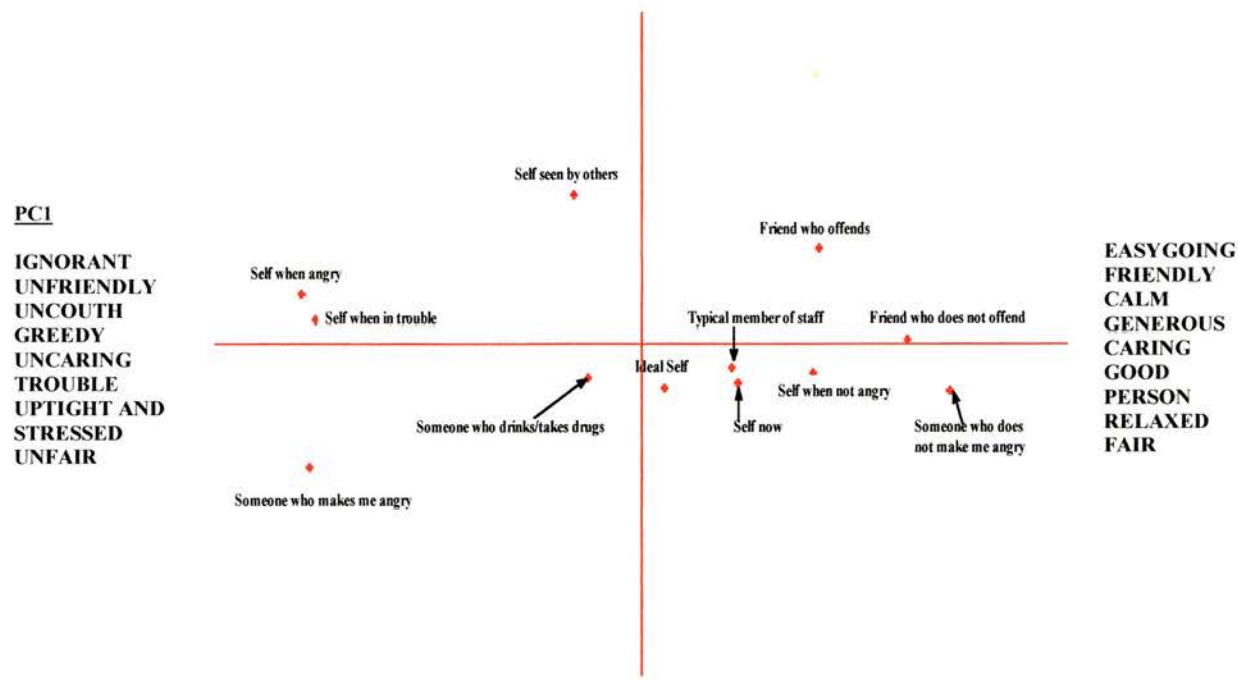



**Figure 15.** Plot of elements in construct space from Participant 7's post-treatment grid, with constructs loading most heavily on the first two principal components (PC1 and PC2) presented in descending order of importance

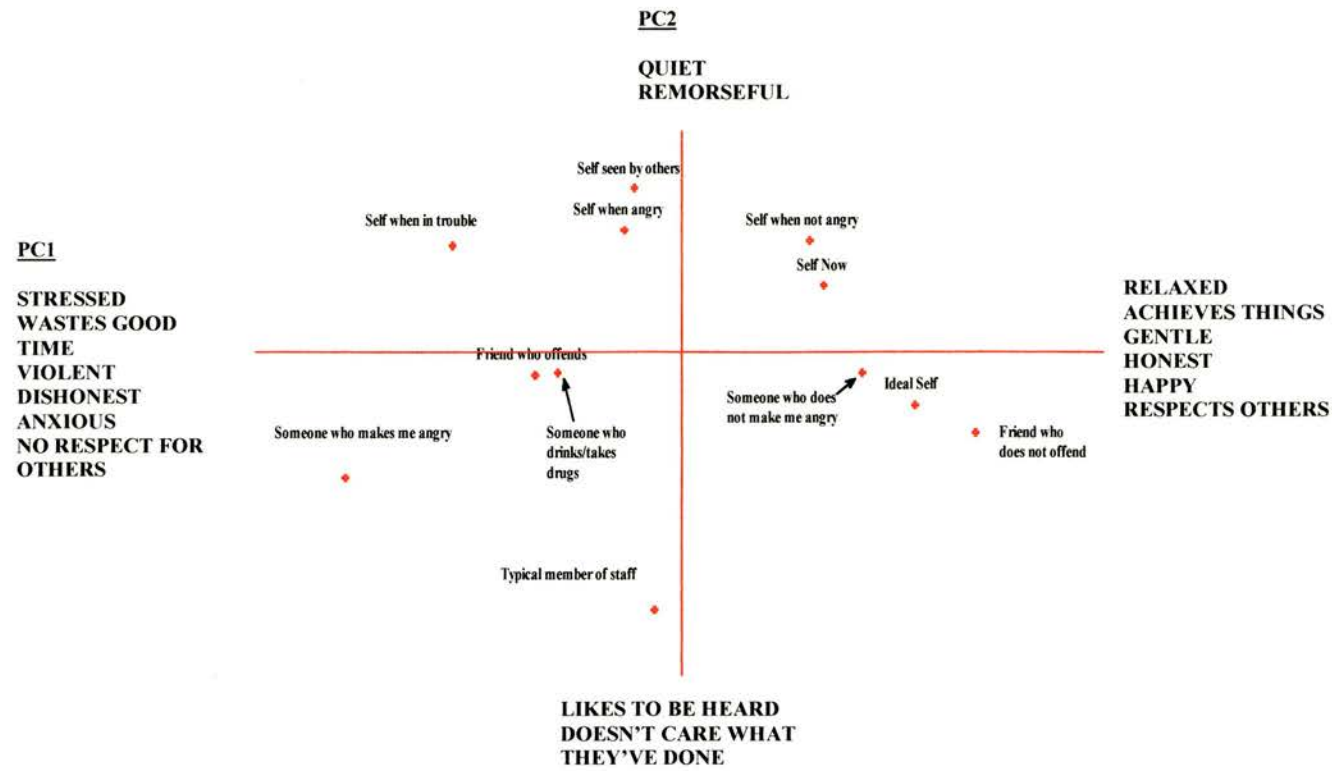



**Figure 16.** Plot of elements in construct space from Participant 8's pre-treatment grid, with constructs loading most heavily on the first two principal components (PC1 and PC2) presented in descending order of importance

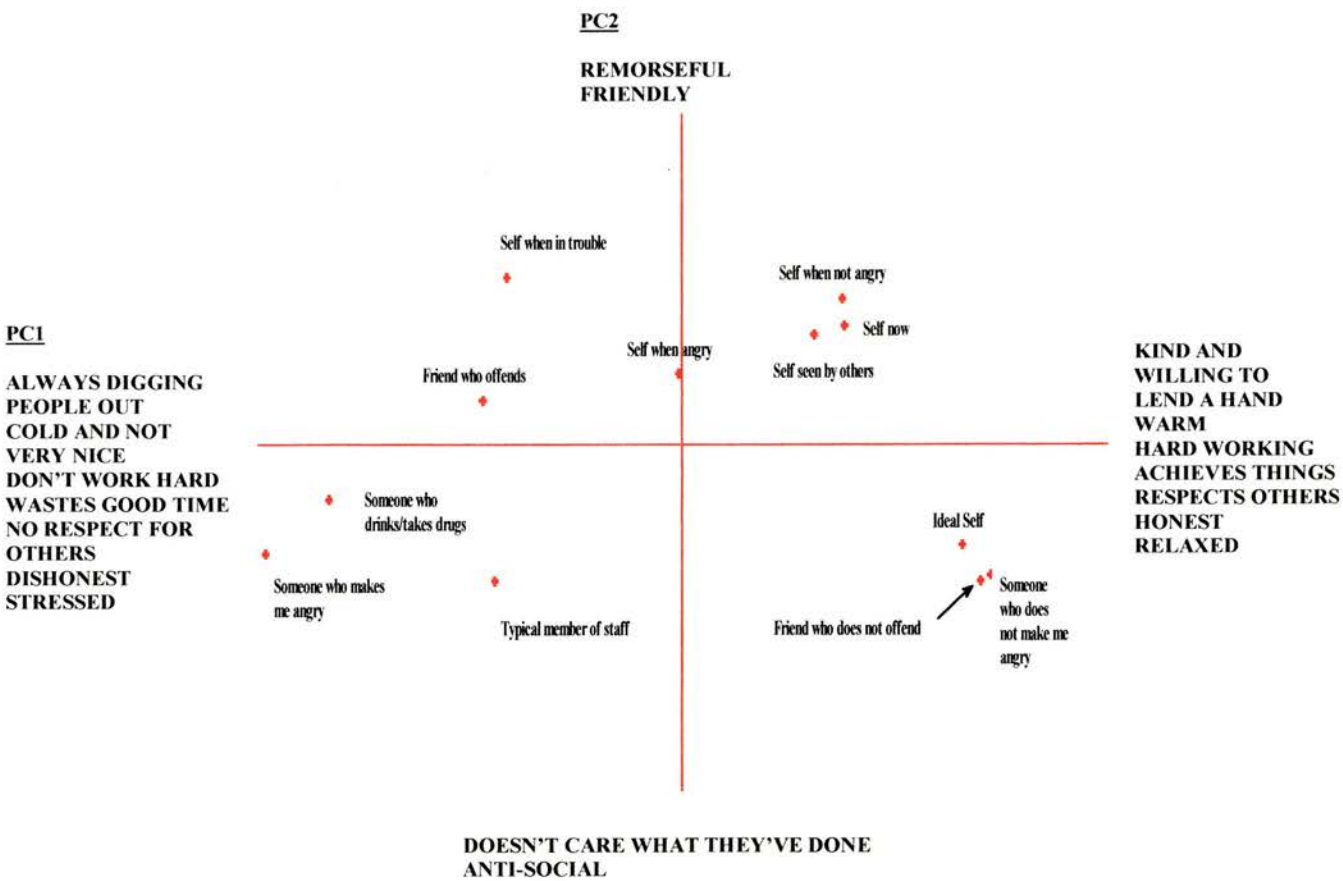



**Figure 17.** Plot of elements in construct space from Participant 8's post-treatment grid, with constructs loading most heavily on the first two principal components (PC1 and PC2) presented in descending order of importance

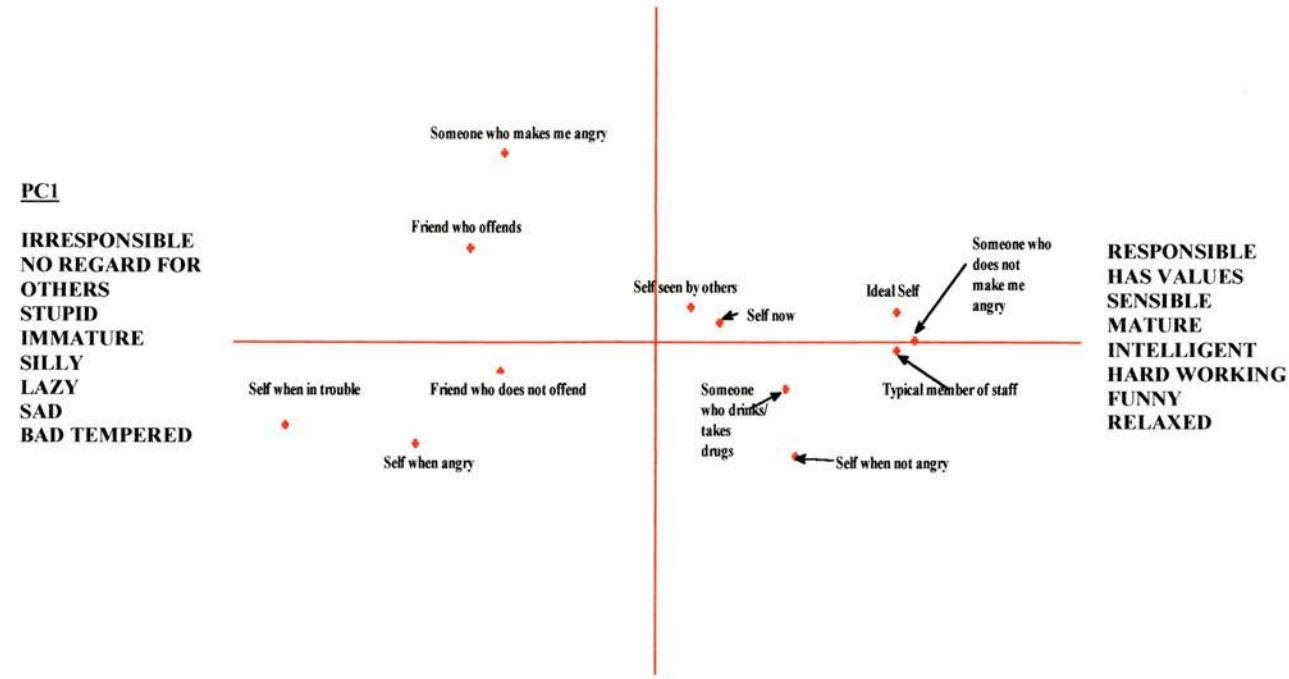



**Figure 18.** Plot of elements in construct space from Participant 9 occasion one grid, with constructs loading most heavily on the first two principal components (PC1 and PC2) presented in descending order of importance

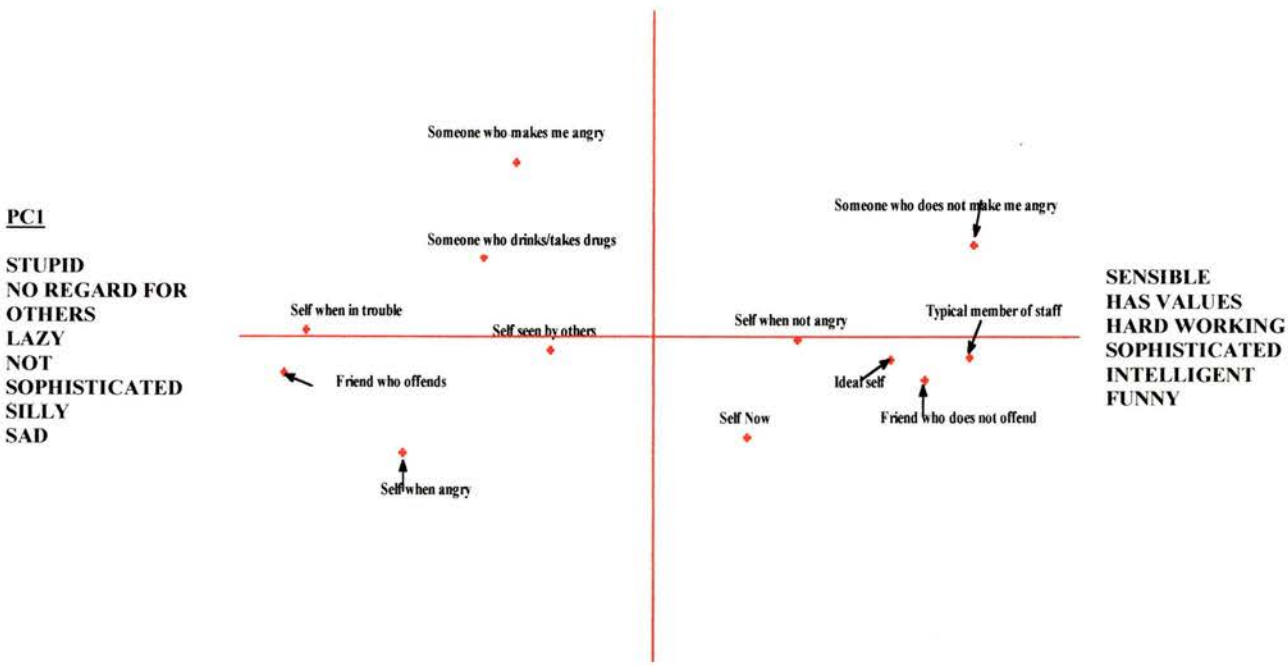



**Figure 19.** Plot of elements in construct space from Participant 9 occasion two grid, with constructs loading most heavily on the first two principal components (PC1 and PC2) presented in descending order of importance

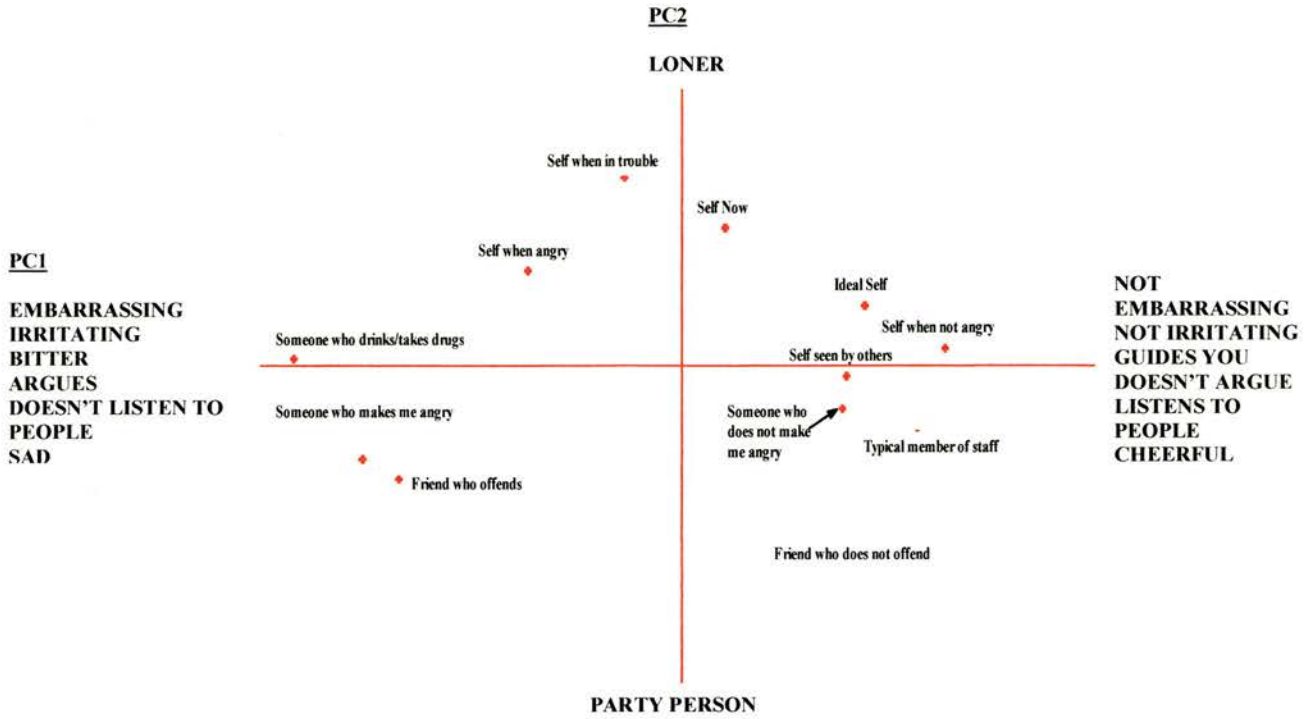



**Figure 20.** Plot of elements in construct space from Participant 10 occasion one grid, with constructs loading most heavily on the first two principal components (PC1 and PC2) presented in descending order of importance


**Figure 21.** Plot of elements in construct space from Participant 10 occasion two grid, with constructs loading most heavily on the first two principal components (PC1 and PC2) presented in descending order of importance

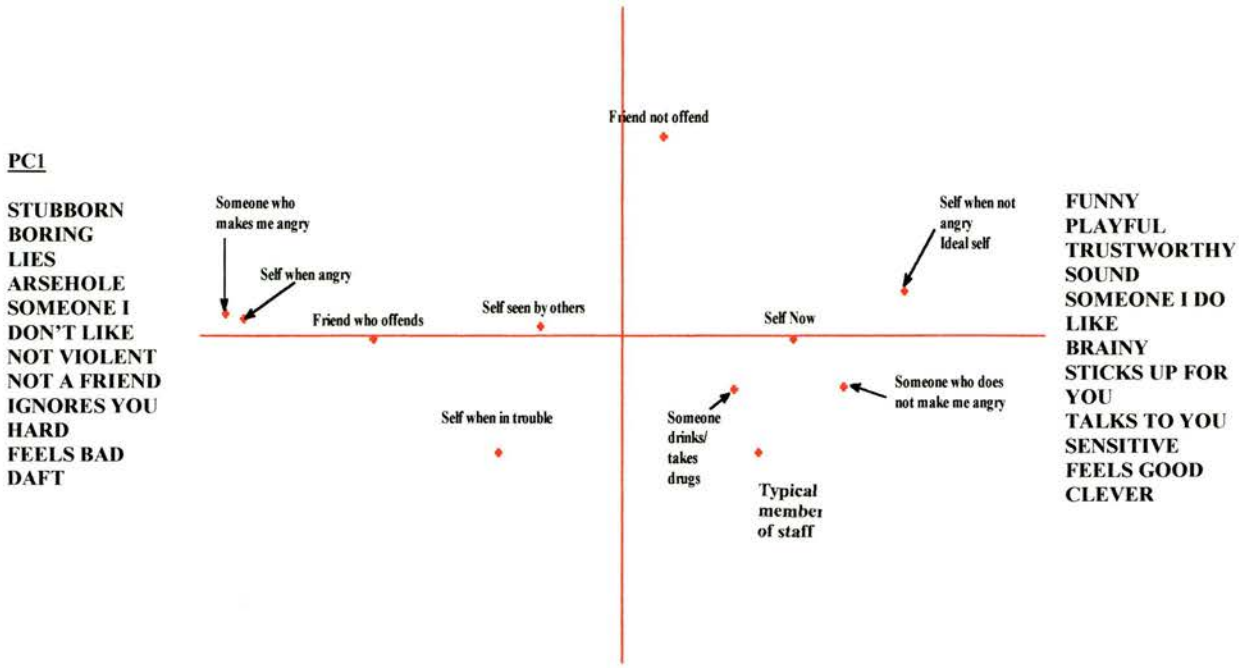



**Figure 22.** Plot of elements in construct space from Participant 11 occasion one grid, with constructs loading most heavily on the first two principal components (PC1 and PC2) presented in descending order of importance

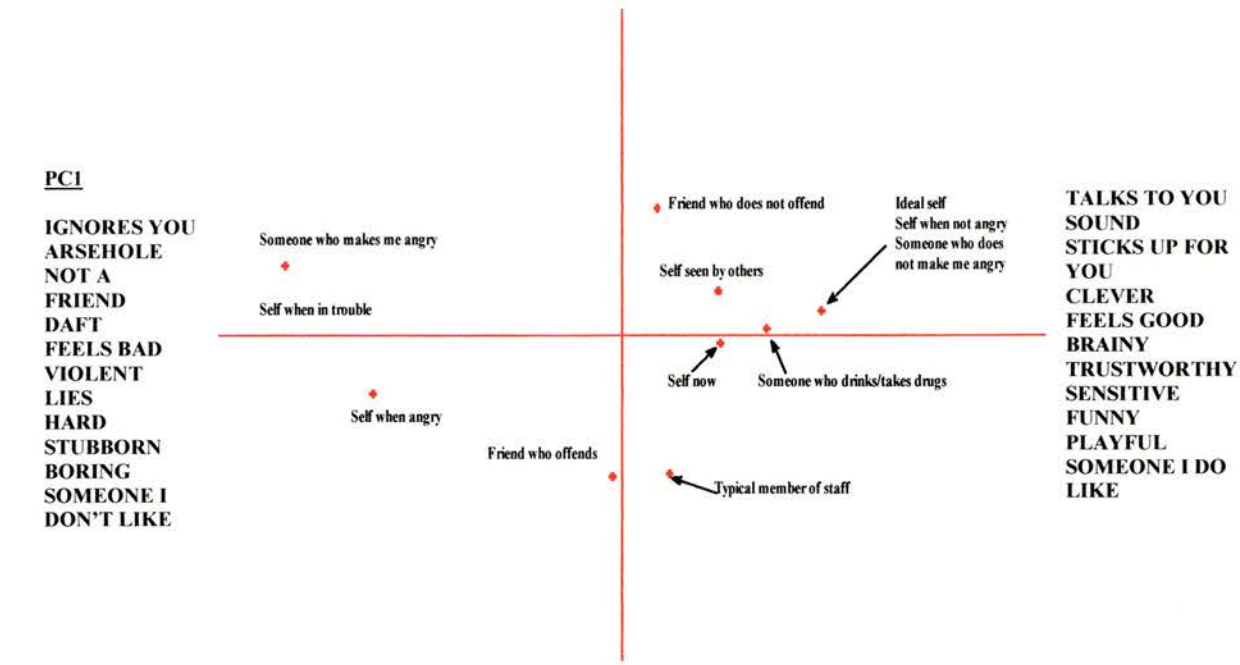



**Figure 23.** Plot of elements in construct space from Participant 11 occasion two grid, with constructs loading most heavily on the first two principal components (PC1 and PC2) presented in descending order of importance

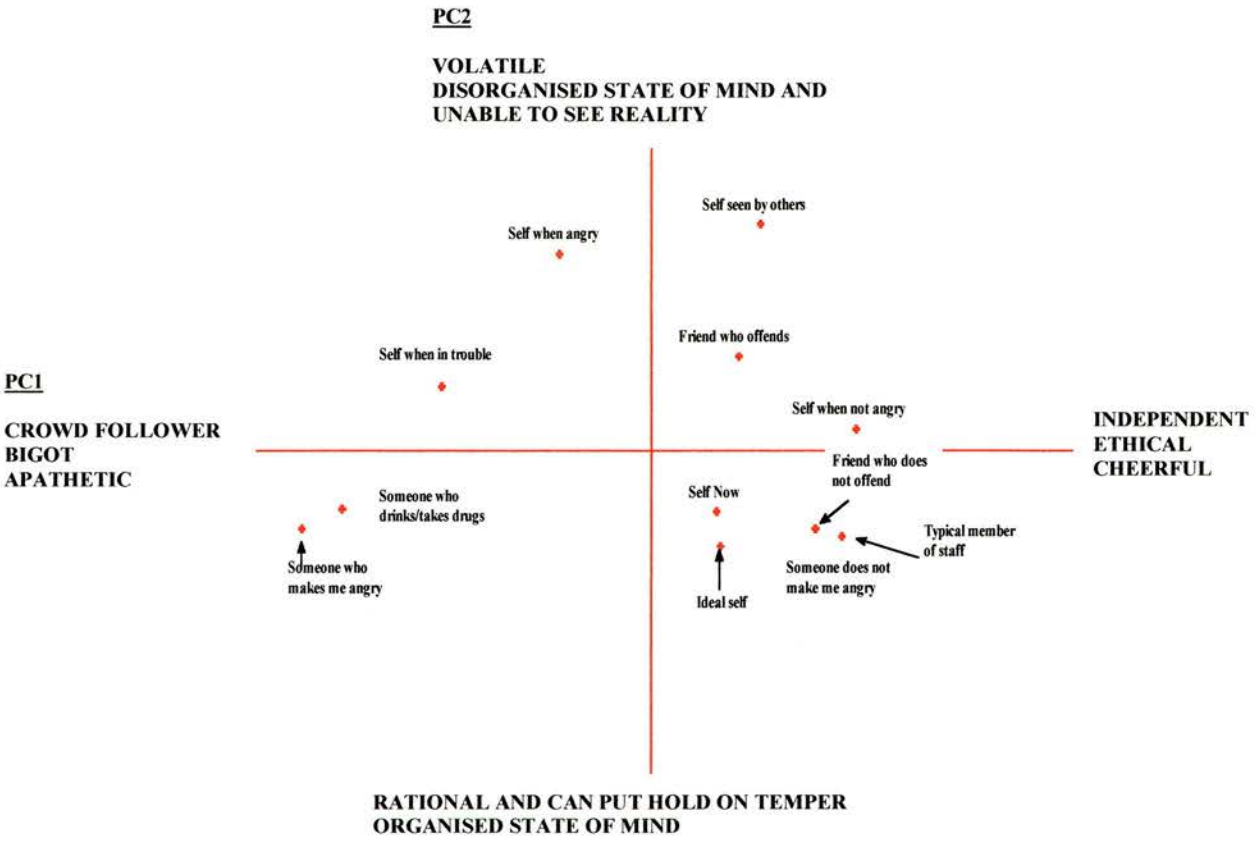



**Figure 24.** Plot of elements in construct space from participant 12 occasion one grid, with constructs loading most heavily on the first two principal components (PC1 and PC2) presented in descending order of importance

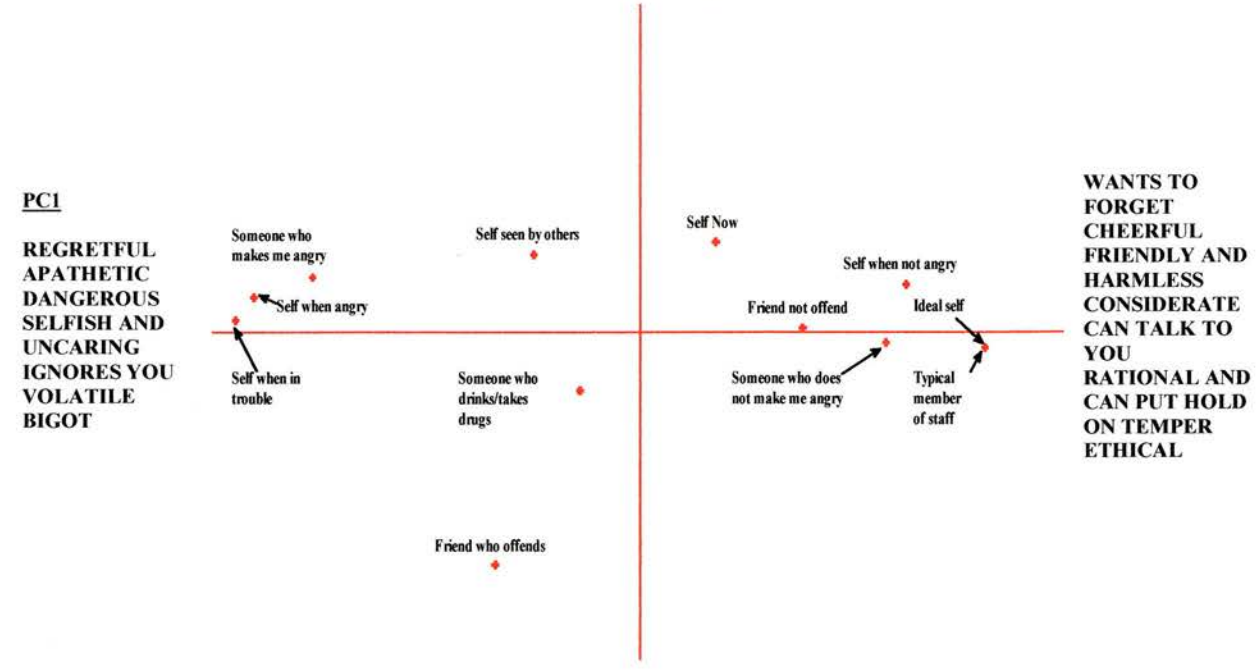



**Figure 25.** Plot of elements in construct space from Participant 12 occasion two grid, with constructs loading most heavily on the first two principal components (PC1 and PC2) presented in descending order of importance

## APPENDIX 12

**Inter-element Euclidean distances from INGRID analysis of repertory grids on two occasions for each participant**

**APPENDIX 12**

Inter-element Euclidean distances from INGRID analysis of repertory grids on two occasions for each participant.

**ELEMENT ABBREVIATIONS:**

| | | | |
|---|---|---|---|
| 1 | Slnw | = | Self now |
| 2 | Swmma | = | Someone who makes me angry |
| 3 | Iself | = | Ideal self |
| 4 | Snmma | = | Someone who does not make me angry |
| 5 | Atmos | = | A typical member of staff |
| 6 | Swit | = | Self when in trouble |
| 7 | Fwo | = | Friend who offends |
| 8 | Swa | = | Self when angry |
| 9 | Swdatd | = | Someone who drinks and takes drugs |
| 10 | Sasbo | = | Self as seen by others |
| 11 | Fwdno | = | Friend who does not offend |
| 12 | Swna | = | Self when not angry |

**TREATMENT GROUP:**

**PARTICIPANT 1**

**PRE-TREATMENT**

| | Slnw | Swmma | Iself | Snmma | Atmos | Swit | Fwo | Swa | Swdatd | Sasbo | Fwdno | Swna |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Slnw | 0.00 | 1.38 | 0.65 | 0.28 | 1.40 | 0.31 | 0.49 | 0.40 | 0.44 | 0.25 | 1.47 | 0.42 |
| Swmma | 1.38 | 0.00 | 1.24 | 1.48 | 1.11 | 1.52 | 1.44 | 1.54 | 1.27 | 1.39 | 0.81 | 1.41 |
| Iself | 0.65 | 1.24 | 0.00 | 0.68 | 1.16 | 0.72 | 0.81 | 0.67 | 0.62 | 0.62 | 1.35 | 0.61 |
| Snmma | 0.28 | 1.48 | 0.68 | 0.00 | 1.46 | 0.13 | 0.40 | 0.28 | 0.49 | 0.34 | 1.57 | 0.51 |
| Atmos | 1.40 | 1.11 | 1.16 | 1.46 | 0.00 | 1.50 | 1.48 | 1.43 | 1.24 | 1.34 | 0.81 | 1.24 |
| Swit | 0.31 | 1.52 | 0.72 | 0.13 | 1.50 | 0.00 | 0.38 | 0.25 | 0.57 | 0.36 | 1.61 | 0.55 |
| Fwo | 0.49 | 1.44 | 0.81 | 0.40 | 1.48 | 0.38 | 0.00 | 0.46 | 0.52 | 0.42 | 1.53 | 0.67 |
| Swa | 0.40 | 1.54 | 0.67 | 0.28 | 1.43 | 0.25 | 0.46 | 0.00 | 0.57 | 0.36 | 1.63 | 0.42 |
| Swdatd | 0.44 | 1.27 | 0.62 | 0.49 | 1.24 | 0.57 | 0.52 | 0.57 | 0.00 | 0.31 | 1.32 | 0.46 |
| Sasbo | 0.25 | 1.39 | 0.62 | 0.34 | 1.34 | 0.36 | 0.42 | 0.36 | 0.31 | 0.00 | 1.44 | 0.38 |
| Fwdno | 1.47 | 0.81 | 1.35 | 1.57 | 0.81 | 1.61 | 1.53 | 1.63 | 1.32 | 1.44 | 0.00 | 1.46 |
| Swna | 0.42 | 1.41 | 0.61 | 0.51 | 1.24 | 0.55 | 0.67 | 0.42 | 0.46 | 0.38 | 1.46 | 0.00 |

**POST-TREATMENT**

| | Slnw | Swmma | Iself | Snmma | Atmos | Swit | Fwo | Swa | Swdatd | Sasbo | Fwdno | Swna |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Slnw | 0.00 | 1.22 | 0.71 | 0.85 | 0.89 | 0.85 | 0.88 | 0.92 | 0.61 | 0.68 | 1.08 | 0.26 |
| Swmma | 1.22 | 0.00 | 1.25 | 1.45 | 1.06 | 1.37 | 1.31 | 1.30 | 0.93 | 1.44 | 0.58 | 1.32 |
| Iself | 0.71 | 1.25 | 0.00 | 0.88 | 0.79 | 1.00 | 1.03 | 1.06 | 0.74 | 0.89 | 1.20 | 0.82 |
| Snmma | 0.85 | 1.45 | 0.88 | 0.00 | 1.25 | 0.47 | 0.53 | 0.59 | 0.93 | 0.42 | 1.56 | 0.79 |
| Atmos | 0.89 | 1.06 | 0.79 | 1.25 | 0.00 | 1.34 | 1.27 | 1.38 | 0.87 | 1.14 | 1.01 | 1.00 |
| Swit | 0.85 | 1.37 | 1.00 | 0.47 | 1.34 | 0.00 | 0.24 | 0.35 | 1.05 | 0.63 | 1.49 | 0.79 |
| Fwo | 0.88 | 1.31 | 1.03 | 0.53 | 1.27 | 0.24 | 0.00 | 0.42 | 1.07 | 0.68 | 1.43 | 0.82 |
| Swa | 0.92 | 1.30 | 1.06 | 0.59 | 1.38 | 0.35 | 0.42 | 0.00 | 0.99 | 0.73 | 1.42 | 0.87 |
| Swdatd | 0.61 | 0.93 | 0.74 | 0.93 | 0.87 | 1.05 | 1.07 | 0.99 | 0.00 | 0.80 | 0.87 | 0.73 |
| Sasbo | 0.68 | 1.44 | 0.89 | 0.42 | 1.14 | 0.63 | 0.68 | 0.73 | 0.80 | 0.00 | 1.44 | 0.60 |
| Fwdno | 1.08 | 0.58 | 1.20 | 1.56 | 1.01 | 1.49 | 1.43 | 1.42 | 0.87 | 1.44 | 0.00 | 1.18 |
| Swna | 0.26 | 1.32 | 0.82 | 0.79 | 1.00 | 0.79 | 0.82 | 0.87 | 0.73 | 0.60 | 1.18 | 0.00 |

**PARTICIPANT 2**

**PRE-TREATMENT**

| | Slnw | Swmma | Iself | Snmma | Atmos | Swit | Fwo | Swa | Swdatd | Sasbo | Fwdno | Swna |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Slnw | 0.00 | 1.16 | 0.81 | 1.01 | 1.06 | 1.24 | 1.15 | 1.16 | 0.72 | 0.39 | 0.89 | 0.66 |
| Swmma | 1.16 | 0.00 | 1.17 | 1.30 | 0.77 | 0.98 | 0.99 | 0.83 | 1.23 | 1.12 | 1.12 | 1.29 |
| Iself | 0.81 | 1.17 | 0.00 | 0.51 | 0.86 | 1.54 | 0.81 | 1.30 | 0.37 | 0.67 | 0.21 | 0.64 |
| Snmma | 1.01 | 1.30 | 0.51 | 0.00 | 0.85 | 1.50 | 0.74 | 1.39 | 0.63 | 0.82 | 0.53 | 0.80 |
| Atmos | 1.06 | 0.77 | 0.86 | 0.85 | 0.00 | 1.01 | 0.85 | 0.80 | 0.83 | 1.03 | 0.77 | 0.90 |
| Swit | 1.24 | 0.98 | 1.54 | 1.50 | 1.01 | 0.00 | 1.35 | 0.92 | 1.47 | 1.25 | 1.51 | 1.42 |
| Fwo | 1.15 | 0.99 | 0.81 | 0.74 | 0.85 | 1.35 | 0.00 | 1.18 | 0.89 | 0.94 | 0.84 | 0.99 |
| Swa | 1.16 | 0.83 | 1.30 | 1.39 | 0.80 | 0.92 | 1.18 | 0.00 | 1.21 | 1.21 | 1.31 | 1.27 |
| Swdatd | 0.72 | 1.23 | 0.37 | 0.63 | 0.83 | 1.47 | 0.89 | 1.21 | 0.00 | 0.70 | 0.43 | 0.43 |
| Sasbo | 0.39 | 1.12 | 0.67 | 0.82 | 1.03 | 1.25 | 0.94 | 1.21 | 0.70 | 0.00 | 0.76 | 0.68 |
| Fwdno | 0.89 | 1.12 | 0.21 | 0.53 | 0.77 | 1.51 | 0.84 | 1.31 | 0.43 | 0.76 | 0.00 | 0.66 |
| Swna | 0.66 | 1.29 | 0.64 | 0.80 | 0.90 | 1.42 | 0.99 | 1.27 | 0.43 | 0.68 | 0.66 | 0.00 |

**POST-TREATMENT**

| | Slnw | Swmma | Iself | Snmma | Atmos | Swit | Fwo | Swa | Swdatd | Sasbo | Fwdno | Swna |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Slnw | 0.00 | 1.09 | 0.46 | 0.45 | 0.94 | 1.38 | 0.79 | 1.31 | 1.09 | 0.58 | 0.69 | 0.30 |
| Swmma | 1.09 | 0.00 | 1.08 | 1.14 | 0.86 | 0.97 | 0.88 | 0.96 | 0.87 | 1.09 | 1.17 | 1.09 |
| Iself | 0.46 | 1.08 | 0.00 | 0.21 | 0.97 | 1.43 | 0.71 | 1.40 | 1.22 | 0.68 | 0.57 | 0.43 |
| Snmma | 0.45 | 1.14 | 0.21 | 0.00 | 1.01 | 1.54 | 0.74 | 1.51 | 1.27 | 0.67 | 0.52 | 0.45 |
| Atmos | 0.94 | 0.86 | 0.97 | 1.01 | 0.00 | 1.12 | 0.92 | 1.01 | 0.95 | 1.08 | 0.83 | 1.01 |
| Swit | 1.38 | 0.97 | 1.43 | 1.54 | 1.12 | 0.00 | 1.21 | 0.46 | 0.81 | 1.26 | 1.39 | 1.31 |
| Fwo | 0.79 | 0.88 | 0.71 | 0.74 | 0.92 | 1.21 | 0.00 | 1.22 | 1.25 | 0.71 | 0.89 | 0.67 |
| Swa | 1.31 | 0.96 | 1.40 | 1.51 | 1.01 | 0.46 | 1.22 | 0.00 | 0.81 | 1.22 | 1.43 | 1.29 |
| Swdatd | 1.09 | 0.87 | 1.22 | 1.27 | 0.95 | 0.81 | 1.25 | 0.81 | 0.00 | 1.07 | 1.09 | 1.14 |
| Sasbo | 0.58 | 1.09 | 0.68 | 0.67 | 1.08 | 1.26 | 0.71 | 1.22 | 1.07 | 0.00 | 0.83 | 0.46 |
| Fwdno | 0.69 | 1.17 | 0.57 | 0.52 | 0.83 | 1.39 | 0.89 | 1.43 | 1.09 | 0.83 | 0.00 | 0.69 |
| Swna | 0.30 | 1.09 | 0.43 | 0.45 | 1.01 | 1.31 | 0.67 | 1.29 | 1.14 | 0.46 | 0.69 | 0.00 |

**PARTICIPANT 3**

**PRE-TREATMENT**

| | Slnw | Swmma | Iself | Snmma | Atmos | Swit | Fwo | Swa | Swdatd | Sasbo | Fwdno | Swna |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Slnw | 0.00 | 0.97 | 1.01 | 0.91 | 1.10 | 0.76 | 1.04 | 0.98 | 1.31 | 0.60 | 0.94 | 0.68 |
| Swmma | 0.97 | 0.00 | 0.64 | 0.56 | 0.71 | 1.06 | 1.20 | 1.09 | 1.12 | 0.82 | 0.69 | 0.91 |
| Iself | 1.01 | 0.64 | 0.00 | 0.54 | 0.73 | 1.12 | 1.31 | 1.16 | 1.23 | 0.74 | 0.41 | 0.68 |
| Snmma | 0.91 | 0.56 | 0.54 | 0.00 | 0.62 | 1.08 | 1.33 | 1.20 | 1.31 | 0.71 | 0.71 | 0.78 |
| Atmos | 1.10 | 0.71 | 0.73 | 0.62 | 0.00 | 1.08 | 1.13 | 1.16 | 1.21 | 0.97 | 0.94 | 0.97 |
| Swit | 0.76 | 1.06 | 1.12 | 1.08 | 1.08 | 0.00 | 0.89 | 0.62 | 1.31 | 0.84 | 1.13 | 1.02 |
| Fwo | 1.04 | 1.20 | 1.31 | 1.33 | 1.13 | 0.89 | 0.00 | 0.74 | 1.14 | 1.28 | 1.35 | 1.39 |
| Swa | 0.98 | 1.09 | 1.16 | 1.20 | 1.16 | 0.62 | 0.74 | 0.00 | 1.17 | 0.99 | 1.09 | 1.21 |
| Swdatd | 1.31 | 1.12 | 1.23 | 1.31 | 1.21 | 1.31 | 1.14 | 1.17 | 0.00 | 1.22 | 1.20 | 1.32 |
| Sasbo | 0.60 | 0.82 | 0.74 | 0.71 | 0.97 | 0.84 | 1.28 | 0.99 | 1.22 | 0.00 | 0.62 | 0.38 |
| Fwdno | 0.94 | 0.69 | 0.41 | 0.71 | 0.94 | 1.13 | 1.35 | 1.09 | 1.20 | 0.62 | 0.00 | 0.62 |
| Swna | 0.68 | 0.91 | 0.68 | 0.78 | 0.97 | 1.02 | 1.39 | 1.21 | 1.32 | 0.38 | 0.62 | 0.00 |

**POST-TREATMENT**

| | Slnw | Swmma | Iself | Snmma | Atmos | Swit | Fwo | Swa | Swdatd | Sasbo | Fwdno | Swna |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Slnw | 0.00 | 0.91 | 0.83 | 0.80 | 1.10 | 0.75 | 1.00 | 0.80 | 1.38 | 0.60 | 0.15 | 0.50 |
| Swmma | 0.91 | 0.00 | 0.80 | 0.77 | 0.89 | 1.10 | 1.19 | 1.07 | 0.98 | 0.91 | 0.87 | 0.81 |
| Iself | 0.83 | 0.80 | 0.00 | 0.30 | 0.72 | 1.01 | 1.43 | 1.21 | 1.40 | 0.80 | 0.72 | 0.66 |
| Snmma | 0.80 | 0.77 | 0.30 | 0.00 | 0.81 | 0.94 | 1.40 | 1.17 | 1.38 | 0.71 | 0.69 | 0.66 |
| Atmos | 1.10 | 0.89 | 0.72 | 0.81 | 0.00 | 1.13 | 1.32 | 1.37 | 1.12 | 1.10 | 1.02 | 1.02 |
| Swit | 0.75 | 1.10 | 1.01 | 0.94 | 1.13 | 0.00 | 0.99 | 0.99 | 1.45 | 0.62 | 0.77 | 0.71 |
| Fwo | 1.00 | 1.19 | 1.43 | 1.40 | 1.32 | 0.99 | 0.00 | 0.88 | 1.42 | 1.15 | 1.01 | 1.23 |
| Swa | 0.80 | 1.07 | 1.21 | 1.17 | 1.37 | 0.99 | 0.88 | 0.00 | 1.32 | 0.88 | 0.81 | 0.92 |
| Swdatd | 1.38 | 0.98 | 1.40 | 1.38 | 1.12 | 1.45 | 1.42 | 1.32 | 0.00 | 1.37 | 1.39 | 1.34 |
| Sasbo | 0.60 | 0.91 | 0.80 | 0.71 | 1.10 | 0.62 | 1.15 | 0.88 | 1.37 | 0.00 | 0.62 | 0.34 |
| Fwdno | 0.15 | 0.87 | 0.72 | 0.69 | 1.02 | 0.77 | 1.01 | 0.81 | 1.39 | 0.62 | 0.00 | 0.52 |
| Swna | 0.50 | 0.81 | 0.66 | 0.66 | 1.02 | 0.71 | 1.23 | 0.92 | 1.34 | 0.34 | 0.52 | 0.00 |

**PARTICIPANT 4**

**PRE-TREATMENT**

| | Slnw | Swmma | Iself | Snmma | Atmos | Swit | Fwo | Swa | Swdatd | Sasbo | Fwdno | Swna |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Slnw | 0.00 | 1.30 | 0.45 | 0.45 | 0.52 | 1.57 | 0.50 | 1.09 | 1.27 | 0.47 | 0.27 | 0.16 |
| Swmma | 1.30 | 0.00 | 1.49 | 1.42 | 1.21 | 0.50 | 1.41 | 0.59 | 0.61 | 1.03 | 1.43 | 1.27 |
| Iself | 0.45 | 1.49 | 0.00 | 0.32 | 0.47 | 1.77 | 0.45 | 1.26 | 1.43 | 0.65 | 0.35 | 0.47 |
| Snmma | 0.45 | 1.42 | 0.32 | 0.00 | 0.35 | 1.68 | 0.55 | 1.22 | 1.32 | 0.65 | 0.47 | 0.47 |
| Atmos | 0.52 | 1.21 | 0.47 | 0.35 | 0.00 | 1.50 | 0.57 | 0.98 | 1.13 | 0.50 | 0.59 | 0.50 |
| Swit | 1.57 | 0.50 | 1.77 | 1.68 | 1.50 | 0.00 | 1.62 | 0.84 | 0.61 | 1.31 | 1.72 | 1.55 |
| Fwo | 0.50 | 1.41 | 0.45 | 0.55 | 0.57 | 1.62 | 0.00 | 1.15 | 1.29 | 0.57 | 0.52 | 0.47 |
| Swa | 1.09 | 0.59 | 1.26 | 1.22 | 0.98 | 0.84 | 1.15 | 0.00 | 0.69 | 0.78 | 1.23 | 1.05 |
| Swdatd | 1.27 | 0.61 | 1.43 | 1.32 | 1.13 | 0.61 | 1.29 | 0.69 | 0.00 | 0.96 | 1.41 | 1.26 |
| Sasbo | 0.47 | 1.03 | 0.65 | 0.65 | 0.50 | 1.31 | 0.57 | 0.78 | 0.96 | 0.00 | 0.55 | 0.45 |
| Fwdno | 0.27 | 1.43 | 0.35 | 0.47 | 0.59 | 1.72 | 0.52 | 1.23 | 1.41 | 0.55 | 0.00 | 0.32 |
| Swna | 0.16 | 1.27 | 0.47 | 0.47 | 0.50 | 1.55 | 0.47 | 1.05 | 1.26 | 0.45 | 0.32 | 0.00 |

**POST-TREATMENT**

| | Slnw | Swmma | Iself | Snmma | Atmos | Swit | Fwo | Swa | Swdatd | Sasbo | Fwdno | Swna |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Slnw | 0.00 | 1.35 | 0.59 | 0.43 | 0.59 | 1.53 | 0.77 | 0.97 | 0.94 | 0.40 | 0.46 | 0.28 |
| Swmma | 1.35 | 0.00 | 1.56 | 1.38 | 1.15 | 0.69 | 1.29 | 0.82 | 0.97 | 1.29 | 1.53 | 1.45 |
| Iself | 0.59 | 1.56 | 0.00 | 0.40 | 0.77 | 1.71 | 0.91 | 1.16 | 1.11 | 0.49 | 0.54 | 0.40 |
| Snmma | 0.43 | 1.38 | 0.40 | 0.00 | 0.61 | 1.59 | 0.78 | 1.01 | 1.01 | 0.43 | 0.59 | 0.33 |
| Atmos | 0.59 | 1.15 | 0.77 | 0.61 | 0.00 | 1.45 | 1.00 | 0.95 | 0.77 | 0.67 | 0.91 | 0.61 |
| Swit | 1.53 | 0.69 | 1.71 | 1.59 | 1.45 | 0.00 | 1.29 | 1.02 | 1.10 | 1.39 | 1.55 | 1.66 |
| Fwo | 0.77 | 1.29 | 0.91 | 0.78 | 1.00 | 1.29 | 0.00 | 1.07 | 1.05 | 0.61 | 0.73 | 0.78 |
| Swa | 0.97 | 0.82 | 1.16 | 1.01 | 0.95 | 1.02 | 1.07 | 0.00 | 0.98 | 0.94 | 1.05 | 1.06 |
| Swdatd | 0.94 | 0.97 | 1.11 | 1.01 | 0.77 | 1.10 | 1.05 | 0.98 | 0.00 | 0.85 | 1.07 | 1.01 |
| Sasbo | 0.40 | 1.29 | 0.49 | 0.43 | 0.67 | 1.39 | 0.61 | 0.94 | 0.85 | 0.00 | 0.40 | 0.43 |
| Fwdno | 0.46 | 1.53 | 0.54 | 0.59 | 0.91 | 1.55 | 0.73 | 1.05 | 1.07 | 0.40 | 0.00 | 0.49 |
| Swna | 0.28 | 1.45 | 0.40 | 0.33 | 0.61 | 1.66 | 0.78 | 1.06 | 1.01 | 0.43 | 0.49 | 0.00 |

**PARTICIPANT 5**

**PRE-TREATMENT**

| | Slnw | Swmma | Iself | Snmma | Atmos | Swit | Fwo | Swa | Swdatd | Sasbo | Fwdno | Swna |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Slnw | 0.00 | 1.09 | 0.95 | 0.77 | 0.72 | 0.74 | 1.20 | 0.85 | 0.80 | 1.22 | 0.76 | 0.25 |
| Swmma | 1.09 | 0.00 | 1.54 | 1.24 | 1.30 | 0.72 | 0.76 | 0.62 | 0.43 | 0.85 | 1.18 | 1.12 |
| Iself | 0.95 | 1.54 | 0.00 | 0.87 | 0.48 | 1.35 | 1.66 | 1.38 | 1.34 | 1.75 | 1.09 | 0.94 |
| Snmma | 0.77 | 1.24 | 0.87 | 0.00 | 0.61 | 0.95 | 1.17 | 1.05 | 1.05 | 1.36 | 0.48 | 0.78 |
| Atmos | 0.72 | 1.30 | 0.48 | 0.61 | 0.00 | 1.15 | 1.44 | 1.18 | 1.11 | 1.59 | 0.82 | 0.70 |
| Swit | 0.74 | 0.72 | 1.35 | 0.95 | 1.15 | 0.00 | 0.66 | 0.50 | 0.61 | 0.67 | 0.85 | 0.84 |
| Fwo | 1.20 | 0.76 | 1.66 | 1.17 | 1.44 | 0.66 | 0.00 | 0.55 | 0.74 | 0.48 | 1.07 | 1.27 |
| Swa | 0.85 | 0.62 | 1.38 | 1.05 | 1.18 | 0.50 | 0.55 | 0.00 | 0.41 | 0.61 | 0.89 | 0.91 |
| Swdatd | 0.80 | 0.43 | 1.34 | 1.05 | 1.11 | 0.61 | 0.74 | 0.41 | 0.00 | 0.81 | 0.94 | 0.81 |
| Sasbo | 1.22 | 0.85 | 1.75 | 1.36 | 1.59 | 0.67 | 0.48 | 0.61 | 0.81 | 0.00 | 1.21 | 1.34 |
| Fwdno | 0.76 | 1.18 | 1.09 | 0.48 | 0.82 | 0.85 | 1.07 | 0.89 | 0.94 | 1.21 | 0.00 | 0.80 |
| Swna | 0.25 | 1.12 | 0.94 | 0.78 | 0.70 | 0.84 | 1.27 | 0.91 | 0.81 | 1.34 | 0.80 | 0.00 |

**POST-TREATMENT**

| | Slnw | Swmma | Iself | Snmma | Atmos | Swit | Fwo | Swa | Swdatd | Sasbo | Fwdno | Swna |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Slnw | 0.00 | 1.25 | 0.62 | 0.71 | 0.91 | 0.91 | 1.13 | 1.09 | 1.18 | 0.53 | 0.45 | 0.32 |
| Swmma | 1.25 | 0.00 | 1.38 | 1.35 | 1.51 | 1.28 | 1.43 | 1.07 | 0.65 | 0.88 | 1.23 | 1.23 |
| Iself | 0.62 | 1.38 | 0.00 | 0.76 | 0.64 | 0.87 | 1.21 | 1.15 | 1.33 | 0.64 | 0.62 | 0.62 |
| Snmma | 0.71 | 1.35 | 0.76 | 0.00 | 0.91 | 0.86 | 0.97 | 1.09 | 1.18 | 0.69 | 0.45 | 0.67 |
| Atmos | 0.91 | 1.51 | 0.64 | 0.91 | 0.00 | 1.03 | 1.33 | 1.40 | 1.38 | 0.90 | 0.79 | 0.83 |
| Swit | 0.91 | 1.28 | 0.87 | 0.86 | 1.03 | 0.00 | 0.50 | 1.03 | 1.31 | 0.64 | 0.88 | 1.02 |
| Fwo | 1.13 | 1.43 | 1.21 | 0.97 | 1.33 | 0.50 | 0.00 | 1.15 | 1.38 | 0.90 | 1.09 | 1.28 |
| Swa | 1.09 | 1.07 | 1.15 | 1.09 | 1.40 | 1.03 | 1.15 | 0.00 | 0.93 | 0.78 | 1.04 | 1.09 |
| Swdatd | 1.18 | 0.65 | 1.33 | 1.18 | 1.38 | 1.31 | 1.38 | 0.93 | 0.00 | 0.87 | 1.13 | 1.16 |
| Sasbo | 0.53 | 0.88 | 0.64 | 0.69 | 0.90 | 0.64 | 0.90 | 0.78 | 0.87 | 0.00 | 0.53 | 0.57 |
| Fwdno | 0.45 | 1.23 | 0.62 | 0.45 | 0.79 | 0.88 | 1.09 | 1.04 | 1.13 | 0.53 | 0.00 | 0.32 |
| Swna | 0.32 | 1.23 | 0.62 | 0.67 | 0.83 | 1.02 | 1.28 | 1.09 | 1.16 | 0.57 | 0.32 | 0.00 |

**PARTICIPANT 6**

**PRE-TREATMENT**

| | Slnw | Iself | Atmos | Swit | Fwo | Swdatd | Sasbo | Fwdno | Swna |
|---|---|---|---|---|---|---|---|---|---|
| Slnw | 0.00 | 1.23 | 1.37 | 1.14 | 1.10 | 1.12 | 0.65 | 1.08 | 1.19 |
| Iself | 1.23 | 0.00 | 1.54 | 0.54 | 0.74 | 0.82 | 0.76 | 0.65 | 0.71 |
| Atmos | 1.37 | 1.54 | 0.00 | 1.58 | 1.53 | 1.31 | 1.43 | 1.62 | 1.54 |
| Swit | 1.14 | 0.54 | 1.58 | 0.00 | 0.58 | 0.68 | 0.68 | 0.54 | 0.54 |
| Fwo | 1.10 | 0.74 | 1.53 | 0.58 | 0.00 | 0.74 | 0.74 | 0.35 | 0.54 |
| Swdatd | 1.12 | 0.82 | 1.31 | 0.68 | 0.74 | 0.00 | 0.87 | 0.71 | 0.87 |
| Sasbo | 0.65 | 0.76 | 1.43 | 0.68 | 0.74 | 0.87 | 0.00 | 0.65 | 0.76 |
| Fwdno | 1.08 | 0.65 | 1.62 | 0.54 | 0.35 | 0.71 | 0.65 | 0.00 | 0.71 |
| Swna | 1.19 | 0.71 | 1.54 | 0.54 | 0.54 | 0.87 | 0.76 | 0.71 | 0.00 |

**POST-TREATMENT**

| | Slnw | Iself | Atmos | Swit | Fwo | Swa | Swdrat | Sasbo | Fwdno | Swna |
|---|---|---|---|---|---|---|---|---|---|---|
| Slnw | 0.00 | 0.41 | 0.87 | 0.58 | 0.65 | 1.80 | 0.58 | 0.65 | 0.65 | 0.29 |
| Iself | 0.41 | 0.00 | 0.87 | 0.71 | 0.65 | 1.71 | 0.58 | 0.65 | 0.65 | 0.50 |
| Atmos | 0.87 | 0.87 | 0.00 | 1.04 | 0.82 | 1.78 | 0.76 | 0.71 | 0.91 | 0.71 |
| Swit | 0.58 | 0.71 | 1.04 | 0.00 | 1.04 | 1.89 | 0.82 | 0.87 | 1.04 | 0.65 |
| Fwo | 0.65 | 0.65 | 0.82 | 1.04 | 0.00 | 1.53 | 0.50 | 0.71 | 0.58 | 0.58 |
| Swa | 1.80 | 1.71 | 1.78 | 1.89 | 1.53 | 0.00 | 1.32 | 1.83 | 1.96 | 1.78 |
| Swdrat | 0.58 | 0.58 | 0.76 | 0.82 | 0.50 | 1.32 | 0.00 | 0.65 | 0.76 | 0.50 |
| Sasbo | 0.65 | 0.65 | 0.71 | 0.87 | 0.71 | 1.83 | 0.65 | 0.00 | 0.58 | 0.41 |
| Fwdno | 0.65 | 0.65 | 0.91 | 1.04 | 0.58 | 1.96 | 0.76 | 0.58 | 0.00 | 0.58 |
| Swna | 0.29 | 0.50 | 0.71 | 0.65 | 0.58 | 1.78 | 0.50 | 0.41 | 0.58 | 0.00 |

**PARTICIPANT 7**

**PRE-TREATMENT**

| | Slnw | Swmma | Iself | Snmma | Atmos | Swit | Fwo | Swa | Swdatd | Sasbo | Fwdno | Swna |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Slnw | 0.00 | 1.18 | 0.76 | 0.77 | 0.79 | 0.90 | 0.43 | 1.10 | 0.86 | 0.54 | 0.66 | 0.75 |
| Swmma | 1.18 | 0.00 | 1.63 | 1.65 | 1.36 | 0.79 | 1.00 | 0.58 | 0.66 | 1.33 | 1.58 | 1.63 |
| Iself | 0.76 | 1.63 | 0.00 | 0.63 | 0.76 | 1.31 | 0.92 | 1.52 | 1.25 | 0.61 | 0.56 | 0.25 |
| Snmma | 0.77 | 1.65 | 0.63 | 0.00 | 0.56 | 1.33 | 0.93 | 1.59 | 1.14 | 0.69 | 0.41 | 0.54 |
| Atmos | 0.79 | 1.36 | 0.76 | 0.56 | 0.00 | 1.05 | 0.83 | 1.33 | 0.91 | 0.70 | 0.66 | 0.69 |
| Swit | 0.90 | 0.79 | 1.31 | 1.33 | 1.05 | 0.00 | 0.86 | 0.73 | 0.72 | 1.09 | 1.25 | 1.30 |
| Fwo | 0.43 | 1.00 | 0.92 | 0.93 | 0.83 | 0.86 | 0.00 | 0.89 | 0.75 | 0.56 | 0.79 | 0.91 |
| Swa | 1.10 | 0.58 | 1.52 | 1.59 | 1.33 | 0.73 | 0.89 | 0.00 | 0.83 | 1.29 | 1.48 | 1.52 |
| Swdatd | 0.86 | 0.66 | 1.25 | 1.14 | 0.91 | 0.72 | 0.75 | 0.83 | 0.00 | 0.95 | 1.09 | 1.19 |
| Sasbo | 0.54 | 1.33 | 0.61 | 0.69 | 0.70 | 1.09 | 0.56 | 1.29 | 0.95 | 0.00 | 0.48 | 0.56 |
| Fwdno | 0.66 | 1.58 | 0.56 | 0.41 | 0.66 | 1.25 | 0.79 | 1.48 | 1.09 | 0.48 | 0.00 | 0.41 |
| Swna | 0.75 | 1.63 | 0.25 | 0.54 | 0.69 | 1.30 | 0.91 | 1.52 | 1.19 | 0.56 | 0.41 | 0.00 |

**POST-TREATMENT**

| | Slnw | Swmma | Iself | Snmma | Atmos | Swit | Fwo | Swa | Swdatd | Sasbo | Fwdno | Swna |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Slnw | 0.00 | 1.22 | 0.55 | 0.85 | 0.46 | 1.17 | 0.70 | 1.34 | 0.51 | 0.81 | 0.77 | 0.38 |
| Swmma | 1.22 | 0.00 | 0.97 | 1.66 | 1.19 | 0.63 | 1.50 | 0.75 | 0.89 | 1.14 | 1.59 | 1.36 |
| Iself | 0.55 | 0.97 | 0.00 | 0.81 | 0.43 | 0.98 | 0.65 | 1.08 | 0.48 | 0.77 | 0.72 | 0.59 |
| Snmma | 0.85 | 1.66 | 0.81 | 0.00 | 0.78 | 1.69 | 0.65 | 1.71 | 1.04 | 1.25 | 0.43 | 0.70 |
| Atmos | 0.46 | 1.19 | 0.43 | 0.78 | 0.00 | 1.20 | 0.72 | 1.23 | 0.57 | 0.77 | 0.57 | 0.59 |
| Swit | 1.17 | 0.63 | 0.98 | 1.69 | 1.20 | 0.00 | 1.33 | 0.73 | 0.80 | 0.87 | 1.60 | 1.32 |
| Fwo | 0.70 | 1.50 | 0.65 | 0.65 | 0.72 | 1.33 | 0.00 | 1.42 | 0.81 | 0.80 | 0.61 | 0.59 |
| Swa | 1.34 | 0.75 | 1.08 | 1.71 | 1.23 | 0.73 | 1.42 | 0.00 | 0.97 | 0.98 | 1.56 | 1.49 |
| Swdatd | 0.51 | 0.89 | 0.48 | 1.04 | 0.57 | 0.80 | 0.81 | 0.97 | 0.00 | 0.73 | 0.97 | 0.70 |
| Sasbo | 0.81 | 1.14 | 0.77 | 1.25 | 0.77 | 0.87 | 0.80 | 0.98 | 0.73 | 0.00 | 1.05 | 0.89 |
| Fwdno | 0.77 | 1.59 | 0.72 | 0.43 | 0.57 | 1.60 | 0.61 | 1.56 | 0.97 | 1.05 | 0.00 | 0.63 |
| Swna | 0.38 | 1.36 | 0.59 | 0.70 | 0.59 | 1.32 | 0.59 | 1.49 | 0.70 | 0.89 | 0.63 | 0.00 |

**PARTICIPANT 8**

**PRE-TREATMENT**

| | Slnw | Swmma | Iself | Snmma | Atmos | Swit | Fwo | Swa | Swdatd | Sasbo | Fwdno | Swna |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Slnw | 0.00 | 1.39 | 0.56 | 0.79 | 1.14 | 1.01 | 0.97 | 0.67 | 0.79 | 0.70 | 0.84 | 0.59 |
| Swmma | 1.39 | 0.00 | 1.41 | 1.39 | 0.98 | 0.90 | 0.86 | 1.08 | 0.86 | 1.17 | 1.52 | 1.40 |
| Iself | 0.56 | 1.41 | 0.00 | 0.80 | 1.00 | 1.27 | 1.14 | 0.94 | 0.98 | 1.05 | 0.52 | 0.79 |
| Snmma | 0.79 | 1.39 | 0.80 | 0.00 | 1.16 | 1.19 | 0.93 | 1.02 | 1.06 | 0.93 | 0.61 | 0.92 |
| Atmos | 1.14 | 0.98 | 1.00 | 1.16 | 0.00 | 1.33 | 1.10 | 1.24 | 0.85 | 1.36 | 1.10 | 1.27 |
| Swit | 1.01 | 0.90 | 1.27 | 1.19 | 1.33 | 0.00 | 0.77 | 0.72 | 0.72 | 0.63 | 1.41 | 1.04 |
| Fwo | 0.97 | 0.86 | 1.14 | 0.93 | 1.10 | 0.77 | 0.00 | 0.89 | 0.64 | 0.86 | 1.17 | 1.08 |
| Swa | 0.67 | 1.08 | 0.94 | 1.02 | 1.24 | 0.72 | 0.89 | 0.00 | 0.70 | 0.41 | 1.17 | 0.66 |
| Swdatd | 0.79 | 0.86 | 0.98 | 1.06 | 0.85 | 0.72 | 0.64 | 0.70 | 0.00 | 0.76 | 1.15 | 0.83 |
| Sasbo | 0.70 | 1.17 | 1.05 | 0.93 | 1.36 | 0.63 | 0.86 | 0.41 | 0.76 | 0.00 | 1.15 | 0.63 |
| Fwdno | 0.84 | 1.52 | 0.52 | 0.61 | 1.10 | 1.41 | 1.17 | 1.17 | 1.15 | 1.15 | 0.00 | 0.87 |
| Swna | 0.59 | 1.40 | 0.79 | 0.92 | 1.27 | 1.04 | 1.08 | 0.66 | 0.83 | 0.63 | 0.87 | 0.00 |

**POST-TREATMENT**

| | Slnw | Swmma | Iself | Snmma | Atmos | Swit | Fwo | Swa | Swdatd | Sasbo | Fwdno | Swna |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Slnw | 0.00 | 1.40 | 0.66 | 0.77 | 1.08 | 0.91 | 0.91 | 0.75 | 1.21 | 0.35 | 0.77 | 0.44 |
| Swmma | 1.40 | 0.00 | 1.56 | 1.59 | 0.64 | 0.94 | 0.75 | 1.13 | 0.35 | 1.35 | 1.58 | 1.43 |
| Iself | 0.66 | 1.56 | 0.00 | 0.48 | 1.13 | 1.26 | 1.18 | 0.98 | 1.43 | 0.73 | 0.48 | 0.86 |
| Snmma | 0.77 | 1.59 | 0.48 | 0.00 | 1.15 | 1.30 | 1.24 | 1.01 | 1.49 | 0.78 | 0.19 | 0.83 |
| Atmos | 1.08 | 0.64 | 1.13 | 1.15 | 0.00 | 0.87 | 0.71 | 0.79 | 0.62 | 1.02 | 1.12 | 1.05 |
| Swit | 0.91 | 0.94 | 1.26 | 1.30 | 0.87 | 0.00 | 0.56 | 0.74 | 0.83 | 0.88 | 1.30 | 0.92 |
| Fwo | 0.91 | 0.75 | 1.18 | 1.24 | 0.71 | 0.56 | 0.00 | 0.89 | 0.51 | 0.79 | 1.21 | 0.99 |
| Swa | 0.75 | 1.13 | 0.98 | 1.01 | 0.79 | 0.74 | 0.89 | 0.00 | 1.06 | 0.78 | 0.99 | 0.74 |
| Swdatd | 1.21 | 0.35 | 1.43 | 1.49 | 0.62 | 0.83 | 0.51 | 1.06 | 0.00 | 1.15 | 1.46 | 1.29 |
| Sasbo | 0.35 | 1.35 | 0.73 | 0.78 | 1.02 | 0.88 | 0.79 | 0.78 | 1.15 | 0.00 | 0.78 | 0.46 |
| Fwdno | 0.77 | 1.58 | 0.48 | 0.19 | 1.12 | 1.30 | 1.21 | 0.99 | 1.46 | 0.78 | 0.00 | 0.83 |
| Swna | 0.44 | 1.43 | 0.86 | 0.83 | 1.05 | 0.92 | 0.99 | 0.74 | 1.29 | 0.46 | 0.83 | 0.00 |

**CONTROL GROUP**

**PARTICIPANT 9**

**OCCASION ONE**

| | Slnw | Swmma | Iself | Snmma | Atmos | Swit | Fwo | Swa | Swdatd | Sasbo | Fwdno | Swna |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Slnw | 0.00 | 1.00 | 0.69 | 0.72 | 0.92 | 1.25 | 0.78 | 1.00 | 0.72 | 0.58 | 1.00 | 0.71 |
| Swmma | 1.00 | 0.00 | 1.23 | 1.25 | 1.23 | 1.09 | 0.49 | 1.02 | 1.15 | 0.90 | 0.95 | 1.26 |
| Iself | 0.69 | 1.23 | 0.00 | 0.49 | 0.72 | 1.64 | 1.15 | 1.38 | 0.58 | 0.69 | 1.11 | 0.74 |
| Swdnmm | 0.72 | 1.25 | 0.49 | 0.00 | 0.58 | 1.63 | 1.19 | 1.36 | 0.53 | 0.75 | 1.25 | 0.63 |
| Atmos | 0.92 | 1.23 | 0.72 | 0.58 | 0.00 | 1.66 | 1.27 | 1.31 | 0.81 | 0.92 | 1.31 | 0.67 |
| Swit | 1.25 | 1.09 | 1.64 | 1.63 | 1.66 | 0.00 | 0.78 | 0.49 | 1.32 | 1.19 | 0.87 | 1.35 |
| Fwo | 0.78 | 0.49 | 1.15 | 1.19 | 1.27 | 0.78 | 0.00 | 0.72 | 1.00 | 0.65 | 0.72 | 1.10 |
| Swa | 1.00 | 1.02 | 1.38 | 1.36 | 1.31 | 0.49 | 0.72 | 0.00 | 1.13 | 0.97 | 0.81 | 1.03 |
| Swdatd | 0.72 | 1.15 | 0.58 | 0.53 | 0.81 | 1.32 | 1.00 | 1.13 | 0.00 | 0.58 | 0.90 | 0.56 |
| Sasbo | 0.58 | 0.90 | 0.69 | 0.75 | 0.92 | 1.19 | 0.65 | 0.97 | 0.58 | 0.00 | 0.81 | 0.71 |
| Fwdno | 1.00 | 0.95 | 1.11 | 1.25 | 1.31 | 0.87 | 0.72 | 0.81 | 0.90 | 0.81 | 0.00 | 1.01 |
| Swna | 0.71 | 1.26 | 0.74 | 0.63 | 0.67 | 1.35 | 1.10 | 1.03 | 0.56 | 0.71 | 1.01 | 0.00 |

**OCCASION TWO**

| | Slnw | Swmma | Iself | Snmma | Atmos | Swit | Fwo | Swa | Swdatd | Sasbo | Fwdno | Swna |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Slnw | 0.00 | 1.00 | 0.71 | 0.87 | 0.88 | 1.09 | 1.13 | 1.03 | 1.06 | 0.63 | 0.71 | 0.60 |
| Swmma | 1.00 | 0.00 | 1.14 | 1.07 | 1.20 | 0.78 | 0.87 | 0.96 | 0.78 | 0.66 | 1.18 | 0.96 |
| Iself | 0.71 | 1.14 | 0.00 | 0.63 | 0.72 | 1.33 | 1.41 | 1.25 | 1.11 | 0.91 | 0.72 | 0.42 |
| Snmma | 0.87 | 1.07 | 0.63 | 0.00 | 0.57 | 1.49 | 1.56 | 1.42 | 1.25 | 1.03 | 0.63 | 0.66 |
| Atmos | 0.88 | 1.20 | 0.72 | 0.57 | 0.00 | 1.51 | 1.58 | 1.27 | 1.25 | 1.05 | 0.49 | 0.77 |
| Swit | 1.09 | 0.78 | 1.33 | 1.49 | 1.51 | 0.00 | 0.44 | 0.64 | 0.69 | 0.64 | 1.41 | 1.13 |
| Fwo | 1.13 | 0.87 | 1.41 | 1.56 | 1.58 | 0.44 | 0.00 | 0.66 | 0.84 | 0.71 | 1.43 | 1.15 |
| Swa | 1.03 | 0.96 | 1.25 | 1.42 | 1.27 | 0.64 | 0.66 | 0.00 | 0.85 | 0.74 | 1.27 | 1.11 |
| Swdatd | 1.06 | 0.78 | 1.11 | 1.25 | 1.25 | 0.69 | 0.84 | 0.85 | 0.00 | 0.77 | 1.11 | 0.87 |
| Sasbo | 0.63 | 0.66 | 0.91 | 1.03 | 1.05 | 0.64 | 0.71 | 0.74 | 0.77 | 0.00 | 0.96 | 0.72 |
| Fwdno | 0.71 | 1.18 | 0.72 | 0.63 | 0.49 | 1.41 | 1.43 | 1.27 | 1.11 | 0.96 | 0.00 | 0.56 |
| Swna | 0.60 | 0.96 | 0.42 | 0.66 | 0.77 | 1.13 | 1.15 | 1.11 | 0.87 | 0.72 | 0.56 | 0.00 |

**PARTICIPANT 10**

**OCCASION ONE**

| | Slnw | Swmma | Iself | Snmma | Atmos | Swit | Fwo | Swa | Swdatd | Sasbo | Fwdno | Swna |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Slnw | 0.00 | 1.14 | 0.67 | 0.89 | 0.87 | 0.58 | 1.07 | 0.94 | 1.18 | 0.75 | 1.03 | 0.77 |
| Swmma | 1.14 | 0.00 | 1.29 | 1.19 | 1.31 | 1.06 | 0.62 | 0.97 | 0.65 | 1.23 | 1.14 | 1.33 |
| Iself | 0.67 | 1.29 | 0.00 | 0.64 | 0.62 | 0.81 | 1.23 | 1.17 | 1.33 | 0.85 | 0.86 | 0.53 |
| Swdnmm | 0.89 | 1.19 | 0.64 | 0.00 | 0.36 | 0.91 | 1.17 | 0.99 | 1.25 | 0.79 | 0.57 | 0.49 |
| Atmos | 0.87 | 1.31 | 0.62 | 0.36 | 0.00 | 1.06 | 1.20 | 1.08 | 1.42 | 0.66 | 0.49 | 0.40 |
| Swit | 0.58 | 1.06 | 0.81 | 0.91 | 1.06 | 0.00 | 1.09 | 0.82 | 1.01 | 0.96 | 1.19 | 0.92 |
| Fwo | 1.07 | 0.62 | 1.23 | 1.17 | 1.20 | 1.09 | 0.00 | 1.01 | 0.77 | 1.20 | 1.09 | 1.35 |
| Swa | 0.94 | 0.97 | 1.17 | 0.99 | 1.08 | 0.82 | 1.01 | 0.00 | 0.92 | 1.03 | 1.23 | 1.08 |
| Swdatd | 1.18 | 0.65 | 1.33 | 1.25 | 1.42 | 1.01 | 0.77 | 0.92 | 0.00 | 1.39 | 1.38 | 1.48 |
| Sasbo | 0.75 | 1.23 | 0.85 | 0.79 | 0.66 | 0.96 | 1.20 | 1.03 | 1.39 | 0.00 | 0.70 | 0.62 |
| Fwdno | 1.03 | 1.14 | 0.86 | 0.57 | 0.49 | 1.19 | 1.09 | 1.23 | 1.38 | 0.70 | 0.00 | 0.67 |
| Swna | 0.77 | 1.33 | 0.53 | 0.49 | 0.40 | 0.92 | 1.35 | 1.08 | 1.48 | 0.62 | 0.67 | 0.00 |

**OCCASION TWO**

| | Slnw | Swmma | Iself | Snmma | Atmos | Swit | Fwo | Swa | Swdatd | Sasbo | Fwdno | Swna |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Slnw | 0.00 | 1.17 | 0.72 | 0.93 | 0.79 | 0.79 | 1.13 | 0.73 | 1.19 | 0.67 | 0.68 | 0.65 |
| Swmma | 1.17 | 0.00 | 1.21 | 1.07 | 1.15 | 1.22 | 1.06 | 1.31 | 0.94 | 1.18 | 1.02 | 1.24 |
| Iself | 0.72 | 1.21 | 0.00 | 0.68 | 0.42 | 1.05 | 1.24 | 0.99 | 1.37 | 0.50 | 0.64 | 0.30 |
| Snmma | 0.93 | 1.07 | 0.68 | 0.00 | 0.46 | 1.13 | 1.15 | 1.09 | 1.25 | 0.84 | 0.72 | 0.74 |
| Atmos | 0.79 | 1.15 | 0.42 | 0.46 | 0.00 | 1.18 | 1.23 | 1.06 | 1.41 | 0.68 | 0.67 | 0.48 |
| Swit | 0.79 | 1.22 | 1.05 | 1.13 | 1.18 | 0.00 | 1.02 | 0.67 | 0.98 | 0.94 | 0.93 | 1.08 |
| Fwo | 1.13 | 1.06 | 1.24 | 1.15 | 1.23 | 1.02 | 0.00 | 0.82 | 1.17 | 1.19 | 1.37 | 1.32 |
| Swa | 0.73 | 1.31 | 0.99 | 1.09 | 1.06 | 0.67 | 0.82 | 0.00 | 1.21 | 0.87 | 1.03 | 0.96 |
| Swdatd | 1.19 | 0.94 | 1.37 | 1.25 | 1.41 | 0.98 | 1.17 | 1.21 | 0.00 | 1.27 | 1.20 | 1.44 |
| Sasbo | 0.67 | 1.18 | 0.50 | 0.84 | 0.68 | 0.94 | 1.19 | 0.87 | 1.27 | 0.00 | 0.74 | 0.48 |
| Fwdno | 0.68 | 1.02 | 0.64 | 0.72 | 0.67 | 0.93 | 1.37 | 1.03 | 1.20 | 0.74 | 0.00 | 0.57 |
| Swna | 0.65 | 1.24 | 0.30 | 0.74 | 0.48 | 1.08 | 1.32 | 0.96 | 1.44 | 0.48 | 0.57 | 0.00 |

**PARTICIPANT 11**

**OCCASION ONE**

| | Slnw | Swmma | Iself | Snmma | Atmos | Swit | Fwo | Swa | Swdatd | Sasbo | Fwdno | Swna |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Slnw | 0.00 | 1.38 | 0.53 | 0.65 | 0.78 | 0.92 | 1.12 | 1.48 | 0.61 | 0.73 | 0.88 | 0.53 |
| Swmma | 1.38 | 0.00 | 1.62 | 1.55 | 1.44 | 0.87 | 0.72 | 0.59 | 1.29 | 0.79 | 1.24 | 1.62 |
| Iself | 0.53 | 1.62 | 0.00 | 0.45 | 0.76 | 1.12 | 1.37 | 1.59 | 0.68 | 0.87 | 0.81 | 0.00 |
| Snmma | 0.65 | 1.55 | 0.45 | 0.00 | 0.40 | 0.98 | 1.21 | 1.45 | 0.57 | 0.80 | 0.89 | 0.45 |
| Atmos | 0.78 | 1.44 | 0.76 | 0.40 | 0.00 | 0.94 | 1.08 | 1.33 | 0.60 | 0.80 | 1.04 | 0.76 |
| Swit | 0.92 | 0.87 | 1.12 | 0.98 | 0.94 | 0.00 | 0.80 | 0.95 | 0.81 | 0.50 | 1.13 | 1.12 |
| Fwo | 1.12 | 0.72 | 1.37 | 1.21 | 1.08 | 0.80 | 0.00 | 0.74 | 1.02 | 0.67 | 0.99 | 1.37 |
| Swa | 1.48 | 0.59 | 1.59 | 1.45 | 1.33 | 0.95 | 0.74 | 0.00 | 1.32 | 0.81 | 1.21 | 1.59 |
| Swdatd | 0.61 | 1.29 | 0.68 | 0.57 | 0.60 | 0.81 | 1.02 | 1.32 | 0.00 | 0.68 | 0.87 | 0.68 |
| Sasbo | 0.73 | 0.79 | 0.87 | 0.80 | 0.80 | 0.50 | 0.67 | 0.81 | 0.68 | 0.00 | 0.73 | 0.87 |
| Fwdno | 0.88 | 1.24 | 0.81 | 0.89 | 1.04 | 1.13 | 0.99 | 1.21 | 0.87 | 0.73 | 0.00 | 0.81 |
| Swna | 0.53 | 1.62 | 0.00 | 0.45 | 0.76 | 1.12 | 1.37 | 1.59 | 0.68 | 0.87 | 0.81 | 0.00 |

**OCCASION TWO**

| | Slnw | Swmma | Iself | Snmma | Atmos | Swit | Fwo | Swa | Swdatd | Sasbo | Fwdno | Swna |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Slnw | 0.00 | 1.35 | 0.48 | 0.48 | 0.70 | 1.41 | 0.80 | 0.99 | 0.56 | 0.50 | 0.64 | 0.48 |
| Swmma | 1.35 | 0.00 | 1.46 | 1.46 | 1.33 | 0.75 | 1.28 | 0.73 | 1.35 | 1.25 | 1.20 | 1.46 |
| Iself | 0.48 | 1.46 | 0.00 | 0.00 | 0.80 | 1.66 | 0.92 | 1.27 | 0.40 | 0.46 | 0.75 | 0.00 |
| Snmma | 0.48 | 1.46 | 0.00 | 0.00 | 0.80 | 1.66 | 0.92 | 1.27 | 0.40 | 0.46 | 0.75 | 0.00 |
| Atmos | 0.70 | 1.33 | 0.80 | 0.80 | 0.00 | 1.43 | 0.69 | 1.00 | 0.80 | 0.71 | 1.03 | 0.80 |
| Swit | 1.41 | 0.75 | 1.66 | 1.66 | 1.43 | 0.00 | 1.27 | 0.82 | 1.56 | 1.39 | 1.31 | 1.66 |
| Fwo | 0.80 | 1.28 | 0.92 | 0.92 | 0.69 | 1.27 | 0.00 | 0.98 | 0.78 | 0.84 | 1.01 | 0.92 |
| Swa | 0.99 | 0.73 | 1.27 | 1.27 | 1.00 | 0.82 | 0.98 | 0.00 | 1.17 | 1.11 | 1.15 | 1.27 |
| Swdatd | 0.56 | 1.35 | 0.40 | 0.40 | 0.80 | 1.56 | 0.78 | 1.17 | 0.00 | 0.46 | 0.75 | 0.40 |
| Sasbo | 0.50 | 1.25 | 0.46 | 0.46 | 0.71 | 1.39 | 0.84 | 1.11 | 0.46 | 0.00 | 0.48 | 0.46 |
| Fwdno | 0.64 | 1.20 | 0.75 | 0.75 | 1.03 | 1.31 | 1.01 | 1.15 | 0.75 | 0.48 | 0.00 | 0.75 |
| Swna | 0.48 | 1.46 | 0.00 | 0.00 | 0.80 | 1.66 | 0.92 | 1.27 | 0.40 | 0.46 | 0.75 | 0.00 |

**PARTICIPANT 12**

**OCCASION ONE**

| | Slnw | Swmma | Iself | Snmma | Atmos | Swit | Fwo | Swa | Swdatd | Sasbo | Fwdno | Swna |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Slnw | 0.00 | 1.15 | 0.75 | 0.70 | 0.68 | 0.85 | 0.98 | 0.96 | 1.00 | 0.98 | 0.74 | 0.74 |
| Swmma | 1.15 | 0.00 | 1.23 | 1.14 | 1.30 | 0.96 | 1.17 | 1.21 | 0.75 | 1.38 | 1.28 | 1.40 |
| Iself | 0.75 | 1.23 | 0.00 | 0.41 | 0.80 | 1.05 | 1.04 | 1.13 | 1.04 | 1.17 | 0.91 | 0.91 |
| Snmma | 0.70 | 1.14 | 0.41 | 0.00 | 0.74 | 0.97 | 0.85 | 0.98 | 1.01 | 1.05 | 0.87 | 0.81 |
| Atmos | 0.68 | 1.30 | 0.80 | 0.74 | 0.00 | 1.17 | 0.78 | 1.22 | 1.22 | 1.02 | 0.87 | 0.84 |
| Swit | 0.85 | 0.96 | 1.05 | 0.97 | 1.17 | 0.00 | 1.02 | 0.80 | 0.57 | 0.96 | 1.14 | 0.99 |
| Fwo | 0.98 | 1.17 | 1.04 | 0.85 | 0.78 | 1.02 | 0.00 | 0.97 | 1.18 | 0.73 | 1.04 | 0.81 |
| Swa | 0.96 | 1.21 | 1.13 | 0.98 | 1.22 | 0.80 | 0.97 | 0.00 | 1.05 | 0.69 | 1.21 | 1.11 |
| Swdatd | 1.00 | 0.75 | 1.04 | 1.01 | 1.22 | 0.57 | 1.18 | 1.05 | 0.00 | 1.27 | 1.19 | 1.19 |
| Sasbo | 0.98 | 1.38 | 1.17 | 1.05 | 1.02 | 0.96 | 0.73 | 0.69 | 1.27 | 0.00 | 1.03 | 0.78 |
| Fwdno | 0.74 | 1.28 | 0.91 | 0.87 | 0.87 | 1.14 | 1.04 | 1.21 | 1.19 | 1.03 | 0.00 | 0.64 |
| Swna | 0.74 | 1.40 | 0.91 | 0.81 | 0.84 | 0.99 | 0.81 | 1.11 | 1.19 | 0.78 | 0.64 | 0.00 |

**OCCASION TWO**

| | Slnw | Swmma | Iself | Snmma | Atmos | Swit | Fwo | Swa | Swdatd | Sasbo | Fwdno | Swna |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Slnw | 0.00 | 1.05 | 0.85 | 0.72 | 0.85 | 1.15 | 1.06 | 1.22 | 0.70 | 0.73 | 0.74 | 0.73 |
| Swmma | 1.05 | 0.00 | 1.49 | 1.31 | 1.49 | 0.69 | 0.95 | 0.67 | 0.79 | 0.69 | 1.18 | 1.33 |
| Iself | 0.85 | 1.49 | 0.00 | 0.40 | 0.00 | 1.60 | 1.22 | 1.55 | 0.90 | 1.06 | 0.60 | 0.38 |
| Snmma | 0.72 | 1.31 | 0.40 | 0.00 | 0.40 | 1.41 | 1.09 | 1.41 | 0.77 | 0.91 | 0.57 | 0.56 |
| Atmos | 0.85 | 1.49 | 0.00 | 0.40 | 0.00 | 1.60 | 1.22 | 1.55 | 0.90 | 1.06 | 0.60 | 0.38 |
| Swit | 1.15 | 0.69 | 1.60 | 1.41 | 1.60 | 0.00 | 0.95 | 0.38 | 0.86 | 0.88 | 1.27 | 1.48 |
| Fwo | 1.06 | 0.95 | 1.22 | 1.09 | 1.22 | 0.95 | 0.00 | 1.01 | 0.56 | 0.92 | 1.03 | 1.20 |
| Swa | 1.22 | 0.67 | 1.55 | 1.41 | 1.55 | 0.38 | 1.01 | 0.00 | 0.87 | 0.82 | 1.26 | 1.43 |
| Swdatd | 0.70 | 0.79 | 0.90 | 0.77 | 0.90 | 0.86 | 0.56 | 0.87 | 0.00 | 0.46 | 0.72 | 0.80 |
| Sasbo | 0.73 | 0.69 | 1.06 | 0.91 | 1.06 | 0.88 | 0.92 | 0.82 | 0.46 | 0.00 | 0.84 | 0.90 |
| Fwdno | 0.74 | 1.18 | 0.60 | 0.57 | 0.60 | 1.27 | 1.03 | 1.26 | 0.72 | 0.84 | 0.00 | 0.61 |
| Swna | 0.73 | 1.33 | 0.38 | 0.56 | 0.38 | 1.48 | 1.20 | 1.43 | 0.80 | 0.90 | 0.61 | 0.00 |