The interaction of emotion and reasoning in contemporary talking therapy

A thesis submitted to the University of Manchester for the degree of Doctor of Clinical Psychology in the Faculty of Medical and Human Sciences

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Abstract

There is a great deal of empirical evidence to support the efficacy and effectiveness of cognitive therapeutic approaches such as cognitive behaviour therapy (CBT) and motivational interviewing (MI). In addition to this, research has identified several mechanisms of change thought to underlie these approaches. However, there has been little exploration of the specific cognitive and emotional processes that may underlie change in CBT and MI, or indeed their interactions. This thesis specifically explored the role of reasoning and emotion in relation to MI and CBT.

In the first paper, the initial sections provided a narrative review whereby the roles of reasoning and emotion in CBT and MI were critically evaluated in context of existing empirical evidence. Further to this, the literature examining the effects of emotion on deductive reasoning was systematically reviewed. A total of 19 papers were identified and the implications of the studies’ findings discussed in relation to the clinical practice of CBT and MI. The studies varied noticeably in terms of the quality of the methodologies employed. Overall the studies considered, suggested that the effects of emotion on reasoning were complex, and yet to be well understood. However, through extrapolating the findings from the experimental study of cognition and emotion to the clinical practice of CBT and MI, the review demonstrated the potential relevance of such findings, and indicated the need for research exploring the role of reasoning and emotion in these approaches.

The second, empirical paper examined the extent to which statements reflecting informal reasoning and the emotional state of the client affected the generation of positive behaviour change statements and positive behaviour change in the context of MI with individuals with psychosis and alcohol use disorders. Participants (n=26) were clients selected from a large randomised controlled trial of integrated MI and CBT for psychosis and substance use. One audio recorded therapy session was selected for each participant. Reasoning and emotion statements were subsequently identified and categorised for each therapy session. It was found that the total number of reasoning statements generated positively predicted the total number of positive behaviour change statements generated. It was also found that negative emotional statements relating to the present, positively predicted the total number of reasoning statements generated. The results suggested that informal reasoning may be a specific cognitive process underpinning the production of behaviour change statements in MI with individuals with psychosis and alcohol use disorders, and provided support for the central role of discrepancy in producing change in MI.

The final section provided a critical reflection of the research process. This included a rationale for the development of the literature review and the empirical paper, followed by a critical reflection on the study context and its’ implication to the study methodology. Finally the theoretical and future implications for research in this area were discussed along with the implications to clinical practice.
Declaration

I declare that no portion of the work referred to in this thesis has been submitted in support of an application for another degree or qualification of this or any other university or other institute of learning.
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To Dave and Billy, with love.
The role and interaction of reasoning and emotion and their relevance to cognitive therapeutic approaches: A review

KATY SILVERMAN
Preface

The work for this paper was carried out between September 2011 and November 2012. The literature search was completed in September 2012. Professor Christine Barrowclough and Dr Patrícia Gooding provided overall supervision for this paper, which included reading drafts of the manuscript.

The author intends to submit this review for publication in Clinical Psychology Review Journal. Therefore the paper has been prepared in accordance with their guidelines (appendix A). The authors will be Katy Silverman, Professor Christine Barrowclough and Dr Patrícia Gooding.
Abstract

In this paper the centrality of reasoning and emotion processes in CBT and MI are explored through narrative review of the theory and practice of these approaches. We highlight the paucity of studies examining reasoning and emotion during the therapy process. We then systematically review and discuss the literature regarding the impact of emotion on the outcome of deductive reasoning processes and extrapolate the findings to the clinical practice of MI and CBT. We find that research largely shows robust impairment effects for incidental mood state, trait and content on reasoning, and that the role of arousal is implicated in impairments resulting specifically from negative mood. Despite facilitation effects being observed in relation to the effects of integral mood on reasoning, we conclude that evidence is currently equivocal, due to methodological weaknesses across studies. The literature suggests that in MI and CBT, in order to maximise reasoning performance, mood should be considered in relation to determining the content of therapeutic dialogue. Evidence suggests the potential need to monitor mood and arousal and induce neutral mood in therapy, and to assess trait anxiety in regard to ensuring the suitability of approaches reliant on reasoning. We conclude that there is a need for further study of the specific cognitive and emotional processes which may underlie MI and CBT.

Key words: Reasoning, Emotion, Cognitive Behaviour Therapy, Motivational Interviewing

Highlights:

- We examine the role of reasoning and emotion in CBT and MI
- We review evidence of the effects of emotion on deductive reasoning
- Incidental emotion and over-arousal impairs, but integral may facilitate reasoning
• Adapting content and monitoring mood/arousal may facilitate reasoning in therapy
• There is a need to study reasoning and emotion processes in CBT and MI further
Introduction

Empirical evidence for the efficacy and effectiveness of cognitively based therapeutic approaches has steadily accumulated over the past thirty years (Motivational Interviewing: Martins & McNeil, 2009; Smedslund, Berg, Hammerstrom, Steiro, Dahl & Karlsen, 2011; Cognitive Behavioural Therapy: Butler, Chapman, Forman & Beck 2006; Olatunji, Cisler, & Deacon, 2010; Westbrook & Kirk, 2005; Wykes, Steel, Everitt, & Tarrier, 2008; Cognitive Analytic Therapy: Chanen, Jackson, McCutcheon, Jovev, Dudgeon, Yuen, Germano, et al., 2008; Ryle & Golynkina, 2000). Of these approaches, Cognitive Behaviour Therapy (CBT) and Motivational Interviewing (MI) are two of the most widely used and have an extensive evidence base. CBT is a structured, problem-focused therapeutic approach, devised to improve mood, motivation and behaviour by helping clients to think more adaptively (Butler & Beck, 1995). Originally conceived for unipolar depression, CBT is now widely used to treat many other mental health difficulties (see above reviews). MI is a “collaborative, person-centred form of guiding, to elicit and strengthen motivation for change” (Miller & Rollnick, 2009). MI techniques have been evidenced as being effective in a number of health and clinical psychology settings, such as those dealing with substance abuse disorders, diet and exercise, diabetes, and oral health (see Martins & McNeil, 2009 for a review). CBT and MI share several commonalities, for example, in general they both emphasise a collaborative approach, are understood to be most effective when focussed on specific problems or behaviours (Flynn, 2011), both recognise the importance of supporting self-efficacy (Miller & Rollnick, 2002; O’Leary & Wilson, 1987) and the manner in which both approaches address ambivalence appear compatible (Driessen & Hollon, 2011).

In terms of our understanding of how positive change is achieved, MI and CBT research have developed independently, due to the differing assumptions underlying the efficacy of the approaches. Several mechanisms of change have been supported
empirically (MI: Apodaca & Longabaugh, 2009; Morgenstern, Kuerbis, Amrhein, Hail, Lynch & McKay, 2012, CBT: Garratt, Ingram, Rand & Sawalani, 2007; Haubert & Dobson, 2007; Hoffart, Sexton, Hedley, & Martinsen, 2008; Shahar, Britton, Sbarra, Figueredo, & Bootzin, 2010; Smits, Powers, Cho, & Telch, 2004). For example, a recent review of the putative mechanisms underlying behaviour change in MI for substance abuse identified four constructs related to the therapist (spirit, consistent behaviours, inconsistent behaviours, and specific techniques) and five constructs relating to the client (change talk, readiness to change, engagement, resistance and experience of discrepancy) (Apodaca & Longabaugh, 2009).

Regards mechanisms underlying change in CBT for depression, for example, Garrat et al.’s (2007) review found that evidence generally supported the cognitive mediation hypothesis (Clark, Beck & Alford, 1999). This hypothesis proposes that in CBT, therapeutic improvement is made through bringing about cognitive changes in the individual. However, despite such evidence regarding mechanisms of change, and the wealth of evidence for efficacy and effectiveness of MI and CBT, still relatively little is known in regard to the specific cognitive and emotional processes which may occur during therapy and which underlie change.

In attempting to identify the specific cognitive processes that may underlie change in MI and CBT, reasoning is a cognitive process that is of interest. In both MI and CBT the client’s ability to reason is arguably central to producing change. For example, in the case of CBT, ‘cognitive restructuring’ (Beck, 1976) requires the client to recognise their negative thoughts, question and weigh up the evidence for their legitimacy, and arrive at a decision of whether that thought was ‘balanced’. Correspondingly, in MI the client is required to explore ambivalence to change; that is,
Weigh up the arguments and evidence for the pros and cons to keeping the status quo, or changing their target behaviour, consequently arriving at a decision of whether to change or not. Thus, examining the extent to which reasoning has been considered in the theory and practice of these therapeutic approaches is of importance. Understanding the role of emotion and the interactions between emotional and cognitive processes is fundamental to psychological theories of mental health problems in regard to their aetiology and maintenance (Cisler & Kostler, 2009; Gotlib & Joorman, 2010; Mobini & Grant, 2007). Hence, there is also a clear need to understand exactly how these processes interact in the therapies designed to treat such problems. Therefore, the central aim of this paper was to determine the relevance of reasoning and emotion processes to the theory and practice of MI and CBT, and to determine the implications of the literature regarding the interactions of reasoning and emotion to these approaches.

There were three objectives of this narrative review. The first was to explore the evidence for the role of reasoning in emotional disorders and within the theory and practice of CBT and MI. The second objective was to consider the role of emotion in these approaches and the evidence that supports this. The third objective was to systematically explore the literature that examines how emotion impacts deductive reasoning ability and to extrapolate the findings to the practice of CBT and MI.

The role of reasoning in therapy

Reasoning has been defined as the process by which people accomplish decision making and problem solving (Leighton, 2004) using available information, in order to make inferences with a view to building understanding of their context.
(Blanchette & Richards, 2010). It has been argued that there is no single model of reasoning, with distinctions made between formal and informal models of logic and the way that individuals reason in specific situations (e.g., Evans & Over, 1996; Johnson-Laird, 1982) for example in educational learning.

The majority of research into reasoning has been conducted within the formal reasoning domain where performance has been measured against formal models of normatively correct performance (Toplak & Stanovich, 2003). Much of the research examining formal reasoning has utilised classic puzzles such as 'The Wason Selection Task' (Wason & Shapiro, 1971) and examined how people reason about 'conditionals' within sentences in natural language (Evans, Newstead & Byrne, 1993). The Wason puzzle can take several forms, usually involving the individual being shown four cards marked with both a number and a colour. The individual must decide which card(s) to turn over in order to test the validity of a proposition. Examining reasoning in natural language has commonly been accomplished using syllogisms whereby a proposition is inferred by primary and secondary premises; for example people may make the modus ponens inference on being given the indicative conditional "If A then B".

The lesser studied area of informal reasoning has been defined as a branch of logic aimed at developing standards, criteria and procedures for analysing, interpreting, evaluating, critique and constructing arguments in everyday conversations within natural language (Johnson & Blair, 2000). It has been argued that informal reasoning (Galotti, 1989; Rips, 2001) better describes how people think about common everyday problems than formal reasoning (Kuhn, 1992). The majority of research in this area has examined instructional or educational learning (e.g., Kolsto, 2006; Sadler, 2004; Sadler & Zeidler, 2005; Toplak & Stanovich, 2003; Wu & Tsai, 2007; Yang, 2005). Informal reasoning, as a construct, has been argued to "subsume both cognitive and
affective processes that contribute to the resolution of complex issues” (Sadler & Zeidler, 2005).

One characteristic of informal reasoning performance that seems to be generalisable across reasoning tasks and domains has been an individual’s ability to remain actively open-minded and unbiased in their thinking (Baron, 1991, 1995, 2000). Individuals have commonly been observed to generate more arguments and evidence in favour of a previously held view than they do for arguments opposing a previously held view (Toplak & Stanovich, 2003). Lack of this so called ‘my-side’ bias has been viewed as one component of rational thought within informal reasoning tasks (Dole & Sinatra, 1998; Nickerson, 1998; Perkins et al., 1993; Stanovich, 1999) suggesting that those who do not display this bias are more accomplished at informal reasoning.

How has the role of reasoning been considered in CBT?

In his cognitive theory of emotion, Beck attributed emotional disorders to faulty reasoning, proposing that examination of the individual’s thoughts would reveal invalid reasoning, such as reasoning based on misconceptions or false beliefs (Beck, 1976) (Johnson-Laird, Mancini & Gangemi, 2006). The extent to which faulty reasoning is a key component of the psychopathology of mental health disorders has been argued to be exaggerated (Oatley & Johnson-Laird, 2011). However, there is a body of empirical evidence to suggest that deficits and biases in reasoning may well be associated with a wide range of emotional disorders, for example, in depression (Singh-Manoux et al., 2010; Yen, Rebok, Gallo, Jones, & Tennstedt, 2011), Obsessive Compulsive Disorder (OCD) (Pélassier and O'Connor, 2002; Simpson, Cove, Fineberg, Msetfi & Ball, 2007), specific phobia (de Jong et al., 1997), heath anxiety (Smeets, de Jong & Mayer, 2000), and in relation to delusional thought in psychosis (Corcoran et al., 2006; Garety, et al.,
It has also been argued that theory of mind in individuals with schizophrenia and depression can be understood as problems of inductive reasoning (Corcoran, 2001, 2003).

In addition to utilising metacognitive strategies, CBT practice has been proposed to draw mainly on explicit verbal reasoning processes with a view to changing memory representations through logical or causal reasoning (Brewin, 2006). These processes are similar to contemporary ideas of reasoning that conceptualise the world in a conscious, rule-based, deliberate and logical manner (Evans, 2004; Kahneman, 2003). In terms of the theory and practice of CBT then, it could be argued that reasoning processes appear to be considered of central importance, as they are implicated in the aetiology of disorders and also utilised in their amelioration. However, to the author’s knowledge, there has been little explicit focus on reasoning processes in CBT practice, and limited empirical study of reasoning processes in CBT. The exception to this appears to be in the area of psychosis.

Empirical research has shown that individuals with delusional symptoms, have been observed to have differences in data-gathering and hypothesis-testing (Chiappelli & Giusberti, 2001; John & Dodgson, 1994) showing biases in reasoning such as belief inflexibility and jumping to conclusions (JTC) (Garety, et al., 2005) and to heuristic reasoning (Corcoran, et al., 2006). A recent pilot study by Waller, Freeman, Jolley, Dunn and Garety (2011) trialled a metacognitive therapy-informed training programme, specifically targeted at individuals with persistent high conviction delusions, which aimed at improving their reasoning processes. Results were promising in that improvements in JTC, belief flexibility and delusional conviction were observed between pre- and post-intervention measures, building on previous findings of pilot studies in this area (Aghotor, Pfueller, Moritz, Weisbrod, & Roesch-Ely, 2010; Moritz &
Woodward, 2007a, b). Thus in relation to psychosis, reasoning biases have not only been evidenced as characteristic of delusional thought, interventions have been developed and tested which explicitly aim to improve reasoning.

Despite limited evidence of an explicit focus on improving reasoning processes in CBT, it can be argued that faulty or biased reasoning is often implicitly addressed in such approaches. A case in point is social anxiety. Cognitive conceptualisations of social anxiety (Clark & Wells, 1995) suggest that individuals are biased toward interpreting ambiguous social information negatively (thinking errors) and empirical evidence has supported this (Amir et al., 1998; Stopa & Clark, 2000). CBT for social anxiety attempts to addresses such biases through methods such as the positive data log (Beck, 1995) which is a task designed to address interpretation biases by encouraging clients to gather positive evidence from wide sources, to inform their reasoning regarding beliefs they hold about themselves, and to reinforce replacement positive beliefs.

Empirical research into reasoning in social anxiety has shown that on a syllogistic reasoning task, belief bias (a bias in deductive reasoning that acts to confirm rather than falsify prior beliefs) increased linearly to fear of negative evaluation in highly socially anxious participants (Vroling & de Jong, 2009). Vroling and de Jong, (2009) suggested this indicated that highly socially anxious individuals have difficulties in judging anxiogenic information as false and reassuring contradictory evidence as true, which may well maintain their anxiety though preventing the adjustment of their dysfunctional cognitions.
The positive data log task in CBT encourages clients to gather a wealth of reassuring evidence, this CBT technique arguably therefore implicitly counters belief-bias. Nevertheless, to the author’s knowledge the empirical literature for CBT approaches to social anxiety has not turned its attention directly towards examining reasoning processes.

**How has the role of reasoning been considered in MI?**

In describing the importance of awareness building as a process essential to MI, Miller (1983) suggested that the principles used to increase awareness should follow the Socratic teaching strategy that "the person is more likely to integrate and accept that which is reached by his or her own reasoning processes" (Miller, 1983). However, despite the explicit reference to the importance of reasoning processes in MI, to the author’s knowledge there has been no formal study of the role of reasoning in MI. Explanations of mechanisms of change in MI place emphasis on qualitative therapist and client factors and the importance of the production of change talk (Apodaca & Longabaugh, 2009). Through examining ways in which the therapist aims to elicit client change talk in MI, it is possible to hypothesise ways in which reasoning processes may be implicated in this practice.

In MI, change talk refers to statements made by the client that indicate their consideration of, motivation for, or their commitment to behavioural change (Miller & Rose, 2009). Preparatory change talk refers to talk which reflects statements of desire, ability, need and reasons for change. The role of the practitioner in MI is to actively listen for statements which may indicate reasons for change and to reinforce them; for example by asking for elaboration or by including them in a summary. The process of elaboration requires the client to gather and generate evidence or ‘reasons’ for change,
and then potentially reach a conclusion on whether to make behavioural change based on these multiple observations. Parallels can be drawn between this process and definitions of reasoning which assert that reasoning is a process by which people accomplish decision making and problem solving (Leighton, 2004) using available information, in order to make inferences with a view to building understanding of their context (Blanchette & Richards, 2010). Therefore it could be hypothesised that the practice of reinforcing reasons to change through elaboration, illustrates a focus on the individual’s reasoning processes in MI in relation to preparatory change talk.

In recent studies of therapy process in MI for substance use, reasons for behaviour change generated by clients were found to predict abstinence at follow-up in adolescents (Baer, Beadnell, Garrett, Hartzler, Wells, & Peterson, 2008) and adults (Walker, Stephens, Rowland & Roffman, 2011). The theory of MI alludes to the importance of reasoning, however, does not appear to explicitly identify it as a process underlying change. MI practice emphasises a focus on the elicitation of change talk which may include encouraging the elaboration for reasons for change. The expression of reasons for change has been observed to predict abstinence in relation to cannabis use (Walker et al.; Baer et al., 2008). Thus it can be hypothesised that reasoning is relevant to MI theory and practice. However, despite recent empirical evidence, thus far there have been no formal investigations into the relationships between reasoning processes and the production of preparatory change talk in MI.

**Summary**

Reasoning can be shown to be of importance within the conceptualisation of CBT and within its practice. However, the explicit empirical evidence to support this is limited, and there is little research to show that the improvement of reasoning
processes in CBT practice has been considered. The exception to this seems to be a small body of research focusing on reasoning biases and their remediation in psychosis. Regarding MI, reasoning seems relevant in regard to this approach in that clients are encouraged to elaborate on reasons for change, so to encourage the production of behaviour change statements. There is empirical evidence to suggest that client expression of reasons for change can be associated with positive outcomes in this approach. However, despite this, and the explicit references to reasoning in Miller’s (1983) early conceptualisation of MI, to the author’s knowledge there has been little study of reasoning processes in this approach.

**To what extent are emotions relevant to therapy?**

Defining the term ‘emotion’ is a complex task. Izard (2010) recently surveyed eminent emotion theorists and researchers, canvassing opinion as to their working definitions of emotion, its’ structure and functions. The results were diverse and suggested that emotion could not be defined as a unitary concept (Izard, 2010). However, Izard (2010) was able to identify six relatively distinct structures and nine functions of emotion on which the opinion of theorists and researchers appeared to converge. Izard (2010) found that:

"Emotion consists of neural circuits (that are at least partially dedicated), response systems, and a feeling state/process that motivates and organizes cognition and action. Emotion also provides information to the person experiencing it, and may include antecedent cognitive appraisals and ongoing cognition including an interpretation of its feeling state, expressions or social-communicative signals, and may motivate approach or avoidant behavior, exercise control/regulation of responses, and be social or relational in nature” (Izard, 2010).
In clinical psychology, across diverging conceptual frameworks, different therapeutic traditions (psychodynamic; experiential; cognitive behavioural) have long held contrasting views as to the relevance of emotional processing in therapy when compared to other aspects of experience such as interpersonal processes, cognition and overt behaviour (Coombs, Coleman & Jones, 2002; Menin & Farach, 2007). Emotional processing has been conceptualised by Rachman (1980) as "...a process whereby emotional disturbances are absorbed and decline to the extent that other experiences and behaviour can proceed without disruption" (1980, p. 51). Rachman (1980) suggested that symptoms of psychopathology for example nightmares and flashbacks in posttraumatic stress disorder (PTSD) (Baker, 2010; Rachman, 2001; Rauch & Foa, 2006) may be artefacts of a failure to completely process emotional disturbances. In experiential and psychodynamic traditions (process experiential therapy: Greenberg, Rice & Elliott, 1993; emotional focusing: Gendlin, 1978, 1996) emotional processing has consistently been linked to positive outcomes (Greenberg & Safran, 1987; Orlinsky & Howard, 1986; Watson & Bedard, 2006). Hence the elicitation, activation and exploration of emotions have been considered as central to the therapy process and fundamental to change (Whelton, 2004).

To what extent are emotions relevant to cognitive therapy?

CBT has been criticised for emphasising the importance of evaluating the legitimacy of thoughts and controlling emotional responses, with less emphasis on emotional experiencing or processing in therapy (Hayes, Strosahl, & Wilson, 1999, 2006; Menin & Farach, 2007; Samoilov & Goldfried, 2000). While there is some evidence to support this assertion (Coombs, Coleman & Jones, 2002; Goldfried, Castonguay, Hayes, Drozd, & Shapiro, 1997) there is also evidence to suggest that the role of emotion can be demonstrated to be of importance in regard to CBT theory and
practice. However, the importance attributed to the elicitation and processing of emotions would seem to vary across CBT approaches to differing disorders. The next section explores the role of emotion in relation to cognitive therapy for depression, PTSD and in regard to the use of positive emotion in contemporary CBT-based approaches.

**The role of emotion in CBT for Depression**

The theory underlying cognitive therapy for depression (Beck, 1976; Beck, Rush, Shaw & Emery, 1979) proposes that the identification and exploration of emotions during therapy is of significance in regard to identifying and modifying the cognitions responsible for depressive symptoms. In this approach, negative emotion has been considered as evidence of worsening depressive ideation and symptoms (Beck, et al., 1979). With a focus on current cognitive functioning considered as crucial in CBT (Clark, 1995), depressed affect in therapy is examined for its source of faulty data with the therapist aiming to make links between ‘hot cognitions’ or emotionally charged thoughts and erroneous beliefs. CBT techniques in which individuals are encouraged to evaluate and ‘scientifically’ test their assumptions, beliefs and negative automatic thoughts about themselves, their circumstances and the world around them, are subsequently utilised to redeploy and alter distorted and unhelpful affect (Beck et al., 1979). The efficacy of this approach in ameliorating depressive symptoms, including depressive affect, has been supported by empirical evidence (Gloaguen, Cottraux, Cucherat, & Blackburn, 1998).

In addition to the importance of exploring affect, emotion is considered in regard to building a therapeutic alliance. For example, the display of empathy and sensitivity to the client’s feelings are also seen as essential ingredients to achieving
positive outcomes (Beck et al., 1979). Therefore rather than controlling or containing emotions, CBT for depression appears to advocate the exploration of affect and its’ links to cognition, via a working relationship characterised by the display of empathy and sensitivity.

In studies which have compared the emotional focus of CBT therapy sessions to that of psychodynamic approaches, the results have been mixed. Some have shown no differences between approaches (Jones & Pulos, 1993; Wiser & Goldfried, 1993), whereas others have observed CBT to focus less on emotion than psychodynamic approaches (Coombs, Coleman & Jones, 2002; Goldfried, Castonguay, Hayes, Drozd, & Shapiro, 1997). One such study (Coombs, et al., 2002) explored the in-session client expression of emotion, and therapist stance in relation to this in both CBT and interpersonal therapy (IPT) for depression. They found that in both approaches their identified factors ‘Collaborative Emotional Exploration’ and ‘Educative/Directive process’, were highly applicable to therapist stance. However, in CBT sessions therapists were significantly more likely to take an Educative/Directive process’ stance and in IPT therapists significantly more likely to take a ‘Collaborative Emotional Exploration’ approach. The results suggested that although CBT therapists focussed on emotional exploration during therapy, they were significantly more likely to take an approach that deemphasised emotion, redirected attention to cognitive themes, and educated and advised about practicing change. These results suggest that in CBT for depression, emotions are focussed on, but perhaps to a lesser degree to cognition.

Coombs et al. (2002) further examined the importance of the client’s affective experience during therapy. They found that clients with higher levels of painful affect experienced during therapy also had poorer outcomes in both approaches, suggesting
that there is an optimal level of patient emotion in psychotherapy above which there is worse outcome in IPT and CBT (Coombs et al., 2002). In addition to this they found that as painful emotion increased in clients, therapists found it more difficult to apply modality-specific interventions.

**Emotional processing in PTSD**

The importance of eliciting and processing emotions during CBT can be demonstrated in contemporary approaches to post-traumatic stress disorder (PTSD) such as trauma focussed CBT (TFCBT). Consistent with theories of trauma (Foa & Kozak, 1986; Horowitz, 1986) TFCBT approaches often emphasise the importance of activating fear responses (emotional engagement) to traumatic events, during exposure work using techniques such as imaginal reliving (Foa & Rothbaum, 1998) and during other approaches (Ehlers, Clark, Hackmann, McManus & Fennell, 2005) which integrate exposure and cognitive restructuring by looking at ‘hot spots’ (moments of great distress) in the trauma memory. TFCBT has an established evidenced base indicating its efficacy in the remediation of PTSD symptoms, along with other approaches such as eye movement desensitisation and reprocessing (EMDR) (Bisson, 2007). Thus the activation and experience of negative emotions during CBT can be argued to be of importance in trauma based approaches and seem to be relevant to achieving positive outcomes in PTSD.

**Positive psychology**

Throughout the past 6 decades leaders in various areas of psychology have called for an increased focus on more positive themes (Tennen & Affleck, 2003). This has culminated in the advent of the Positive Psychology Movement in the 1990’s, the growing concentration on the promotion of positive function (Duckworth, Steen & Seligman, 2005; Linley, Harrington, Joseph & Wood, 2006) and the new drive for a
Positive Clinical Psychology as described by Wood and Tarrier (2010). An important consideration of the relevance of emotion to cognitive therapeutic approaches is, therefore, the recent focus on the use of positive emotions during the therapy process.

The broaden-and-build theory (Fredrickson, 1998, 2003, 2009) argues that positive emotions allow individuals to amplify their normal range of thought-action repertoires through flexibly drawing on higher-level connections and wider ranging ideas, percepts and action urges (Garland, Fredrickson, Kring, Johnson, Meyer & Penn, 2010). This broadened cognition is thought to lead to behavioural flexibility which may cumulatively build personal resources, such as resilience and mindfulness (Cohn, Fredrickson, Brown, Mikels & Conway, 2009). Accumulating evidence has supported these assertions in relation to, for example, the scope of visual attention, peoples’ repertoire of desired actions (Fredrickson & Branagan, 2005), openness to critical feedback (Raghunathan & Trope, 2002) and closeness with others (Waugh & Fredrickson, 2006).

The application of these findings has been seen recently in several areas. For example, interventions aimed at increasing gratitude have been found to reduce body dissatisfaction and worry as effectively as common CBT techniques (Geraghty, Wood & Highland, 2010a; Geraghty, Wood & Highland, 2010b). Similarly, the concept of reciprocity has been used with individuals with PTSD (Tarrier & Humphreys, 2003) whereby encouraging individuals to help others has been observed to increase their own sense of self-worth, self-efficacy, increase positive social interactions and create a resource of support from which they can draw in future.
The broad-minded affective coping (BMAC) technique is designed to promote positive emotions through the act of recalling positive autobiographical memories (Tarrier, 2010). This cognitively-based technique involves relaxation, guided imagery of positive memories, engaging senses, exploring emotion and interrogating the memory. A recent study compared BMAC to a control task of listening to classical music whilst relaxing, in individuals with schizophrenia-spectrum disorders, finding greater increases in happiness and hope in participants in the BMAC condition compared to controls (Johnson, Gooding, Wood, Fair & Tarrier, 2012). Positive results have also been observed with BMAC in relation to individuals with PTSD (Panagioti, Gooding & Tarrier, 2012).

**The role of emotion in Motivational Interviewing (MI)**

MI has been styled as a therapeutic approach born through integrating social and cognitive psychology research findings with concepts derived from humanistic, cognitive and behavioural therapies (Wagner & Ingersoll, 2008). MI, in general, places emphasis on cognitive rather than emotional strategies (Miller & Rollnick, 2002). However, it has been argued (Wagner & Ingersoll, 2008) that emotion is at the heart of MI theory and process in that the therapist’s creation of a context in which individuals may experience both positive and negative affect, is central to achieving therapeutic aims. The empirical evidence to support the centrality of affect in effective MI is limited. Nevertheless, a number of key strategies in MI including the creation of discrepancy and the use of empathy are designed to increase motivation for change through the experience of affect.

Self-discrepancy theory purports that negative feelings highlight a discrepancy between the actual and desired states, or goals, that an individual holds (Carver,
One way to resolve this discrepancy is to move towards the desired state or goal, i.e. to engage in behaviour change. In MI, the tension or negative mood state that unresolved ambivalence may create is argued to have a motivational effect on the individual, leading them to seek resolution (Wagner & Ingersoll, 2008). The therapist is therefore tasked with developing a sense of discrepancy in clients (Miller & Rose, 2009).

There is some empirical evidence to support the effectiveness of MI in developing discrepancy. Two studies have shown MI to have a small to medium effect size on increasing the client’s experience of discrepancy compared to assessment only (McNally, Palfai & Kahler, 2005) and relaxation/medication (Budney, Higgins, Radonovich, & Novy, 2000). Further to this, an increased sense of discrepancy has been associated with a small to medium effect size on substance use outcomes in clients (McNally et al., 2005).

As regards the role of positive emotions in MI, Wagner and Ingersoll (2008) argued that therapist agape (Miller, 1999) a form of love aimed at cultivating the client’s sense of well-being, and the principles that guide therapist behaviour such as ‘express empathy’, may play a role in facilitating positive outcomes in MI. Parallels can be drawn between MI theory which advocates therapist agape, and the use of empathy and rolling with resistance, and with Fredrickson’s (1998, 2003, 2009) broaden-and-build theory, in that both theoretical perspectives propose that using and promoting positive emotions can counter the effects of negative emotional experience and self-perceptions in the client, leading to positive experience and therapeutic gains. Wagner and Ingersoll (2008) suggest that through expressing an understanding and acceptance of the client’s experience, the therapist may invoke a sense of calmness and safety; reducing feelings of isolation thus lessening the impact of any negative
affect. There is empirical evidence to suggest that in MI empathy can be associated with positive outcomes. Gaume et al., (2008) reported a positive correlation between therapist empathy and 12-month alcohol use outcomes. However, whether this effect is mediated by the creation of a positive affect resulting from empathy is unclear.

Emotion has also been considered in the MI therapy process in terms of the specific focus of therapy dialogue. There is some evidence that negative mood states may result in the generation of fewer behaviour change statements; a key predictor of positive outcome in MI. For instance, caution has been emphasized in the use of negative feedback during MI (Amrhein, Miller, Yalne, Palmer, & Fulcher, 2003). It was found that individuals who were ambivalent about behaviour change regarding drug abuse endorsed their current drug taking status rather than showing commitment to behaviour change when they were given negative feedback.

**Summary**

The role of emotion in CBT appears to be complex and yet to be fully understood. Theory underlying cognitive therapy for depression places importance on exploring emotion in order to identify the underlying pathology in cognition. In studies, CBT therapists have been observed to attend to emotional exploration during therapy, however, they have also been observed to be significantly more likely than other approaches to deemphasise emotion. The activation of fear associated with trauma is argued to be essential in CBT approaches to PTSD, whereas the experience of painful affect during CBT for depression has been found to predict poor outcomes. Conversely the manipulation of positive emotion has been shown to improve outcomes in contemporary CBT approaches. Thus it can be shown that although the role of emotion in CBT is complex and not fully understood, it does seem to be of importance.
Regards the role of emotion in MI; despite limited empirical evidence, a number of key strategies such as the creation of discrepancy and the use of empathy appear to be important in increasing motivation for change. There is also evidence to suggest that negative feedback in MI may lead to poorer outcomes, implying that the experience of negative affect may in some circumstances be unhelpful.

**How does emotion affect reasoning?**

Having illustrated the ways in which reasoning and emotion appear important to aspects of CBT and MI, the review now explores the empirical literature which has experimentally tested the effects of emotion on deductive reasoning and considers the implications for clinical practice.

There are several areas of reasoning that may be relevant to cognitive therapeutic approaches such as moral and social reasoning and formal and informal reasoning which are discussed in the section which explored the role of reasoning in therapy. However, to examine all areas of potential interest would be beyond the scope of the current review. Deductive reasoning can be defined as the process of reasoning from one or more general statements to draw a logically certain conclusion (Sternberg, 2009). In cognitive models of emotional disorder the role of irrational beliefs in maintaining difficulties perhaps suggests the importance of an individuals’ ability to draw adequate conclusions (Vroling & de Jong, 2009). Because of its pertinence to cognitive models of therapy this paper has focused mainly on deductive reasoning.
In their invited review entitled ‘The influence of affect on higher level cognition: A review of research on interpretation, judgement, decision making and reasoning’, Blanchette and Richards (2010) identified fourteen studies that examined the effects of incidental and integral mood on the outcome of deductive reasoning processes. Incidental mood states are that which are experienced independent of the semantic content of the experimental stimuli and integral mood states those experienced where the stimuli have intrinsically emotional semantic meaning. Blanchette and Richards (2010) presented empirical evidence without offering critical appraisal of the studies, leaving it difficult to extrapolate their relevance to clinical practice. Therefore the following sections critically re-examine the studies considered in their review, along with five papers identified through a systematic review of the literature.

Studies experimentally testing the psychological effects of emotion on deductive reasoning were identified following a search using the keywords emotion, reasoning and the Boolean operator ‘and’. This was repeated substituting ‘mood’ for ‘emotion’. The databases PsychInfo, Medline and the Web of Science were searched from 1945 to the end of October 2012. The reference lists of abstracts and papers were also searched by hand. Five papers of interest were identified: Oaksford, Carlile and Moore, (2004); Goel and Vartanian, (2011); Blanchette and Leese, (2011); Perham and Rosser, (2012); Eliades, Mansell, Stewart and Blanchette (2012).

How does incidental mood affect logical reasoning; how may this relate to clinical practice?

Blanchette and Richards (2010) concluded that in regard to state, trait and content, both positive and negative heightened incidental affect appeared to impair logicality. Palfai and Salovey (1993) found that participants in elated (induced) mood
performed slower on deductive reasoning tasks, whereas those in depressed (induced) mood were slower on inductive tasks. Oaksford, Morris, Grainger, and Williams (1996) manipulated mood using a video clip, and tested participant’s performance on The Wason selection task. They found that compared to participants in the neutral mood condition, the reasoning performance of participants in the positive and negative mood conditions was impaired. Similarly, Melton (1995) found participants in a positive mood to be impaired in performance compared to those in a neutral mood on a syllogistic reasoning task. However, given the differences in the manner in which mood ratings data was collected between experimental and control groups, it is possible that the induction group’s ratings were subject to biases. This group was given a rationale for obtaining mood ratings which alluded to experimental aims, whereas the control group was not. This may have led to hypothesis guessing and subsequent ratings aimed at ‘helping’ the researcher.

In addition to affective state, affective traits have been found to influence reasoning. For example, high trait-anxious participants have been shown to be impaired on verbal reasoning in high-demand tasks compared to those with low trait anxiety (Derakshan & Eysenck, 1998) and individuals with high depression (as scored by the Beck Depression Inventory) impaired on syllogistic reasoning tasks (Channon & Baker, 1994).

Studies examining whether participants reason about emotional and neutral contents in a comparable way, have found evidence of impaired logicality when reasoning about emotional contents in clinical (Kemp, Chua, McKenna, & David, 1997) and non-clinical samples (Blanchette, 2006; Blanchette & Richards, 2004). Through using methods such as classical conditioning, whereby both positive and negative valence can be conditioned to the same word, it has been shown that it is the affective
value of content, rather than semantic value that has produced this effect (Blanchette, 2006; Blanchette & Richards, 2004).

The empirical evidence regarding the effects of incidental mood on reasoning would largely seem robust; impairment effects being observed across affective state, trait and content across samples, and using different methods in studies largely of quality. There are several implications of these findings to clinical practice. Firstly, in relating the study findings of Palfai and Salovey (1993) to the clinical practice of CBT for psychosis or bi-polar disorder where individuals may experience both elated or depressed mood, this might suggest that a client in an elevated mood may find it difficult when considering a specific thought or belief in cognitive restructuring, to then generalise this out to other situations or beliefs they hold. The converse may be true for those in depressed moods. Given the variety in the presentations of clients with these difficulties, this would suggest that closely monitoring mood would be important in maximising reasoning ability during the therapy process.

Secondly, as traits are generally thought of as being stable (McCrae & Costa, 1997) and therefore not amenable to remediation, the evidence implies that therapeutic approaches that rely on reasoning may not be helpful for high trait-anxious clients. Therefore this raised the question of whether it is important to assess trait anxiety in clients who seek MI or CBT. Thirdly, if both positive and negative incidental mood may affect reasoning this might suggest that a neutral mood would be the most conducive to reasoning. This suggests that it may be of benefit to avoid emotional material when reasoning or to manipulate mood toward neutrality.
Emotion or depletion of cognitive resources?

There is some evidence to suggest that the impairments observed in reasoning may not be linked to emotional experience per se, but instead due to the production of irrelevant thoughts resulting from the manner in which mood is induced in studies. Perham and Rosser (2012) recently argued that the suppression effect of emotion on reasoning could be understood in context of Ellis and Ashbrook (1988) and Eysenck’s (1979) extrapolations regards allocation of cognitive resources in individuals with elevated mood (such as anxiety and depression), whereby cognitive resources such as attention are focussed towards intrusive thoughts and rumination. Their study tested three groups of participants; controls and those with negative or neutral mood (induced by considering their experiences in relation to twenty words), on the Spielberger State Anxiety Inventory (SSAI: Spielberger, Gorsuch, & Lushene, 1970) pre and post mood induction and after the performance of a syllogistic reasoning task. They found that both mood induction conditions performed significantly poorer on the reasoning task compared to controls. However, those in the negative mood induction condition alone showed a significant increase in anxiety. These findings would suggest that rather than client’s mood disrupting their reasoning processes, it may be that the cognitive symptoms associated with their difficulties that will impact on their ability to reason during therapy.

How does integral mood affect logical reasoning; how may this relate to clinical practice?

Blanchette and Richards (2010) reported that in regard to integral mood, there was growing evidence to suggest that individuals may not necessarily reason less logically, and may in fact perform better when the material on which they reasoned
was intrinsically emotional. The following section examines studies which have tested the effects of integral mood on deductive reasoning.

Blanchette, Richards, Melynk and Lavda (2007) examined the reasoning ability of participants one week after a terrorist attack carried out in London. Participants were selected from three locations and reasoned about syllogisms which were neutral, generally emotional, and emotionally related to terrorism. Generally, participants reasoned more accurately on neutral problems compared with general emotional and terrorism-related problems, implying that consistent with the research on incidental mood, the emotional content of stimuli negatively affected reasoning ability. However, participants from the site of the terrorist incident were moderately more accurate when reasoning about terrorism-related problems and were less likely to exhibit belief-bias, despite reporting high levels of emotion (mixed in valence). Similar results have been found in relation to individuals with OCD and phobias whereby they reasoned more logically when the contents on which they reasoned related to their psychopathology (Johnson-Laird, Mancini, & Gangemi, 2006).

Blanchette et al., (2007) retested participants six months later producing similar results, suggesting that the observed effect was robust. However, several methodological weaknesses limit the reliability of these results. For example, prior to completing the reasoning task, participants were asked about their whereabouts during the terrorist attacks and asked to rate their mood in relation to the attacks. This may have emotionally primed them before the task and therefore it may not have been the syllogisms themselves that produced the emotions experienced by participants. In considering their emotional responses to the terrorist attack, participants rated their emotions on scale of 0 (did not feel this at all) to 100 (felt this more than ever before). From this we are able to deduce differences in emotional experience between
participant groups from different locations. However, in the absence of a standardised and objective measure of mood it is not possible to say whether the emotions experienced by participants were necessarily heightened or at clinical levels.

A second study by Blanchette and Campbell (2012) examined the reasoning ability of war veterans using neutral, generally emotional and combat related syllogisms. They found that veteran’s reasoning was most accurate in relation to war-related syllogisms compared to neutral content, but not significantly different to generally emotional content. However, this effect decreased with increased level of combat experience. Those with PTSD (as measured by the PC-PTSD; Prins et al., 2003) reasoned less accurately overall, but the effect of content type was still observable. The results of this study supported that of Johnson-Laird et al. (2006) suggesting that although participants with PTSD generally were less accurate in their reasoning, they still reasoned more accurately regarding personally relevant stimuli. However, again, methodological issues limit the applicability of the findings. For example, Blanchette and Campbell’s study (2012) lacked a control group. In the absence of being able to compare reasoning performance with a group of individuals who did not have combat experience, it is not really possible to say whether it was the personal relevance of the war-related syllogisms that improved war veterans performance or whether it was due to another factor. Similarly to Blanchette et al. (2007), participants were asked about their combat experiences prior to the reasoning task, and this may have conferred a priming effect on emotion.

In addition to the methodological concerns relating to the studies of integral mood discussed so far, there is also recent evidence which has produced results contradicting the findings. Eliades, Mansell, Stewart and Blanchette (2012) recently tested the effects of emotion on reasoning and belief bias across two experiments,
conducted in two different countries using neutral, generally neutral and sexual abuse-related syllogisms. In both studies the results indicated that increased belief bias could be observed in relation to sexual abuse related contents and that decreased logicality was observed in relation to generally emotional contents of syllogisms. This would suggest that contrary to Blanchette et al. (2007) and Blanchette and Campbell (2012), reasoning about emotional contents which are intrinsically linked to the stimuli, produces impairments to logical reasoning.

Eliades et al. (2012) appear to suggest that due to the different methodologies that they employed across both studies, such as the same syllogisms being presented in different response formats (categorical and scale) and different languages, the findings of both studies could be viewed together as evidence of belief bias and decreased logicality in relation to emotional stimuli. However, in study two there was no reported test of reliability of the translations, and the experiment was carried out as part of a larger battery of tests which may have led to fatigue and priming effects due to the additional tests examining the effects of emotion on other cognitive processes. Further to this the conclusions of valid and invalid syllogisms were differently worded to each other, making it difficult to attribute the validity of premises as the cause of the effect between the categories.

Putting aside the methodological concerns raised, the results of the studies by Blanchette et al. (2007) and Blanchette and Campbell (2012) suggest that individuals’ reasoning abilities may be enhanced by focussing on material that is of personal valence. While therapy undoubtedly involves a focus on personal themes, there are occasions when the therapist may bring in more generalised or neutral themes. In CBT for panic disorder (DSV IV APA, 1994) for example, during socialisation to the model,
when introducing the idea that performing safety behaviours prevents clients from having experiences that disconfirm their unhelpful beliefs, the therapist may use metaphor or allegory to illustrate this point (Wells, 1997). However, based on the preliminary evidence presented it may suggest that it would be beneficial to avoid the use of metaphor or more general sources of material during cognitive restructuring and only focus on personally relevant material in order to enhance the client’s reasoning processes.

Regards the implications of these studies to the practice of MI, it may suggest that when eliciting preparatory change talk in clients, it may be most effective to encourage them to reflect on personal reasons for and against behaviour change. For example, rather than reasoning about the effects of alcohol use on the body using evidence from psycho-education, research or the opinion of Doctors, it may be preferable to focus on more personal sources of evidence such as family, friends and the clients own observations.

Blanchette and Campbell’s study (2012) indicated that participants with PTSD, although generally less accurate in their reasoning, still reasoned more accurately in regard to personally relevant stimuli. These findings are encouraging in context of the literature regarding the effects of incidental mood state which has suggested that individuals experiencing extremes of emotional state (Palfai & Salovey, 1993) are impaired on logical reasoning tasks.
The influence of negative emotions on belief bias

Goel and Vartanian (2011) investigated the role of negative emotions in relation to attenuating belief bias in logical reasoning. The results of this study which used a syllogistic reasoning task showed that when participants were exposed to negative emotionally charged stimuli, they were less likely to be influenced by their beliefs, suggesting that under certain conditions, negative emotions can attenuate beliefs in logical reasoning and reverse belief-bias. They also observed that ‘reaction times’ (i.e. the time taken to draw a conclusion) on reasoning tasks were significantly longer on accurate trials in the negative opposed to neutral content condition; also observing that reaction times were longer for invalid (opposed to valid) responses to invalid syllogisms with believable conclusions, suggesting a link between negative content and higher accuracy. Goel and Vartanian (2011) suggested that their and the results of Blanchette et al. (2007) could be accounted for by the Affect Infusion Model (Forgas, 1995) which proposes that negative emotions may lead to processing that is more vigilant and systematic and so reduces the effect of beliefs on reasoning.

The results of this study (Goel & Vartanian, 2011) imply that the experience of negative emotion may lead to a more systematic style of processing which decreases the likelihood of reaching conclusions based on the individual’s beliefs. This finding might be considered in context of the theory and practice of MI which purports that the creation of discrepancy (induction of a mild negative mood) through examining the current status quo and a potential alternative/preferred future, leads towards the production of change statements, which are known to predict positive outcome (Miller & Rose, 2009). It may be that through experiencing negative emotion, clients reason more carefully and systematically regarding the pros and cons of behaviour change, because being in this negative state reduces the likelihood of them being biased by
their previously held beliefs. Nonetheless, due to the novel nature of this study and its small sample size (n= 34) the results perhaps should be considered with caution.

**The role of arousal in reasoning**

The literature discussed so far has shown complex effects of emotion on reasoning. Nonetheless, little research has sought to ‘unpack’ these effects and illustrate any direct causal links between reasoning performance and the specific components of emotion. One study that has addressed this issue examined the potential role of arousal in suppressing reasoning performance.

Blanchette and Leese (2011) investigated sympathetic nervous system arousal in relation to reasoning with negative and neutral stimuli. Participants’ arousal was measured using skin conductance methods when their mood was 1) manipulated by the emotional value of stimuli through classical conditioning, 2) with either the simultaneous presentation of neutral/negative pictures and 3) using intrinsically neutral/negative words. Participants who showed greater skin conductivity to negative compared to neutral stimuli were observed to be more likely to make errors on negative rather than neutral reasoning content; supporting the idea that there may be a negative link between physiological arousal and logicality in deductive reasoning.

The results of Blanchette and Leese’s (2011) study suggest that the arousal associated with negative emotional experience, or ‘emotion-induced arousal’ may have led to impaired reasoning performance. Blanchette and Campbell (2012) found that war veterans reasoned more accurately in regard to combat-related syllogisms. However, those with increased level of combat experience lost this advantage. Coombs et al. (2002) found that clients with higher levels of painful affect experienced during
CBT had poorer outcomes. An interesting question then is whether these observed effects might be due to the level of arousal experienced? It may be the case that the personal relevance of the stimuli led participants to reach an optimum level of arousal, which, in accordance with the Yerkes Dodson law (Yerkes & Dodson, 1908) facilitated reasoning during the task. When the optimal level of arousal was surpassed (for participants with increased level of combat experience), this effect decreased. Again, this may be relatable to the role of discrepancy in MI.

As discussed, the creation of discrepancy in MI is thought to encourage the individual to move from an unpleasant state to one that is more desirable, through the resolution of ambivalence (Miller & Rose, 2009). Blanchette and Leese, (2011) found that participants with greater skin conductivity to negative compared to neutral stimuli were more likely to make errors on negative rather than neutral reasoning content. This perhaps leads to the question of whether it is useful to monitor arousal during MI to ensure that in experiencing discrepancy, clients do not become aroused to the point that it is of detriment to their ability to reason.

**Can reasoning effect emotion?**

The literature we have reviewed so far has focussed on the effects of emotion on the outcomes of reasoning. A further consideration is the way in which reasoning itself may have an effect on emotion. Oaksford, Carlile and Moore (2004) suggested that as recent cognitive theories (Oatley & Johnson-Laird, 1987, 1995) have proposed that emotions are elicited by significant cognitive events that might occur in the performance of a task (for example negative mood may be induced by the failure of a plan or loss of a goal; Oatley & Jenkins, 1996, p.256), other high level cognitive events such as reasoning may also produce this effect. In their subsequent study they
explored whether performing a reasoning task affected emotional state in the context of different prior moods. Mood was assessed pre and post mood-induction procedure, and then after a syllogistic reasoning task. The results indicated that participants in the positive, but not negative or neutral mood, moved to a more negative mood after the reasoning task, suggesting that individuals may move to a state most conductive to the cognitive task they are performing and that this may be a neutral or negative mood.

The findings of Oaksford, Carlile and Moore’s study (2004) resonate with those relating to incidental mood which inferred that a neutral mood state may be most conducive to reasoning. In addition, they suggest that the measurement of mood post reasoning task may be as important as measurement prior to task completion, as it has been shown that the act of reasoning may change mood states. These findings are important when considering the validity of all results discussed in this section of the review, implying that it cannot be assumed that the mood participants were induced into, were the moods they were in for the duration of reasoning tasks or thereafter. Considering the relevance of these findings to therapeutic practice, this may mean that it is important to monitor mood both prior to, and post work involving reasoning processes. Not least to ensure that if indeed a negative mood state is moved to, that this doesn’t confer any risk to the client.

**Summary and conclusions**

We have presented evidence to support the assertion that reasoning and emotion are processes that are important to the theory and practice of CBT and MI. Further to this, our critical examination of the literature which has explored the effects
of emotion on the outcome of deductive reasoning has illuminated several issues pertinent to the clinical practice of MI and CBT.

In concurring with Blanchette and Richards (2010) that a number of studies have demonstrated impairment effects for positive and negative incidental mood state, trait and content, we hypothesised several ways in which this may impact therapeutic process. Firstly, as incidental mood has been observed to affect inductive and deductive reasoning differently (Palfai & Salovey, 1993) the client’s experience of elevated or depressed mood state may determine the focus of cognitive restructuring (i.e. working with specific themes/negative thoughts or beliefs and generalising the learning to other areas, and vice versa). Secondly, as both positive and negative (but not neutral) incidental mood seem to impair reasoning, it may be of benefit to attempt to induce a neutral mood to maximise the benefit to the client. Although, when working with clients who are experiencing mood disturbance, this would prove challenging.

Thirdly, impairments have been observed in relation to increased arousal associated with negative incidental mood (Blanchette & Leese, 2011). This suggests that it may be helpful to monitor arousal during therapy and avoid (negative) highly emotive topics. Lastly, given the observed effects of anxious traits on reasoning (Derakshan & Eysenck, 1998), we raised the question of whether it is important to consider assessing trait anxiety in clients who seek MI or CBT.

Regards the effects of integral emotion on deductive reasoning, it is difficult to draw any reliable conclusions as to the relevance of evidence to clinical practice as
there appear to be relatively few studies, and those reviewed had several methodological weaknesses. However, that said, based on the available evidence, it would appear that when the contents on which an individual reasons are intrinsically emotional and of personal relevance, it may lead to reasoning that is more logical (Blanchette & Campbell, 2012; Blanchette, Richards, Melynk & Lavda, 2007; Johnson-Laird et al., 2006). This would suggest that it may be helpful in therapy to avoid the use of more general themes, metaphor and objective sources of evidence in favour of themes that are specific to the individual.

It is possible that when personally valenced material elicits too much emotion, this may impair reasoning (Blanchette & Campbell, 2012). Given the evidence to suggest that incidental mood states impair reasoning, it would seem that there may be an additive effect, whereby reasoning becomes further impaired when the content of therapy is intrinsically emotional and elicits high arousal. Therefore the management of affect in therapy appears important if people are to have optimum reasoning capacity.

In addition to illustrating how emotion may affect reasoning in therapy, we showed how the act of reasoning itself may effect a client’s mood (Oaksford et al., 2004) thus highlighting the further importance of monitoring mood in therapy. In addition to this we proposed that the findings of Oaksford et al. (2004) that individuals seem to move to a more neutral or negative mood state after reasoning, may call in to question the reliability of the evidence considered in the review.

In light of Perham and Rosser’s (2012) findings that impaired reasoning appeared to be due to a depletion of cognitive resources resulting from the mood induction utilised in experiments and not emotional experience, we considered whether
the cognitive symptoms associated with emotional disorders such as rumination and worry may affect the client’s ability to reason in therapy.

By bringing together two bodies of literature from the experimental study of cognition and clinical psychology, we have hypothesised how the findings of one may relate to the other. In doing so, we have highlighted the paucity of empirical evidence examining reasoning and emotion or indeed their interactions, during the therapy process, and demonstrated the need for further study of the specific cognitive and emotional processes which may underlie MI and CBT.
The role of everyday reasoning and emotion, in therapy for people with psychosis and alcohol use disorders

KATY SILVERMAN
Preface

The work for this paper was carried out between September 2008 and November 2012. Professor Christine Barrowclough and Dr Patricia Gooding provided overall supervision for this study which included reading drafts of the manuscript.

The author intends to submit this study paper for publication in Behaviour Research and Therapy Journal. Therefore the paper has been prepared in accordance with their guidelines (appendix B). The authors will be Katy Silverman, Professor Christine Barrowclough and Dr Patricia Gooding.
Abstract

Research investigating the cognitive and emotional processes underlying behaviour change in Motivational Interviewing (MI) is limited. The aims of this study were to examine the extent to which statements reflecting informal reasoning and the emotional state of the client affected the generation of positive behaviour change statements and positive behaviour change in the context of MI with individuals with psychosis and alcohol use disorders. Participants (n=26) were clients selected from a large randomised controlled trial of integrated MI and CBT for psychosis and substance use. One audio recorded therapy session was selected for each participant. Reasoning and emotion statements were subsequently identified and categorised for each therapy session. It was found that the total number of reasoning statements generated, positively predicted the total number of positive behaviour change statements. It was also found that negative emotional statements relating to the present, positively predicted the total number of reasoning statements generated. The results suggested that informal reasoning may be a specific cognitive process underpinning the production of behaviour change statements in MI with individuals with psychosis and alcohol use disorders and provided support for the central role of discrepancy in producing change in MI.

Key words: Motivational Interviewing, Psychosis, Substance- misuse, Emotion, Reasoning, Alcohol

Highlights:

- We examine informal reasoning processes and their interactions with emotion in MI
- Informal reasoning ability predicts the production of change statements in MI
- Negative mood resultant of present experiences, predicts informal reasoning ability
• Informal reasoning may be a cognitive process underlying change in MI
Introduction

Empirical evidence for the efficacy and effectiveness of cognitively based talking therapies such as Motivational Interviewing (MI), Cognitive Behavioural Therapy (CBT) and Cognitive Analytic Therapy (CAT) has steadily accumulated over the past thirty years (MI: Martins & McNeil, 2009; Smedslund, Berg, Hammerstrom, Steiro, Dahl & Karlsen, 2011; CBT: Butler, Chapman, Forman & Beck 2006; Olatunji, Cisler, & Deacon, 2010; Westbrook & Kirk, 2005; Wykes, Steel, Everitt, & Tarrier, 2008; CAT: Chanen et al., 2008; Ryle & Golynkina, 2000). In terms of understanding the processes by which positive change is achieved in such therapies, several mechanisms have been proposed (MI: Apodaca & Longabaugh, 2009; Morgenstern, Kuerbis, Amrhein, Hail, Lynch & McKay, 2012; CBT: Garratt, Ingram, Rand & Sawalani, 2007; Haubert & Dobson, 2007; Hoffart, Sexton, Hedley, & Martinsen, 2008; Shahar, Britton, Sbarra, Figueredo, & Bootzin, 2010; Smits, Powers, Cho, & Telch, 2004). For example, a recent review of the putative mechanisms underlying behaviour change in MI for substance abuse identified four constructs related to the therapist (spirit, consistent behaviours, inconsistent behaviours, and specific techniques) and five constructs relating to the client (change talk, readiness to change, engagement, resistance and experience of discrepancy) finding that client change talk and client experience of discrepancy had been consistently linked with favourable outcomes (Apodaca & Longabaugh, 2009).

Regards mechanisms of change in CBT, Garrat et al.’s (2007) review found that evidence generally supported the cognitive mediation hypothesis (Clark, Beck & Alford, 1999) which proposes that in CBT, therapeutic improvement is made through bringing about cognitive changes in the individual. Research has also explored mechanisms of change in regard to CBT for specific emotional disorders. For example, in CBT for panic disorder, the role of the reduction of ‘fear of fear’ has been supported as partially mediating positive outcomes for anxiety, agoraphobia and panic (Smits, et al., 2004). However, despite what is known about efficacy, effectiveness and mechanisms of
change, still relatively little is known about the specific cognitive and emotional processes which may occur during the therapy process. To date, there has been no research examining the specific cognitive and emotional processes thought to underlie cognitively based psychological therapy. The current study sought to address this by investigating the relationships between informal reasoning, behaviour change statements and positive emotion in the context of MI for individuals with psychosis and alcohol disorders.

MI is a client-led therapy for enhancing motivation to change behaviour, through exploring and resolving ambivalence to change (Emmons & Rollnick, 2001; Miller & Rollnick, 2009; Rollnick, Kinnersley, Gregory & Mash, 2010). Research exploring mechanisms of change in MI for substance or alcohol use has identified several constructs relating to both therapist and client thought to be instrumental in achieving positive behaviour change (see review by Apodaca & Longabaugh, 2009). However, the remit of research for the most part has been the active inter-relational therapy process (examining client/therapist dialogue with a focus on the production of change talk) with minimal focus on the cognitive processes that may underlie the generation of change talk. The current study therefore sought to explore specific cognitive processes central to change in MI.

The cognitive focus of this study was informal reasoning. Reasoning is concerned with the evidence or ‘arguments’, used in thinking or argumentation. It has been defined as the process by which people accomplish decision making and problem solving (Leighton, 2004). Informal reasoning is a branch of logic aimed at developing standards, criteria and procedures, for analysing, interpreting, evaluating, critique and constructing argument in everyday conversations within natural language (Johnson &
Blair, 2000). Unlike formal reasoning which is measured against formal models of normatively correct performance within a formal system of abstract thought (Toplak & Stanovich, 2003), informal reasoning has been argued (Rips, 2001) to better describe how people think about common everyday problems (Galotti, 1989; Kuhn, 1992). Paradigms which have been developed to assess informal reasoning generally require participants to generate reasoning statements for and against particular issues, for instance, whether people should be allowed to sell their organs (e.g., Toplak & Stanovich, 2003).

Parallels can be drawn between informal reasoning and psychological therapies with a cognitive element such as MI, as the client's ability to reason is arguably central to producing change. In MI, the client is encouraged to explore ambivalence to change. This involves the client weighing up arguments and evidence for the pros and cons to keeping the status quo, or changing their target behaviour. The outcome of this process is the client making a decision of whether to change or not. In recent studies of therapy process in MI for substance use, reasons for behaviour change generated by clients were found to predict abstinence at follow-up in adolescents (Baer, Beadnell, Garrett, Hartzler, Wells, & Peterson, 2008) and adults (Walker, Stephens, Rowland & Roffman, 2011), supporting the idea that reasoning may well be a process underlying change in MI.

There is an apparent overlap between informal reasoning and social problem solving ability in that they both involve the identification and definition of a problem, followed by the generation and evaluation of possible solutions (Maydeu-Olivares & Dzurilla, 1996). The ability to solve social problems has been investigated using the Means-End Problem-Solving Procedure (MEPS)(Platt & Spivack, 1975). This method, in
which participants are presented with a problematic situation, requires them to
generate the ‘means’ or steps that they would take to resolve the problem. It is
implicitly assumed that the more steps that are taken to reach a solution, then the
more sophisticated that solution is, and so the more complex is the reasoning
underlying that solution. In the current study we adopted the same approach to
measuring the complexity of reasoning.

In descriptions of MI the role of emotion has typically concentrated on the
tensions caused by ambivalence and their part in bringing about change (Wagner &
Ingersoll, 2008). This fits with self-discrepancy theory which purports that negative
feelings highlight a discrepancy between the actual and desired states, or goals, that
an individual holds (Carver, Lawrence, & Scheier, 1999; Carver & Scheier, 1990). One
way to resolve this discrepancy is to move towards the desired state or goal, i.e. to
engage in behaviour change. Nevertheless, there is some evidence that negative mood
states may result in the generation of less behaviour change statements. For instance,
caution has been emphasised in the use of negative feedback during MI (Amrhein,
Miller, Yalne, Palmer, & Fulcher, 2003). It was found that individuals who were
ambivalent about behaviour change regarding drug abuse endorsed their current drug
taking status rather than showing commitment to behaviour change when they were
given negative feedback.

Recently, there has been evidence to suggest that a positive emotional
experience may enhance an individual’s cognitive abilities (Fredrickson & Branagan,
2005; Raghunathan & Trope, 2002; Rowe, Hirsch & Anderson, 2007). The broaden-
and-build theory (Fredrickson, 1998, 2003, 2009) proposes that experiencing positive
emotion may broaden an individual’s cognitive functioning by allowing the amplification
of their normal range of thought-action repertoires, through flexibly drawing on higher-level connections and wider ranging ideas, percepts and action urges (Garland, et al., 2010). This is also thought to lead to behavioural flexibility which may cumulatively build personal resources; for example resilience and mindfulness (Cohn, Fredrickson, Brown, Mikels & Conway, 2009). On the basis of these findings, a key question addressed by the current study was whether positive emotional statements (assumed to reflect the experience of positive mood) would increase the generation of informal reasoning and behaviour change statements.

Often in therapeutic settings where MI is appropriate, clients seek therapy because they have already identified a behaviour as being problematic, such as smoking. Participants in the current study were people with a diagnosis of psychosis who were misusing alcohol. Rather than electing to have therapy, they were referred into a large Randomised Control Trial (RCT) by case managers. Similar to this client group as a whole (Baker & Hambridge, 2002; Barrowclough, et al., 2001), many participants did not identify their alcohol intake as problematic or were, at best, ambivalent about needing help at the start of therapy. The intervention of the RCT was structured to explore how participants’ problematic alcohol use was preventing them from achieving their desired values and goals, and it was aimed at increasing awareness of the need to make changes to their alcohol use to progress toward these goals. Hence, targets for behaviour change were alcohol use and mental health related problems (e.g., those related to psychosis, anxiety or depression).

In the current study behaviour change in both substance abuse and mental health, and indeed any other domain was of interest. Therefore the key outcome variable of behaviour change statements, was divided into statements that related
either to substance abuse or mental health issues, termed target change behaviours, or statements that related to other domains (e.g., physical health; financial situations), termed non-target change behaviours.

This study was necessarily exploratory because it was the first to address this issue in a therapeutic setting. The principal aim of the study was to determine the relationship between the ability to reason by generating arguments and evidence and the generation of and positive behaviour change statements. A secondary aim was to explore the impact of mood on the ability to reason. A subsidiary aim was to determine the relationship between the ability to reason by generating arguments and evidence and the generation of and positive behaviour change statements with positive alcohol use outcome. There were four predictions. First, that the frequency of informal reasoning statements would predict the frequency of positive behaviour change statements. Second, that the frequency of statements reflecting positive emotion would be predictive of behaviour change statements. Third, that reasoning ability measured by the frequency of informal reasoning statements would predict positive alcohol use outcomes (percentage days abstinent at 12 months follow-up (post therapy) and percentage change in average daily use) and fourth, that positive behaviour change statements would predict positive alcohol use outcomes.
Methods

Design

Cross sectional, correlational and multi-level modelling designs were employed as appropriate for the hypotheses.

Study Context

This study utilised transcribed psychological therapy sessions from the MIDAS trial, a large RCT evaluating integrated MI and CBT (MI-CBT) for individuals with a dual diagnosis of psychotic illness and substance misuse/dependence (Barrowclough et al., 2010). The MIDAS trial was approved by the Eastern Multi-site Research Ethics Committee, UK (2003) and the current study was approved as an amendment to the original ethics proposal (appendix C). All identifiable client data were either omitted from transcripts or anonymised.

MIDAS trial inclusion criteria were a current clinical diagnosis of non-affective psychotic illness (International Classification of Diseases, 10th revision (ICD-10), Diagnostic and Statistical Manual of Mental Disorders, fourth edition (DSM-IV), or both), with no known organic causes implied; drug or alcohol dependence or abuse meeting DSM IV (APA, 1994) criteria with alcohol use exceeding 28 units for men, or 21 units for women on at least half of the weeks in the previous three months prior to assessment, and/or illicit drugs use on at least two days per week, on at least half of the weeks in the previous three months prior to assessment; English as the primary language; a fixed abode; contact with adult mental health services; and fully informed written consent gained.
The 164 participants randomly allocated to the therapy arm of the MIDAS trial were offered up to 26 sessions of MI-CBT (Barrowclough et al., 2010) over a 12-month period. Ninety-four of these participants reported alcohol as the main substance that they used and were potentially eligible for the current study. Therapy was delivered by five therapists who had extensive training in CBT and MI. The therapeutic approach, MI-CBT, based treatment around two distinct phases of “motivation building” and “action”, allowing the integrity of both styles of therapy to be preserved. The phase of interest in the reported study was phase one of therapy. This focused on eliciting and reinforcing change talk which was achieved through using core skills of MI across a number of stages, such as engagement; eliciting and understanding the client’s life goals; exploring clients’ perspectives on substance misuse and mental health issues in relation to their goals. Clients were offered information and feedback from assessments where appropriate, and encouraged to explore and resolve ambivalence so as to build motivation for change, and formulate a shared understanding (or case formulation) of factors that needed to be changed if they were to achieve their valued goals.

**Power calculation**

Kreft and De Leeuw (1998) argued that it is almost impossible to produce any meaningful ‘rules of thumb’ in regard to calculating power for multilevel models, due to the number of factors involved in multilevel analysis and the fact that power changes according to the number of groups (participants) and the number of individual observations per participant. Consequently, when attempting to calculate power for multilevel models, clear-cut conclusions are often difficult to reach, and even if the optimum combination of levels and participants are calculated it is often hard in practice to achieve these levels (Twisk, 2006)
Kreft and De Leeuw (1998) suggested that to detect cross-level interactions, 20 groups may generally be considered as sufficient and for multi-level modelling analyses looking at fixed parameters, they largely consider a sample size of 30 participants as sound. Multilevel modeling simulation studies which have sought to determine the effects of sample size on levels 1 and 2 (Maas & Hox, 2005) have observed both the regression coefficients and variance components to be estimated without bias in sample sizes of 30 groups, with the standard errors of the regression coefficients also estimated accurately. In the current study, the analysis strategy for the primary predictions (one and two) utilised multi-level mixed effects linear regression analyses to determine interactions between a two level model, therefore based on the recommendations of Kreft and De Leeuw (1998) and the findings of Maas and Hox (2005) a sample of 30 groups was calculated to be adequate for the current study.

**Participant selection**

In order to select participants, this study utilised data from the MIDAS trial which was collected as baseline measures prior to participants’ randomisation to therapy.

Of the 94 MIDAS participants whose main substance used was alcohol, 60 had at least 6 available audio-taped therapy sessions \((M = 21; \text{Range} 6-33)\) and from these, 30 sessions (from 30 different participants) were selected for the current study. As detailed below, the selection was pseudo- random attempting to ensure an even spread for the range of depression scores, therapist rated substance use outcomes, therapist, and stage of therapy. Additionally, sessions were required to be predominantly MI in style as rated by therapist at the time of conducting the session.
The 60 clients who met the initial selection criteria were pooled into groups according to baseline scores on the Calgary Depression Scale (CDS; Addington, Addington, & Maticka-Tyndale, 1993) (appendix D) and subjective therapist ratings for target behaviour change at end of therapy. The CDS establishes the level of depression experienced by people with schizophrenia, with total scale scores ranging from 0-27 (low- high). The 60 clients were ranked into tertiles (low 0-4, mid 5-9, high 10-20) according to their CDS baseline scores ($M = 6.24$; $SD=5.31$; $Range 0-20$).

The end of therapy (EOT) rating scale was completed by therapists after the last therapy session and asked therapists to give their subjective impression of the extent to which clients had improved as regards their substance use, on a 6 point scale 0-5 (low-high change). Two groups were defined; those with 'low' positive change to their substance using behaviour (i.e. those who did not now use less, post therapy) (scores of 0, 1, 2) and those with 'high' change (i.e. those who were now using less, post therapy) (scores of 3, 4, 5) ($M = 3.22$ $SD 2.21$ $Range= 0-5$). This produced 6 groups from which to select participants ('EOT low/CDS Low', 'EOT low/CDS Mid', 'EOT low/CDS High', 'EOT high/CDS low', etc). Thirty audio taped sessions, one per client, were then selected from each of the 6 pooled groups attempting to gain an even spread for the additional variables of trial therapist (therapist 1,2,3,4 or 5) and time point in the therapy programme (early 3-9, mid 10-16 or late 17-25). The taped therapy sessions were transcribed by 3 individuals blind to the studies aims and hypotheses.

Data used for the process of sample selection such as end of therapy outcome data, were subsequently not available to the coder (KS), to ensure blindness to potentially biasing information.
Coding

KS coded the therapy transcripts using a manualised scheme devised and validated by \(^1\)Gooding (personal communication, 2010) (appendix E). Statements pertaining to reasoning, positive behaviour change and emotional state were identified for each 5 minutes of therapy dialogue within each transcript (e.g. a 55-minute therapy session produced 11, 5-minute time ‘windows’ of dialogue which could be coded).

Reasoning statements

A reasoning statement was defined as one containing causal information, which explained, explored or supported the underlying reasons for a cognition (attitude, belief, perception or opinion) held by the client. Causal statements were required to i. Answer a “why” question ii. Indicate a cognition held by the client and iii. Provide information which explored or explained the cause of the cognition. Reasoning statements were subsequently categorised as either simple, with one step or complex, with two or more steps (a step being a separate reasoning process). This method was based on the Means-End Problem-Solving Procedure (Platt & Spivack, 1975) as previously discussed. Simple reasoning comprised a basic argument taking the form of X causes Y, whereas more complex reasoning would be X causes Y because of Z. For example “I drink because it makes me feel better” is a simple reasoning statement, whereas a complex statement would be “I drink because it makes me feel better, so then I can face the day”.

\(^1\)To request the manual please contact Dr P. Gooding at Patricia.A.Gooding@manchester.ac.uk
**Emotion statements**

Statements indicating positive or negative emotional states were identified and categorised as pertaining to either the present, past or future. Positive emotion statements were defined as those containing descriptors reflecting positivity, happiness, satisfaction, excitement, hope, amusement and pleasure; and negative statements as those reflecting sadness, displeasure, distress, anxiety, low mood, anger, disgust, loss, shame, guilt, regret and negative self-perceptions.

**Behaviour change statements**

Behaviour change statements were identified according to the Manual for the Motivational Interviewing Skill Code (MISC) Version 2.1 (Miller, Moyers, Ernst, & Amrhein, 2008) which is a behavioural coding system designed to identify MI process variables. Five criteria (Miller et al., 2008) were used to identify statements relating to positive behavior change within dialogue; that is, statements which reflected the client’s ability, desire, need or commitment to move towards behaviour that was helpful or adaptive for them or that related to achieving a personal goal or aim. Talk that also illustrated steps taken toward change was considered as a behaviour change statement.

Extracted behaviour change statements were rated as either target or non-target. In the context of this study, target behaviour change statements were those relating to alcohol use or mental health; non-target were those relating to other areas of life such as relationships, work, social life, housing and so forth.
Proficiency in this coding method was established using a manual devised by Gooding (personal communication, 2010). The first author, KS, practiced extracting all categories of statements from a pool of 14 previously coded transcripts from the MIDAS trial (Barrowclough et al., 2010). Subsequently, statements were categorized and compared with a set of “gold standard” categorizations derived in the development of the coding scheme which had previously been rated by two separate coders in order to establish their agreement and thus the reliability of the coding method. KS coded a series of eight randomly selected scripts for reasoning, behaviour change and emotion statements, which again had been rated by two coders and analysed to establish agreement. Intraclass correlation coefficients and the percentage of agreements between KS and the ‘gold standard’ of previously coded scripts were calculated. The extracted statements were then categorized (e.g., simple/complex reasoning; target/non-target change statements) and kappa scores were calculated against the gold standard.

To establish the reliability of the coding used in this study, a post-doctoral psychologist, who was blind to the aims of this study, co-rated 20% of the therapy transcripts.

Assessments

Data collected as baseline measures in the MIDAS trial were used in the multilevel modelling and correlation models to control for variance in participants mood, psychotic symptoms, alcohol use and cognitive function.

Data from the Alcohol Use Disorders Identification Test (AUDIT) (Saunders, Aarsland, Babor, de la Fuente & Grant, 1993) (appendix F) was used to control for
variation in alcohol use. This brief measure was designed to screen for excessive drinking; examining hazardous alcohol use, harmful alcohol use and dependence symptoms. To control for variance in mood and psychotic symptoms the CDS and Positive and Negative Syndrome Scale (PANSS) (Kay, Fiszbein & Opler, 1987) (appendix G) were used. The CDS establishes the level of depression experienced by people with schizophrenia separate from positive, negative and extrapyramidal symptoms, in the past two weeks. The PANSS is a 30 item measure with four scales identifying negative syndromes, positive syndromes, their relationship to one another and general psychopathology in schizophrenia. The PANSS item “difficulty in abstract thinking” was selected as a proxy indicant of participant’s cognitive function at baseline and was used as a control variable. This item ascertains the extent to which individuals can classify information and form generalisations, moving beyond concrete and egocentric thinking during problem solving tasks. Scores for this item were removed from the overall PANSS total combined scales score and also from the negative symptom scale scores.

MIDAS trial data for the Time Line Follow Back Interview (TLFB; Sobell & Sobell, 1992) (appendix H) which was collected at 12 months follow up (post therapy) was used as a measure of alcohol use outcomes in the correlation analysis for predictions 3 and 4. This method ascertained daily alcohol use patterns for the preceding 90 day period. Alcohol use was converted to standard UK units (1 measure =10 ml pure ethanol). The reliability of this self-report method was assessed in the MIDAS trial where they found that averaged across the 5 time points of the trial, the mean agreement between client self-reports and care-coordinator reports for alcohol was k= 0.62. Also reported were significant (P<0.01) associations between client and care co-ordinator time-line follow-back reports with intraclass correlation coefficients.
for percentage days abstinent from main substance used 0.67; percentage change in average daily amount of units of alcohol 0.63.

**Analysis Strategy**

For the first prediction that frequency of informal reasoning statements would predict the frequency of behaviour change statements, the analysis used multi-level regression modelling. The predictor and outcome variables were informal reasoning statements and behaviour change statements per five-minute time window respectively. Regression models were then run to investigate whether simple and/or complex reasoning statements predicted behaviour change statements and whether reasoning affected the production of target and non-target change statements differently.

The second prediction of this study was that frequency of statements reflecting positive emotion would be predictive of informal reasoning statements. Again, multi-level regression modelling was used; the predictor and outcome variables were the total number of positive emotion statements and the total number of informal reasoning statements produced per five-minute time window respectively.

For predictions one and two, multi-level mixed effects linear regression analyses were applied to the data for each five-minute time window per therapy session for participants, using the xtmixed command in Stata version 9 (StataCorp LP 1996-2009). Data for each of the variables were repeated for any participant in each five-minute time window and for every time window in a therapy session. Parameter standard errors and confidence intervals were estimated using the bootstrap procedure.
(1000 samples, using the client identification number as the bootstrapped sampling unit). The bootstrapping technique makes no distributional assumptions about the data and so is appropriate to use when the data are skewed with essential zeros (Byford, Barber, Fiander, Marshal, & Green, 2001; Davison & Hinkley, 1997; Efron & Tibshirani, 1993). For the bootstrapping re-sampling procedure (1000 repetitions) the seed was set randomly at number 4342. Restricted maximum likelihood estimation was used for the observed data points.

The third and fourth predictions were that a significant positive association between positive alcohol use outcomes and both greater informal reasoning ability and behaviour change statements would be observed, respectively. Due to positive skew observed in the outcome data, the analysis for both predictions used non-parametric correlations (Spearman’s rho) between percentage days abstinent from alcohol and total behaviour change statements, and then between percentage days abstinent from alcohol and total reasoning statements. Non-parametric correlations were then repeated using a further alcohol use outcome measure of percentage change in average daily amount of alcohol used.
Results

Reliability of the coding

To establish the reliability of the coding used in this study, 20% of therapy transcripts were rated by a second coder as described. Inter-rater reliability as assessed by intraclass correlation coefficients were 0.81; 0.78; 0.83; 0.85 for the identification of reasoning, behaviour change and positive and negative emotion statements respectively. The percentage of agreements between KS and the second coder were 75% (reasoning) 43% (behaviour change statements) 50% (positive mood) 60% (negative mood). The second coder then categorised the statements identified by KS. The kappa scores for the categorisation of reasoning statements as simple or complex; change statements as primary or secondary targets; positive emotional statements as past, current or future; and negative emotional statements as past, current or future, were 0.44; 0.65; 0.90; 0.88 respectively. Reliability results, on the whole exceeded 0.7 and so were considered robust (for discussion see Sim & Wright, 2005), with the exception of the secondary categorisation of reasoning statements and behaviour change statements which neared 0.7.

Initial regression analyses indicated that there may be outliers in the cognitive ability scores, as highly significant results were produced for cognitive ability scores ($p < 0.009$), implying that the poorer a participant’s cognitive ability the more change statements they produced. The cognitive ability score alone did not significantly predict the total number of change statements produced per five minute time window ($p < 0.222$). Further examination of raw data identified outlying data for four participants who scored highly for poor cognitive function at baseline, yet conversely produced a high number of arguments and evidence. This was unique across the sample, with no
identifiable explanatory pattern. Data for these participants was excluded for the full analysis reducing the data set to \( n = 26 \).

In the sample of 26 observed, the mean therapy session number selected was 12, minimum 3, maximum 25. The five trial therapists conducted 3, 4, 5, 5 and 9 respectively, of the sessions included in the study. Table 1 shows the demographic data for the study sample. Table 2 displays descriptive statistics for control variables and alcohol use outcome variables.

**Differences in behaviour change, reasoning and positive and negative emotional statements**

The total number of observations in the multi-level modelling analysis was 219. The mean number of five minute time windows per participant was 9 (\( SD \ 2.33 \), minimum 2, maximum 13). Table three shows the mean scores and standard deviations for the four variables of interest: informal reasoning statements, behaviour change statements, and positive and negative emotional statements. Descriptive data for the sub-categories of these variables is also shown. From table three it can be seen that an average of 3.2 reasoning statements were generated per 5 minute time window of a therapy session.

**Predictors of behaviour change statements**

The two main predictions of this study were that the frequency of informal reasoning statements would predict the frequency of behaviour change statements and that frequency of statements reflecting positive emotion would be predictive of greater behaviour change statements. With respect to the first prediction, the frequency of
informal reasoning statements (total number of arguments and evidence) did significantly predict the frequency of behaviour change statements suggesting that every 10 extra arguments and evidence produced could be associated with the production of 1 extra behaviour change statement. Neither complex nor simple reasoning statements were found to independently predict behaviour change statements (see table four).

With regard to the second prediction of the study, the frequency of statements reflecting positive emotion did not significantly predict the frequency of behaviour change statements, nor did they predict the frequency of informal reasoning statements (total number of arguments and evidence). However, further analysis indicated that statements relating to negative mood (pertaining to the present) significantly predicted the total number of arguments and evidence produced per five minute time window; this was with PANSS negative scale scores, total utterances, AUDIT, and cognitive ability scores in the model (see table five).

**Predictors of positive alcohol use outcomes**

With respect to the third prediction that there would be a significant positive association between greater informal reasoning ability and positive alcohol use outcomes, the Spearman’s rho test showed that this prediction was not supported for either outcome measure of percentage of days abstinent from alcohol at MIDAS trial 12 month follow up \( (rs /25] = .053, p < .400) \) or percentage change in average daily usage at MIDAS trial 12 month follow up \( (rs /25] = -.093, p < .329) \). N.B There were missing data for one participant in respect of alcohol use outcomes.
The fourth prediction that there would be a significant positive association between greater rate of behaviour change statements and positive alcohol use outcomes was also not supported for either outcome measure of percentage of days abstinent from alcohol at MIDAS trial 12 month follow up ($rs_{25} = .120, p < .283$) or percentage change in average daily usage at MIDAS trial 12 month follow up ($rs_{25} = -.159, p < .225$).
Discussion

This was an exploratory study conducted in the context of a randomised controlled trial of an integration of CBT and MI techniques in clients with a dual diagnosis of psychosis and substance abuse. The focus of this study was on cognitive and emotional processes which may be instrumental in facilitating the production of behaviour change statements and behavioural change in the context of MI. There were four main predictions.

The first prediction was that the greater the number of informal reasoning statements observed, the more behaviour change statements would be observed. This prediction was supported. These findings suggested that informal reasoning may indeed be a cognitive process underlying the production of positive behaviour change statements in the context of MI. The exploration of reasons to change is central to MI and is one factor thought to contribute to ‘commitment to change talk’ (found to directly predict behaviour change) (Amrhein et al., 2003; Moyers et al., 2007) and has also been found to predict outcomes independently from change talk (Walker et al., 2011). Although the findings of this study are tentative and exploratory, they suggest that engaging in informal reasoning processes, be they simple or complex, with this particular client group is important in the production of behaviour change statements. As such, when exploring ambivalence about positive behaviour change with clients it may be vital for therapists to focus specifically on encouraging informal reasoning processes.

The complexity of reasoning statements was not found to significantly predict the production of behaviour change statements. This may have been due to the secondary categorisation of reasoning statements (as simple or complex) being unreliably low. It is possible that the complexity of reasoning statements may well be
of importance in regard to the production of change statements, and therefore it may be of benefit to improve the reliability of coding for this variable in future work.

The second key prediction of the study was that the frequency of statements reflecting positive emotion would be predictive of more behaviour change statements. This prediction was not supported. However, further exploration indicated that statements indicative of a negative emotional state, pertaining to the present, significantly predicted the production of reasoning statements.

It has been suggested that in developing discrepancy in MI, the generation of negative emotional states is designed to focus an individual’s attention to the areas of their life in which they are not content (Wagner & Ingersol, 2008). The tension experienced is believed to motivate clients to subsequently take action in order to move from this mildly unpleasant state to one that is more favourable (Wagner & Ingersol, 2008). This mild discomfort has been associated with positive therapeutic outcomes (Britt, Hudson, & Blampied, 2004). The findings of the current study fit with these self-discrepancy mechanisms (Carver, Lawrence, & Sheier, 1999; Carver & Sheier, 1990) thought to underlie change. However, the importance of creating discrepancy with this client group should perhaps be viewed with caution. Negative self-evaluations which may relate to hopelessness can arise through perceptions of discrepancy. In those with schizophrenia the absence of hope has been found to be particularly harmful (Lysaker, Campbell & Johannesen, 2005). Given that negative states have also been found to be predictive of suicidal ideation via increased hopelessness (Cornette, Strauman, Abramson, & Busch, 2009) it would seem crucial that in creating discrepancy during MI with individuals with psychosis, the presence of feelings of hopelessness is closely monitored by the therapist.
The third and fourth predictions of the study concerned the relationships between the production of reasoning statements and behaviour change statements with alcohol use outcomes. Both predictions were not supported. The relationship between change talk and outcomes in MI has been well evidenced (Amheirn, et al., 2003; Hodgins, Ching & McEwen, 2009; Moyers et al., 2007). Emerging evidence however, has suggested that this relationship may be less robust and perhaps more complex than first thought (Baer et al., 2008; Walker et al., 2011). The failure of this study to find a relationship between change talk and alcohol use outcomes may be indicative that other factors not considered in this study such as strength of change talk, therapeutic alliance, readiness to change and motivation may mediate this relationship. However, it is possible that the study was insufficiently powered for correlational analysis and therefore it is possible that a Type 2 error was made.

Desire and reasons for change have been directly linked to positive outcomes in MI for marijuana use (Baer et al., 2008; Walker, et al., 2011). In the current study, the ability to reason alone was considered in relation to outcomes and was not found to be associated with them. In the coding system used in the current study, desire to change was coded as a positive behaviour change statement. It may be of interest to further develop the coding system used, to incorporate a separate measure of desire to draw out any further relationships between this factor, reasoning and outcomes.

Whilst the results of the study suggest that informal reasoning may be a specific cognitive process underpinning the production of behaviour change statements in MI with this client group, several limitations of the study warrant further discussion. The exploratory nature of the study and its methodological limitations mean these findings are not yet sufficient to be generalised to the development and delivery of
therapy. One important issue to consider is that of inferring causality between predictor and outcome variables. Relationships may only be validly interpreted as casual if there is no confounding between the predictor and outcome variables (Elmsley, Dunn & White, 2010). In RCT’s the random allocation of participants to conditions may lead to selection effects, which in turn may result in ‘hidden’ (i.e. unknown) confounding variables. In the context of the current study, both the randomisation of clients to the therapy condition of the MIDAS trial and the selection to the current study may have led to hidden confounding variables as a result of selection effects. Therefore without more sophisticated methods of analysis that may statistically account for such hidden confounds, it is not possible to validly interpret the current results as indicting that the greater production of reasoning statements caused the greater production of change statements as there may be other hidden variables responsible for that effect. Due to the exploratory nature of this study it was not possible to address this issue. Similarly, the cross sectional nature of the study meant that causal inference could not be made between predictor and outcome variables. In future, this might be addressed through utilising a longitudinal design.

It should be noted that although the study found significant positive results for the effect of current negative emotion on the production of reasoning statements, the measure of emotionality was a proxy indicant. That is, the emotional experience of the participant was measured through the coder’s identification of statements which the participant had made in relation to past, present or future negative or positive emotional experience, and not directly measured. To improve the validity and applicability of these findings it would be favourable to directly measure emotion states during the therapy process.
Another way in which emotionality may have been measured in the current study is through prosody of speech. There is interesting experimental evidence that suggests that speech analysed for vocal output, inflection, emphasis and amplitude from the recall of autobiographical memories may show meaningful changes in prosodic expression (Cohen, Hong & Guevara, 2010) when analysed with PRAAT (Boersma & Weenink, 2006), a program that has been used in speech pathology and linguistic studies. However, this method was beyond the scope of the current study. Additionally, this may not be a very reliable measure of emotional experience in this particular client group, as individuals with schizophrenia have been found to be impaired in their production of emotional prosody in speech (Hoekert, Kahn, Pijhnenborg & Aleman, 2007).

In addition to considering measuring mood through other means, it must also be highlighted that the identification of the other variables of interest might also be achieved through other means and coding schemes.

Recent evidence suggests that interventions utilising MI can be effective with people with psychosis and substance use problems (Barrowclough et al., 2010; Carey, Leontieva, Dimmock, Maisto & Bakti, 2007). However, the characteristics associated with this client group, and evident in our sample, may limit the generalisability of our findings. Participants in this study produced relatively few change statements within therapy sessions. This may be due to the fact that rather than electing to have therapy, they were referred into a large RCT by case managers and that many did not identify their alcohol intake as problematic or were, at best, ambivalent about needing help at the start of therapy.

Having acknowledged the limitations of the study a number of strengths should be highlighted. Firstly, the information gathered representing the production of
reasoning and emotional statements by clients, was generated in the context of a therapy session. That is, within a naturalistic setting, whereby participants were not called upon to consider their emotional state at that time, or asked to engage in reasoning. As such the findings of this study can be argued to be of ecological validity and thus directly applicable to therapy contexts and practice, more so than if reasoning or emotional experience were experimentally manipulated or consciously evaluated by participants.

Secondly, this study specifically examined the informal reasoning ability of clients with psychosis and co-morbid alcohol use disorders in the context of MI. Clients were able to produce enough reasoning statements to be considered a variable of interest and as such this tells us that this client group are able to engage in reasoning processes in the context of therapy. This may have implications for the future development of therapy and practice with this client group.

Third, and arguably most importantly, this study attempted to directly form a bridge between cognitive processes and therapeutic processes in the context of MI which is currently lacking from the literature. Informal reasoning processes were found to be predictive of the production of behaviour change statements, and so appear to represent a mechanism or part of mechanism underlying the process of change in MI. Negative emotional statements were found to be predictive of the production of reasoning statements themselves. Future work examining these processes across naturalistic, therapeutic and laboratory settings, is to be encouraged.
Table 1. Participant demographics, psychiatric and substance use history (n=26)

<table>
<thead>
<tr>
<th></th>
<th>Mean (sd)</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (mean, sd, range)</td>
<td>37, 10.47</td>
<td>39.96</td>
</tr>
<tr>
<td>Gender (n % male)</td>
<td>23</td>
<td>88.5</td>
</tr>
<tr>
<td>Age left education ( mean, sd)</td>
<td>16</td>
<td>1.65</td>
</tr>
<tr>
<td>Current living arrangement (n %)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alone</td>
<td>9</td>
<td>34.6</td>
</tr>
<tr>
<td>With partner</td>
<td>3</td>
<td>11.5</td>
</tr>
<tr>
<td>With family member</td>
<td>4</td>
<td>15.4</td>
</tr>
<tr>
<td>House share</td>
<td>2</td>
<td>7.7</td>
</tr>
<tr>
<td>Hostel/temporary accommodation</td>
<td>8</td>
<td>30.8</td>
</tr>
<tr>
<td>Ethnicity (n %)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>22</td>
<td>84.6</td>
</tr>
<tr>
<td>Black Caribbean</td>
<td>1</td>
<td>3.8</td>
</tr>
<tr>
<td>Black African</td>
<td>1</td>
<td>3.8</td>
</tr>
<tr>
<td>Black other</td>
<td>2</td>
<td>7.7</td>
</tr>
<tr>
<td>Employment status (n %)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employed</td>
<td>1</td>
<td>3.5</td>
</tr>
<tr>
<td>Unemployed</td>
<td>23</td>
<td>88.5</td>
</tr>
<tr>
<td>Student</td>
<td>2</td>
<td>7.7</td>
</tr>
<tr>
<td>Attended higher education (n %)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>15</td>
<td>57.7</td>
</tr>
<tr>
<td>no</td>
<td>11</td>
<td>42.3</td>
</tr>
<tr>
<td>Case note diagnosis (n %)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Schizophrenia</td>
<td>21</td>
<td>80.8</td>
</tr>
<tr>
<td>Schizoaffective disorder</td>
<td>1</td>
<td>3.8</td>
</tr>
<tr>
<td>Psychosis NOS</td>
<td>4</td>
<td>15.4</td>
</tr>
<tr>
<td>Years since onset psychosis (mean sd, range)</td>
<td>12.25</td>
<td>8.04</td>
</tr>
<tr>
<td>Substance use history in years(mean, sd, range)</td>
<td>9.08</td>
<td>9.81</td>
</tr>
<tr>
<td>DSM-IV diagnosis (alcohol)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Abuse (n %)</td>
<td>10</td>
<td>38.5</td>
</tr>
<tr>
<td>Dependence (n %)</td>
<td>16</td>
<td>61.5</td>
</tr>
<tr>
<td>DSM-IV diagnosis drugs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Abuse (n %)</td>
<td>6</td>
<td>23.1</td>
</tr>
<tr>
<td>Dependence (n %)</td>
<td>1</td>
<td>3.8</td>
</tr>
</tbody>
</table>

Min. – minimum score; max. = maximum score; SD = standard deviation; % = percentage of sample; n= number of sample
Table 2. PANSS scale scores, cognitive item scores, CDS, AUDIT and TLFB (baseline & 12 month) MIDAS scores

<table>
<thead>
<tr>
<th>Metric</th>
<th>Mean</th>
<th>SD</th>
<th>Min-Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>PANSS cog item score</td>
<td>2.46</td>
<td>1.36</td>
<td>1-6</td>
</tr>
<tr>
<td>PANSS positive scale</td>
<td>14.73</td>
<td>4.39</td>
<td>7-24</td>
</tr>
<tr>
<td>PANSS negative scale</td>
<td>12.31</td>
<td>4.96</td>
<td>6-25</td>
</tr>
<tr>
<td>PANSS general scale</td>
<td>30.96</td>
<td>6.59</td>
<td>19-43</td>
</tr>
<tr>
<td>PANSS total scale scores</td>
<td>58</td>
<td>12.97</td>
<td>37-85</td>
</tr>
<tr>
<td>Calgary Depression Scale</td>
<td>6.47</td>
<td>5.7</td>
<td>18</td>
</tr>
<tr>
<td>AUDIT baseline scores</td>
<td>20.08</td>
<td>6.40</td>
<td></td>
</tr>
<tr>
<td>TLFB (% days abstinent at Baseline, % change in days abstinent at 12 months)</td>
<td>28.46</td>
<td>42.22</td>
<td></td>
</tr>
<tr>
<td>TLFB % change in average daily use 12 months</td>
<td>-13.74</td>
<td>72.59</td>
<td>-100-267</td>
</tr>
</tbody>
</table>

Min. = minimum score; max. = maximum score; SD = standard deviation; % = percentage of sample; n= number of sample
Table 3. Descriptive statistics are shown for all key variables. Results are based on 26 data points (i.e., 26 participants). Results for the reasoning, change, and emotional statements are based on 219 data points (i.e., all five minute time windows).

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>SD</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>AE total</td>
<td>3.17</td>
<td>2.27</td>
<td>0</td>
<td>11</td>
</tr>
<tr>
<td>Simple</td>
<td>2.50</td>
<td>1.95</td>
<td>0</td>
<td>8</td>
</tr>
<tr>
<td>Complex</td>
<td>.64</td>
<td>.80</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Change total</td>
<td>.77</td>
<td>1.21</td>
<td>0</td>
<td>8</td>
</tr>
<tr>
<td>Target</td>
<td>.56</td>
<td>1.08</td>
<td>0</td>
<td>8</td>
</tr>
<tr>
<td>Non-target</td>
<td>.21</td>
<td>.60</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Pos total</td>
<td>.64</td>
<td>.97</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>Neg total</td>
<td>.92</td>
<td>1.27</td>
<td>0</td>
<td>8</td>
</tr>
<tr>
<td>Pos past</td>
<td>.27</td>
<td>.58</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Pos Current</td>
<td>.28</td>
<td>.61</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Pos future</td>
<td>.09</td>
<td>.34</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Neg past</td>
<td>.53</td>
<td>.91</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>Neg current</td>
<td>.40</td>
<td>.80</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>Neg future</td>
<td>.055</td>
<td>.22</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Word Count per window</td>
<td>319.35</td>
<td>184.98</td>
<td>8</td>
<td>837</td>
</tr>
<tr>
<td>Time windows</td>
<td>9.29</td>
<td>2.33</td>
<td>2</td>
<td>13</td>
</tr>
</tbody>
</table>

Min. = minimum score; max. = maximum score; SD = standard deviation
Table 4. Coefficients, bootstrap standard errors (SE), z scores, p values, and confidence interval data (CI) are shown for the predictor and control variables and outcome variable of total change behaviour statements

<table>
<thead>
<tr>
<th>Variable</th>
<th>Co-efficient</th>
<th>SE</th>
<th>Z</th>
<th>P</th>
<th>CI 95%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Panss cognitive item</td>
<td>.088</td>
<td>.066</td>
<td>1.33</td>
<td>ns</td>
<td>-.042</td>
</tr>
<tr>
<td>Word count</td>
<td>.000</td>
<td>.000</td>
<td>0.29</td>
<td>ns</td>
<td>-.001</td>
</tr>
<tr>
<td>Panss neg scale</td>
<td>-.013</td>
<td>.023</td>
<td>-0.60</td>
<td>ns</td>
<td>-.059</td>
</tr>
<tr>
<td>Total Arguments &amp; Evidence</td>
<td>.11</td>
<td>.053</td>
<td>2.05</td>
<td>&lt;0.040</td>
<td>.004</td>
</tr>
<tr>
<td>Audit</td>
<td>0.004</td>
<td>.012</td>
<td>0.35</td>
<td>ns</td>
<td>-.020</td>
</tr>
<tr>
<td>Constant</td>
<td>.255</td>
<td>.466</td>
<td>0.55</td>
<td>ns</td>
<td>-.657</td>
</tr>
</tbody>
</table>

Table 5. Coefficients, bootstrap standard errors (SE), z scores, p values, and confidence interval data (CI) are shown for the predictor and control variables and outcome variable of total arguments and evidence (reasoning statements)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Co-efficient</th>
<th>SE</th>
<th>Z</th>
<th>P</th>
<th>CI 95%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Panss cog control</td>
<td>-.058</td>
<td>.074</td>
<td>-0.79</td>
<td>ns</td>
<td>-.203</td>
</tr>
<tr>
<td>Word count</td>
<td>.008</td>
<td>.000</td>
<td>9.98</td>
<td>&lt;0.000</td>
<td>.006</td>
</tr>
<tr>
<td>Panss neg scale</td>
<td>.032</td>
<td>.026</td>
<td>1.21</td>
<td>ns</td>
<td>-.019</td>
</tr>
<tr>
<td>Neg Current</td>
<td>.312</td>
<td>.114</td>
<td>2.72</td>
<td>&lt;0.006</td>
<td>.087</td>
</tr>
<tr>
<td>Audit</td>
<td>.002</td>
<td>.012</td>
<td>0.23</td>
<td>ns</td>
<td>-.021</td>
</tr>
<tr>
<td>Constant</td>
<td>-0.410</td>
<td>.620</td>
<td>-0.07</td>
<td>ns</td>
<td>-1.257</td>
</tr>
</tbody>
</table>
A critical reflection
of the research process

KATY SILVERMAN
Overview

This paper provides a critical reflection of the research process. Firstly, the rationale for, and the development of the literature review is critically examined. Secondly the rationale for the development of the main empirical paper is examined. This is followed by an examination of methodological and ethical issues relating to the research process. To conclude, the theoretical, clinical and future implications of the study for research in this area are discussed.

The literature review

Reasoning and emotion can be demonstrated to be of importance to the theory and practice of cognitive behaviour therapy (CBT) and motivational interviewing (MI). There is extant literature that indicates the presence of reasoning impairments in a wide range of emotional disorders. However, to the author's knowledge there had been little attention given to studying reasoning processes during MI or CBT, or indeed their interaction with emotion. Furthermore, despite the existing empirical literature examining the effects of emotion on reasoning presented in the literature review, there had been no previous reviews which specifically sought to bring this literature in to focus in regard to the theory and practice of cognitive therapeutic approaches such as MI and CBT.

Blanchette and Richards’ review (2010) presented evidence to illustrate the potentially different roles of incidental and integral emotion in either impairing or facilitating logical reasoning; concluding that the effects of emotion on deductive reasoning were complex. By critically re-examining the studies considered in their review along with subsequent studies identified by systematic review of the literature, we extended their findings in several ways. Firstly, by illuminating the methodological
weaknesses of the studies examining the effects of integral mood on reasoning
(Blanchette & Campbell, 2012; Blanchette, Richards, Melyn & Lavda, 2007) and presenting contradictory findings (Eliades, Mansell, Stewart & Blanchette, 2012) we showed that the observed results where emotion was found to facilitate reasoning, may not be wholly reliable. Secondly, we made links between empirical evidence from the clinical psychology literature (Coombs, Coleman & Jones, 2002) and the evidence from the experimental study of cognition (Blanchette & Campbell, 2012; Blanchette & Leese, 2011) that supported the potential role of arousal associated with negative emotional experience in leading to impaired reasoning performance. Thirdly, we presented evidence that suggests how reasoning may affect emotion (Oaksford, Carlile & Moore, 2004). In doing so we highlighted the impact this may have in regard to the validity of the findings of studies which measured mood prior to, but not post reasoning tasks; presumably under the assumption that participants would remain in the induced mood state for the duration of the task.

Lastly and most importantly the current review contributed towards developing an understanding of the specific cognitive and emotional processes underlying cognitive therapeutic approaches, by bringing together two bodies of literature from the experimental and clinical psychology fields and illustrating how the findings of one may relate to the other. In doing this, the review demonstrated the need for further study of the specific cognitive and emotional processes which may underlie MI and CBT.

Having discussed several strengths of the literature review, it is also important to highlight the areas in which the literature review may have been improved and the challenges that were encountered in its’ development. Firstly, overall it was extremely challenging to bring in to focus the two diverse literatures of clinical psychology and
the experimental study of cognition. Secondly, in writing the descriptive part of the review regarding CBT and MI theory and practice, there were many examples that could be identified as illustrating reasoning and emotion as central processes. However, it was challenging to identify explicit empirical evidence that supported these examples, as the studies of reasoning processes and emotion in MI and CBT are scarce. For example, although the generation of reasons for change are regarded as important precursors to the production of behaviour change statements in MI (Miller & Rose, 2009), it was only possible to identify two studies that had examined their role empirically (Baer, Beadnell, Garrett, Hartzler, Wells, & Peterson, 2008; Walker, Stephens, Rowland & Roffman, 2011). This meant that parts of the review were reliant on a relatively small literature and robust conclusions could not be made.

Regarding the systematic review; it initially required a great deal of background reading to get to grips with some of the concepts and terminology used in the experimental cognition literature. Also, as there was a great deal of potentially relevant literature on emotion and reasoning, it was extremely challenging to narrow the remit of this section of the review. For example, there have recently been interesting findings regarding the role of emotion in moral reasoning in relation to individuals with a diagnosis of schizophrenia, where they have been observed to be less sensitive towards unfairness to their own disadvantage (Wischniewski & Bruene, 2011). Were it possible to conduct a systematic review of the literature across a broader spectrum, incorporating moral and social reasoning, problem solving and decision making, it may have enabled the development of a broader view of the potential implications to cognitive therapeutic approaches. Similarly, it would have been of interest to consider how the effects of emotion on deductive reasoning related to these other areas of reasoning and vice versa.
The empirical paper

The review demonstrated that reasoning processes were relevant to the theory and practice of CBT and MI, and asserted that to the author’s knowledge, no studies had specifically explored whether reasoning processes were instrumental in achieving positive change in these approaches. The review also illustrated the role of emotion in CBT and MI, and in presenting empirical evidence regarding what is known about the effects of emotion on reasoning, highlighted how this literature may relate to the practice of these approaches. In doing so the review demonstrated the need for the empirical study of reasoning, emotion and their interactions in context of cognitive therapeutic approaches. The research paper was designed to address this need by exploring whether informal reasoning may be a specific cognitive process underlying change in MI. It was found that the generation of informal reasoning statements was significantly positively associated with the generation of positive behaviour change statements. This suggested that informal reasoning may be a specific cognitive process underlying the production of change statements in MI.

Based on recent findings regarding the helpful effects of positive emotion in cognitive therapeutic approaches and techniques (Geraghty, Wood & Highland, 2010a; Geraghty, Wood & Highland, 2010b; Johnson, Gooding, Wood, Fair & Tarrier, 2012; Panagioti, Gooding & Tarrier, 2012) the study also looked to ascertain whether positive emotional experiences would positively affect client’s informal reasoning ability. The study did not find positive emotional experience to be associated with the generation of informal reasoning statements. However, a significant, positive association was observed in relation to negative mood (relating to present) and the generation of informal reasoning statements; possibly reinforcing the role of discrepancy in MI. The findings will be discussed further in the theoretical implications section.
The evidence base for using MI with individuals with psychosis and substance use disorders is growing (Barrowclough et al., 2010; Carey, Leontieva, Dimmock, Maisto & Bakti, 2007). Although impairments in reasoning processes can be associated with the experience of psychotic, anxious and depressive symptoms (Corcoran et al., 2006; Garety, et al., 2005; Pélissier & O'Connor, 2002; Simpson, Cove, Fineberg, Msetfi & Ball, 2007; Yen, Rebok, Gallo, Jones, & Tennstedt, 2011), it was found that individuals with co-occurring psychosis and alcohol use disorders in this study were well able to engage in informal reasoning during the therapy process. Therefore the research paper contributed to this evidence base by providing information about this group’s ability to engage in informal reasoning processes during MI and also their ability to generate positive change talk in this therapeutic approach.

Overall, the literature review and the research paper together, contributed toward developing an understanding of the specific cognitive processes which may underlie cognitive therapeutic approaches, how these processes may interact with emotion during the therapy process, and the future need for further study of these processes and interactions. In particular, the study findings suggest that the role of emotion in informal reasoning processes warrants more attention.

**The Study context**

The study utilised existing participant data collected from the MIDAS trial, in addition to a substantial amount of novel (primary) data derived from the coding of existing therapy sessions which took place as part of the MIDAS trial. There were several advantages to conducting the study in context of this large RCT. Firstly, the quality and fidelity of MI was monitored and assessed in the MIDAS trial through clinical supervision and through independent ratings made by an individual who was experienced in delivering MI and CBT. A percentage of the audiotaped therapy
sessions were assessed using a fidelity scale designed to assess integrated MI and CBT which has good inter-rater reliability and validity (Haddock et al., 2012). The number of items rated as compliant on the treatment fidelity scale ranged from 13/16 (81%) to 16/16 (100%) across the 40 audiotaped sessions (Barrowclough et al., 2010). Therefore we know that the therapy sessions used in the current study were MI adherent, and that consequently our findings are directly applicable to MI theory and practice. Secondly, as the MIDAS trial was a large multi-site study, there was a substantial available pool of recorded therapy sessions, for a substantial number of individuals, which corresponded to a large amount of rich, existing data regarding these individuals. The pros and cons of using the existing data will be further discussed in the section regarding control and assessment measures.

Without access to MIDAS data it would not have been possible to generate the amount and quality of data for a pilot study of this nature, within the current study’s available resources. While the author believes that ethically, it is important to make the best use of all data gathered in studies and there must be a duty of care to ensure that client groups are not over-researched, designing a study that utilised secondary data did prove limiting in some respects. The following section critically examines the study methodology and explores ways in which the context of the study affected the methodological design employed.

**Methodological considerations**

*The Sample*

The manner in which the sample was selected was pseudo-random and out of a larger pool of participants from the MIDAS trial. Sample selection was a lengthy process and required the audit of all audio-taped therapy sessions for the original pool of 94 alcohol using participants of the MIDAS trial.
Before the transcription of therapy sessions could be competed, it was necessary to transfer them from audio cassette to digital format. This process had to be completed in 'real time' i.e. the cassette had to play for the duration of the therapy session. In the process of transcription the poor sound quality of recordings often led to a large number of tapes being rejected. Further therapy sessions were rejected by the transcriber on the basis of the quality of client’s speech, which, characteristic of psychosis was often flattened in tone with extremes of speech pressure (Andreasen & Olsen, 1982) making it difficult to understand; this also necessitated further sample selection. Consequently, in order to maintain the variance in mood, therapist rated outcomes, and stage of therapy required across the sample, it was necessary to monitor, adjust and reselect participants over a substantial period of time. Therefore, sample selection was an on-going and time-consuming process.

It is possible that the rejection and reselection of therapy sessions may have led to a bias in the sample. For example, it may be the case that where tapes were rejected due to the speech being unintelligible, the participants may have been experiencing more psychotic symptoms and using more alcohol at that time. Therefore their omission may have led to less variance in the sample. Nonetheless, despite the difficulties experienced in relation to sample selection, the selection method itself was thorough and well-designed to produce a sample with an even spread for the range of depression scores, therapist rated substance use outcomes, therapist, and stage of therapy.

A further consideration regarding the sample, relates to the generalisability of the study findings. Participants in this study produced relatively few change statements within therapy sessions. This may be due to the fact that rather than electing to have therapy, they were referred into a large RCT by case managers, and that many did not
identify their alcohol intake as problematic or were, at best, ambivalent about needing help at the start of therapy. Hence it may be the case that in client groups where target behaviours are identified as problematic and motivation to change is higher, a different pattern between reasoning and behaviour change statements will emerge.

Control & Assessment measures

Due to the study context, measures used to assess participants’ depressive (Calgary Depression Scale; Addington, Addington, & Maticka-Tyndale, 1993) and psychotic symptoms, (Positive and Negative Syndrome Scale; Kay, Fiszbein & Opler, 1987), clinical diagnoses and substance use status (DSM IV; APA, 1994) baseline alcohol use (Alcohol Use Disorders Identification Test; Saunders, Aarsland, Babor, de la Fuente & Grant, 1993) and alcohol outcomes (Time Line Follow Back interview; Sobell & Sobell, 1992) were pre-determined by those which were used in the MIDAS trial. Due to the independence of these measures and their established reliability and validity, it can be concluded that they were both appropriate and reliable sources of data for the current study. That said, in further studies, it may be of interest to gather data through experience sampling methods (ESM) as using ESM to measure constantly changing phenomena such as mood and alcohol consumption as they occur in their natural environment may minimise any retrospection bias (Swendsen et al., 2000).

In seeking to control for the potentially varying cognitive ability of participants, the current study isolated an item of the PANSS (“difficulty in abstract thinking”) for this purpose. If the current study were to be replicated, it would be preferable to use a measure of cognitive ability which provided richer information and that was designed specifically for this purpose. For example, measures that may be used might include the Matrix Reasoning subset of the Wechsler Abbreviated Scale of Intelligence (WASI) (Wechsler, 1999) which is designed to assess nonverbal fluid reasoning and general
intellectual ability or the Wisconsin Card Sorting Test (Heaton, Chelune, Talley, Kay, & Curtis, 1993), originally designed to assess abstract reasoning and set shifting (Berg, 1948).

Coding system

The coding system (Gooding personal communication, 2010) was developed based on a sound rationale for identifying and classifying reasoning statements (Platt & Spivack, 1975) and behaviour change statements (Miller, Moyers, Ernst, & Amrhein, 2008) and was well validated in its development. In the current study it was established that the author had good reliability in using this method.

Reliability results for the current study on the whole exceeded 0.7 and so were considered robust (for discussion see Sim & Wright, 2005). However, the observed kappas for the reliability of secondary categorisations of reasoning statements and behaviour change statements were below 0.7. Taking this in to account with the percentage of agreements between raters for behaviour change statements (43%) it is possible that in the current study the reliability of the identification and categorisation of behaviour change statements were not as robust as might be. This inconsistency may be due to slight rater ‘drift’ resulting from the piecemeal coding of scripts across a period of year and a half. This was an unfortunate artefact of the lengthy process of transcribing and sample re-selection as described.

Regarding the identification of variables of interest using the coding scheme; this process was lengthy and complex, due to the often circumstantial nature of client’s speech. Further to this, as the majority of examples of reasoning were embedded within dialogue between therapist and client, identifying them was often challenging.
In the current study, reasoning on all subjects was considered of interest. In future it may be of interest to separate examples of reasoning in regard to target behaviour change to see if any relationships may be observed.

*Rating Emotion*

Although the study had good ecological validity in that the therapy sessions from which variables of interest were coded were naturalistic, with participants spontaneously engaging in reasoning processes, a methodological weakness resulting from this was that ratings of emotional experience were made by ‘proxy’. That is, emotion was rated by the researcher in relation to the client’s speech in which emotional experience was represented by descriptive dialogue. An alternate means of measuring emotion in future may be through measuring the prosody of participant’s speech. This could be done through a computer programme used in speech pathology and linguistic studies (Cohen, Hong & Guevara, 2010). Alternately, it may be possible to develop the coding system to incorporate a measure of prosody. However, this may not be a very reliable measure of emotional experience in this client group, as individuals with schizophrenia have been found to be impaired in their production of emotional prosody in speech (Hoekert, Kahn, Pijhnenborg & Aleman, 2007). Perhaps a more representative measure of the client’s mood may be gained through inviting clients to rate their mood during the therapy session. However, this may have the disadvantage of focussing the client’s attention toward their mood, possibly leading to a distraction effects on their reasoning ability and also the possibility of clients giving inaccurate reports of their mood for reasons of social desirability or to please the therapist.
Service user involvement

In addition to the methodological issues described, a further shortcoming of the study was that service users were not involved in the study’s design. This was due to the nature of the study design; using therapy session recordings and data from the MIDAS trial which had been collected previously to the inception of the current study. In future studies which examine reasoning and its interactions with emotion, it would be important to gain a service user perspective when deciding the means through which mood may be assessed, if this were to be done during therapy itself. This would ensure that the methods used did not negatively impact on the therapeutic work.

Study power & Statistical analysis

According to Kreft & De Leeuw (1998) calculating power in multilevel models is complex and complicated by the fact that it changes according to the number of groups (participants) and the number of individual observations per participant. However, they suggest that to detect cross-level interactions, 20 groups should be sufficient. Therefore the power calculation for the primary aims of the study (predictions 1 and 2) using multi-level modelling analysis looking at fixed parameters, should have been sound at n= 26.

In small samples, regression co-efficients in multi-level modelling have been found to be unbiased (Maas & Hox, 2005) therefore bootstrapping (Goldstein, 2003; Hox, 2002) and other simulation methods are considered useful in sampling the variability in the sample. The study utilised bootstrapping to estimate the distribution of the means and sample the variance. Therefore in general, the statistical findings for predictions one and two might be considered as reliable.
For the subsidiary aims of the study (predictions 3 and 4) which used non-parametric correlations, the study was potentially under-powered. Therefore it is possible that a type II error was observed. Unfortunately, due to the time constraints of the research in terms of generating data through repeated sample selection, transcription, coding training and coding itself, it was not possible to increase the sample size beyond that of the original 30.

In MI, clinician interpersonal skills have been correlated significantly with measures of client engagement (Boardman, Catley, Grobe, Little, & Ahluwalia, 2006) and intensity of the therapeutic interaction (Catley, Harris, Mayo, Hall, Okuyemi, Boardman, & Ahluwalia, 2006). In addition to the items controlling for mood, alcohol use, psychotic symptoms and cognitive ability that were entered into the model for the multi-level modelling regression analyses, it would have been of interest to be able to include a measure of therapeutic alliance. This may have given more information regarding which factors influence the generation of behaviour change statements. The MIDAS trial did collect data regarding therapeutic alliance. However, unfortunately, this data was missing for a substantial percentage of the current study sample.

**Ethical considerations**

Ethical approval for the MIDAS trial was sought and granted by the Eastern Multi-site Research Ethics Committee, UK (2003) and a substantial amendment (appendix I) to the original ethics proposal was approved in 2005 that allowed the use of MIDAS trial data to further understand the process of therapy (appendix C). This application specified exploring the role of reasoning and emotion in relation to outcomes and also outlined that therapy would be transcribed and analysed for preliminary work in the area of the empirical study, first begun by Dr P. Gooding who
devised the coding scheme. The remit of the current study fell under the parameters of the substantial amendment. The current study was approved by the MIDAS trial management committee, and so the study ethics may be considered as sound.

Consent

When consenting to take part in the MIDAS trial (appendix J) participants were specifically asked to give their consent for audio-taped therapy sessions to be listened to for the purpose of understanding more about the process of therapy and assessment as part of their participation in the MIDAS trial. Participants were informed that they were free to decline to this and that doing so would not affect their participation in the MIDAS trial in any way. Therefore all participants to the current study gave their informed consent to take part.

Confidentiality

All information gathered from participants during the MIDAS trial which was used in the current study was kept confidential, including information about substance use. Identifiable information was kept separately from study measures in a locked filing cabinet. The therapy tapes were transcribed by both volunteers and paid University staff who had signed confidentiality agreements devised by the MIDAS trial (appendix K). Transcripts were produced according to strict guidelines regarding the anonymisation or omission of identifiable information such as names, place names, pet names, locations, dates and so forth. Transcripts were labelled with client identification numbers which could be paired with outcome data from the MIDAS trial.
Study Implications

Theoretical and future implications

The exploratory nature of the study and its methodological limitations mean that the study findings are not yet sufficient to be generalised to the development and delivery of therapy. However, they may inform the future focus of MI process research in several ways.

The majority of empirical research into mechanisms of change in MI has focussed on the inter-relational therapy process; examining client/therapist dialogue (Apodaca & Longabaugh, 2009). There is now a strong evidence base to suggest that therapist use of MI techniques can be associated with increased client change talk (Amrhein, Miller, Yahne, Knupsky, & Hochstein, 2004; Houck & Moyers, 2008; Moyers & Martin, 2006; Moyers, Martin, Christopher, Houck, Tonigan, & Amrhein, 2007). The results of the current study demonstrated that client’s informal reasoning ability could be associated with the production of behaviour change statements in MI, and that client’s experience of current negative mood could be associated with the production of informal reasoning statements. One implication of these findings to the study of mechanisms of change in MI is that informal reasoning may be a specific cognitive process which plays a role in the production of behaviour change statements.

Miller and Rose’s (2009) recent paper entitled “Toward a theory of motivational interviewing” (Miller and Rose, 2009), hypothesised a causal chain model which linked therapist training, therapist and client responses during treatment sessions, and post-treatment outcomes (Figure 1). In this paper they posit that:

"...it is plausible that the processes of MI trigger covert events that are not directly observable, but which result in both increased commitment language and subsequent behavior change. In this case, the observed commitment language is not
itself a cause of change, but represents a signal that the covert events are occurring and that change is likely to follow”

Given that the current study found a positive association between informal reasoning statements and the generation of behaviour change statements, one possible hypothesis is that informal reasoning processes may represent one potential ‘covert event’ to which Miller and Rose (2009) refer. As such, the study of the role of informal reasoning processes in MI would warrant further investigation.

Figure one: Miller and Rose’s (2009) hypothesized relationships among process and outcome variables in motivational interviewing

The literature review illustrated ways in which reasoning was central to CBT. Given the commonalities between MI and CBT (Driessen & Hollon, 2011; Flynn, 2011) it may be the case that the study findings can also inform the future direction of research in CBT.

In the study, negative emotion (pertaining to current experiences) was found to positively predict the generation of reasoning statements. A second implication to the study of mechanisms in MI, therefore relates to the client’s experience of negative emotion during the therapy process. In MI the creation of self-discrepancy (Carver, Lawrence, & Sheier, 1999; Carver & Sheier, 1990) is argued to be of importance in that the client’s experience of a mildly unpleasant state is thought to motivate them to
take action, in order to move from this state to one that is more favourable (Wagner & Ingersoll, 2008). Apodaca and Longabaugh’s (2009) review of mechanisms of change in MI examined empirical evidence for the role of discrepancy. They were only able to find two studies that provided empirical evidence of this. Apodaca and Longabaugh (2009) reported that studies comparing MI to a minimal/placebo control condition had shown a small to medium effect size on increasing the client’s experience of discrepancy compared to assessment only (McNally, Palfai & Kahler, 2005) and relaxation/medication (Budney, Higgins, Radonovich, & Novy, 2000). Further to this they reported that increased sense of discrepancy had been associated with a small to medium effect size on substance use outcomes in clients (McNally et al., 2005). Apodaca and Longabaugh (2009) held that as increasing discrepancy was a distinct aim of MI, it was important to study this area further.

Although the study did not specifically investigate the role of discrepancy in MI, the findings that negative mood could be positively associated with the generation of reasoning statements, may be indicative of the presence of discrepancy and its role in bringing about change in MI. In future studies examining the role of reasoning and emotion in MI, it would be of interest to incorporate a specific measure of discrepancy to explore whether the creation of discrepancy may be associated with clients current negative mood state and their reasoning ability.

In their study of the role of negative emotions in attenuating belief bias in deductive reasoning, Goel and Vartanian (2011) found that the experience of negative emotion led participants to be less likely to be influenced by their beliefs, suggesting that under certain conditions, negative emotions can attenuate beliefs in logical reasoning and reverse belief-bias. They observed ‘reaction times’ (i.e. the time taken to draw a conclusion) on reasoning tasks that were significantly longer on accurate trials.
in the negative opposed to neutral content condition; also observing that reaction times were longer for invalid (opposed to valid) responses to invalid syllogisms with believable conclusions, suggesting a link between negative content and higher accuracy. Goel & Vartanian (2011) suggested that these results could be due to a more vigilant and systematic style of processing associated with the experience of negative mood (Forgas, 1995). It may be possible to interpret the results of the current study (where current negative mood state was positively associated with the generation of informal reasoning statements) in context of Goel and Vartanian’s (2011) findings. This might suggest that the experience of negative mood in MI leads to a style of reasoning that is more systematic and vigilant. However, the use of negative feedback in MI has been found to result in fewer behaviour change statements (Amrhein, Miller, Yalne, Palmer, & Fulcher, 2003). Assuming that negative feedback leads to negative emotional experience, the current study results along with Amrhein et al., (2003) would suggest that the role of negative emotion in MI is complex.

Preliminary exploration of the role of arousal in regard to deductive reasoning has indicated that the experience of arousal associated with negative mood may be negatively linked to reasoning performance; leading to impairments, or loss of advantage to reasoning on topics of personal valence (Blanchette & Campbell, 2012; Blanchette & Leese, 2011). Given the current findings that negative emotion may enhance reasoning in MI, along with findings that negative feedback leads to the generation of fewer changes statements (Amhrein et al., 2003), it would thus seem to be of importance to further investigate the role of negative emotions in MI and within this to consider the role of arousal in facilitating or impairing outcomes.
The implications for clinical practice

The findings of the study have several implications for the clinical practice of MI. Firstly, as informal reasoning appears to be a process underlying the production of behaviour change statements in this approach, it would suggest that MI should seek to elicit and improve client’s reasoning processes during therapy. This has implications not only for the process of MI, but also for the training of MI therapists.

Secondly, regards the role of emotion in MI; the findings of the current study suggest that in practice when creating discrepancy between the client’s current and desired states, it may be more helpful to the client to avoid discussing their past, and to use themes or experiences that are more current, as this seems to elicit an experience of negative mood that enables informal reasoning, which the study demonstrated to underlie the production of change statements.

Thirdly, the results of the study along with those of Amrhein et al., (2003) suggest that monitoring mood and/or arousal during MI may be advantageous, because, whereas a negative mood seems to be helpful to reasoning processes and presumably the exploration of ambivalence, the use of negative feedback appears to be unhelpful.
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Appendix A: Clinical Psychology Review author guidelines

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Essential title page information
Title. Concise and informative. Titles are often used in information-retrieval systems. Avoid abbreviations and formulae where possible. Note: The title page should be the first page of the manuscript document indicating the author's names and affiliations and the corresponding author's complete contact information.

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Abstract
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Appendix B: Behaviour Research and Therapy author guidelines

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This journal has standard templates available in key reference management packages EndNote (http://www.endnote.com/support/enstyles.asp) and Reference Manager (http://refman.com/support/rmstyles.asp). Using plug-ins to wordprocessing packages, authors only need to select the appropriate journal template when preparing their article and the list of references and citations to these will be formatted according to the journal style which is described below.

Reference style
References should be arranged first alphabetically and then further sorted chronologically if necessary. More than one reference from the same author(s) in the same year must be identified by the letters "a", "b", "c", etc., placed after the year of publication.

References should be formatted with a hanging indent (i.e., the first line of each reference is flush left while the subsequent lines are indented).


**Use of the Digital Object Identifier**

The Digital Object Identifier (DOI) may be used to cite and link to electronic documents. The DOI consists of a unique alpha-numeric character string which is assigned to a document by the publisher upon the initial electronic publication. The assigned DOI never changes. Therefore, it is an ideal medium for citing a document, particularly 'Articles in press' because they have not yet received their full bibliographic information.

Example of a correctly given DOI (in URL format; here an article in the journal *Physics Letters B*): [http://dx.doi.org/10.1016/j.physletb.2010.09.059](http://dx.doi.org/10.1016/j.physletb.2010.09.059) When you use a DOI to create links to documents on the web, the DOIs are guaranteed never to change.
Appendix C: Ethical approval of substantial amendment to MIDAS trial protocol

Eastern Multi-centre Research Ethics Committee

Our ref: winword/letters05/035455SL32Favopamendspt05
02 September 2005

Prof. C Barrowclough
School of Psychiatry and Behavioural Sciences
University of Manchester
2nd Floor, Education and Research Centre,
Wythenshawe Hospital
Southmoor Road, Manchester, M23 9LT

Dear Prof. Barrowclough

MREC reference number: 03/5/45
Study Title: Motivational Intervention of drug and alcohol misuse in Schizophrenia.

Amendment number: 3 and 4
Amendment date: 07/07/2005

The above amendment was reviewed by the Eastern MREC Executive Sub Committee.
Please accept our apologies in the delay in replying to you, which has been due to a
combination of staff being on sick and annual leave.

Ethical opinion

The members of the Executive Sub Committee gave a favourable ethical opinion of the
amendment.

Approved documents

The documents reviewed and approved were:
Letter from applicant dated 7/7/2005
Notice of substantial amendment form version 3 dated 7/7/2005
Consent form version 3 dated 7/7/2005
Notice of substantial amendment form version 4 dated 7/7/2005
Self report measure
Patient information sheet version 4 dated 24/09/2005

Membership of the Committee

The members of the Eastern MREC Executive Sub Committee are listed below.

Management approval

All investigators and research collaborators in the NHS should notify the R&D Department for
the relevant NHS care organisation of this amendment and check whether it affects local
management approval of the research.

The Central Office for Research Ethics Committees is responsible for the
operational management of Multi-centre Research Ethics Committees
Statement of compliance

CTIMPs only

This Committee is recognised by the United Kingdom Ethics Committee Authority under the Medicines for Human Use (Clinical Trials) Regulations 2004, and is authorised to carry out the ethical review of clinical trials of investigational medicinal products.

The Committee is fully compliant with the Regulations as they relate to ethics committees and the conditions and principles of good clinical practice.

All studies

The Committee is constituted in accordance with the Governance Arrangements for Research Ethics Committees (July 2001) and complies fully with the Standard Operating Procedures for Research Ethics Committees in the UK.

MREC 03/5/45 Please quote this number on all correspondence

Yours sincerely

[Signature]

Anne Burnley
MREC Administrator

Email: Admin@easternmrec.com

List of members for Executive Sub Committee
Dr S Evans-Lay Chairman
Dr M Wilkinson- Vice Chairman
Mr R Driver- Lay member
Appendix D: Calgary Depression Scale

ID Number: Observation Period ___________ Date

Interviewer: Ask the first question as written. Use follow up probes or qualifiers at your discretion. N.B. The last item (9) is based on observations of the entire interview.

1. DEPRESSION: How would you describe your mood over the last two weeks? Do you keep reasonably cheerful or have you been very depressed or low spirited recently? In the last two weeks how often have you (own words) every day? All day?
   0. Absent
   1. Mild: Expresses some sadness or discouragement on questioning.
   2. Moderate: Distinct depressed mood persisting up to half the time over last 2 weeks: present daily.
   3. Severe: Markedly depressed mood persisting daily over half the time interfering with normal motor and social functioning.

2. HOPELESSNESS: How do you see the future for yourself? Can you see any future? - or has life seemed quite hopeless? Have you given up or does there still seem some reason for trying?
   0. Absent
   1. Mild: Has at times felt hopeless over the last two weeks but still has some degree of hope for the future.
   2. Moderate: Persistent, moderate sense of hopelessness over last week. Can be persuaded to acknowledge possibility of things being better.

3. SELF DEPRECIATION: What is your opinion of your self compared to other people? Do you feel better, not as good, or about the same as other? Do you feel inferior or even worthless?
   0. Absent
   1. Mild: Some inferiority; not amounting to feeling of worthlessness.
   2. Moderate: Subject feels worthless, but less than 50% of the time.
   3. Severe: Subject feels worthless more than 50% of the time. May be challenged to acknowledge otherwise.

4. GUILTY IDEAS OF REFERENCE: Do you have the feeling that you are being blamed for something or even wrongly accused? What about? (Do not include justifiable blame or accusation. Exclude delusions of guilt.)
   0. Absent
   1. Mild: Subject feels blamed but not accused less than 50% of the time.
   2. Moderate: Persisting sense of being blamed, and/or occasional sense of being accused.
   3. Severe: Persistent sense of being accused. When challenged, acknowledges that it is not so.

5. PATHOLOGICAL GUILT: Do you tend to blame yourself for little things you may have done in the past? Do you think that you deserve to be so concerned about this?
   0. Absent
   1. Mild: Subject sometimes feels over guilty about some minor peccadillo, but less than 50% of time.
   2. Moderate: Subject usually (over 50% of time) feels guilty about past actions the significance of which he exaggerates.
3. **Severe:** Subject usually feels s/he is to blame for everything that has gone wrong, even when not his/her fault.

6. **MORNING DEPRESSION:** When you have felt depressed over the last 2 weeks have you noticed the depression being worse at any particular time of day?

0. **Absent:** No depression.

1. **Mild Depression:** present but no diurnal variation.

2. **Moderate Depression:** spontaneously mentioned to be worse in a.m.

3. **Severe Depression:** markedly worse in a.m., with impaired functioning which improves in p.m.

7. **EARLY WAKENING:** Do you wake earlier in the morning than is normal for you? How many times a week does this happen?

0. **Absent:** No early waking.

1. **Mild:** Occasionally wakes (up to twice weekly) 1 hour or more before normal time to wake or alarm time.

2. **Moderate:** Often wakes early (up to 5 times weekly) 1 hour or more before normal time to wake or alarm.

3. **Severe:** Daily wakes 1 hour or more before normal time.

8. **SUICIDE:** Have you felt that life wasn’t worth living? Did you ever feel like ending it all? What did you think you might do? Did you actually try?

0. **Absent**

1. **Mild:** Frequent thoughts of being better off dead, or occasional thoughts of suicide.

2. **Moderate:** Deliberately considered suicide with a plan, but made no attempt.

3. **Severe:** Suicidal attempt apparently designed to end in death (i.e.: accidental discovery of inefficient means).

9. **OBSERVED DEPRESSION:** Based on interviewer’s observations during the entire interview. The question “Do you feel like crying?” used at appropriate points in the interview, may elicit information useful to this observation.

0. **Absent**

1. **Mild:** Subject appears sad and mournful even during parts of the interview, involving affectively neutral discussion.

2. **Moderate:** Subject appears sad and mournful throughout the interview, with gloomy monotonous voice and is tearful or close to tears at times.

3. **Severe:** Subject chokes on distressing topics, frequently sighs deeply and cries openly, or is persistently in a state of frozen misery if examiner is sure that this is present.
Appendix E: Manual for coding reasoning, emotion and behaviour change statements

Coding Arguments and Evidence from transcripts of therapy sessions using motivational interviewing and CBT with clients who have a dual diagnosis of substance abuse and psychosis.

Trish Gooding, Christine Barrowclough and Peter Taylor
Katy Silverman
Kate Marshall
Ellen Swannell
June 2008

Acknowledgements:
The coding scheme described in this manual has been developed in an iterative fashion over the course of 18 months with the help of postgraduate students and Research Assistants (Silverman, Marshall, Swannell and Taylor) working on this project.
1.0 Introduction

The goal of this manual is to provide guidance on the coding of the transcripts of therapy involving motivational interviewing (MI) for clients with a dual diagnosis of psychosis and substance abuse.

Coders are required to look for three types of statement generated by the client, every five minutes of the therapy session. This is so that variability in statements can be calculated over the course of any one therapy session.

The three types of statement are:

1. Arguments and supporting evidence
2. Statements related to behaviour change
3. Indications of positive and negative mood

1.1 The coding template

Coders are provided with a template recording the clients ID, session number and date. Evidence of each of the three types of statement should be copied and pasted into the tables provided in the template, for each five minute time window of the session transcript. Where appropriate, these statements can then be sub-categorised. For instance, arguments and evidence have five sub-categories of response (see section 2.2):

1. Objective
2. Personal/anecdotal
3. Alternatives
4. Evidence from others
5. Moral/social

1.2 Context and section of dialogue:

It is often the case that single statements alone do not reflect the arguments and evidence generated by the clients nor their emotional mood states. Rather, it is through a small section of dialogue that reasoning, commitment to change, and affective states become evident. Hence, when coding it is helpful if the coder inserts the section of dialogue into the coding template. For example:

"T: It's things are so difficult that your own health or your own well being doesn't come into the picture at all.
C: Yeah, my own safety doesn't. It's like, my brother's took all the sharp knives away 'cause he knows what I'm like with knives."

is more helpful than:
"C: Yeah, my own safety doesn’t. It’s like, my brother’s took all the sharp knives away ’cause he knows what I’m like with knives.”

1.3 When dialogue can be categorised under more than one heading
Initially, statements/sections of dialogue could not be coded under more than one category. So, a statement that was categorised as argument and evidence could not also be categorised as a negative or a positive statement. In this, the latest version of the coding scheme, two categories have been created which are argument and evidence plus negative statement, argument and evidence plus positive statement (see section 2.4). In these instances, the positive or negative statements are embedded within the argument and evidence.

1.4 Tone of voice
Additionally, coders are required to assess the tone of the voice of the client as positive or negative. This is required only for statements which have been identified as indicating whether the client is in a positive or negative mood state at the time of the therapy (see section 5).

1.5 Overlapping time windows
Occasionally, a relevant statement may overlap time windows. For instance, a statement containing arguments and evidence may occur at the end of the first 0-5 minute window and continue into the next 5-10 minute window. In instances such as this, the entire statement should be cited and coded under the second time window.

1.6 Word counts
The number of words uttered by clients should be controlled for. Hence, there should be a word count for every 5 minute time window of the client’s utterances. (This can be done in word with the automated word count command, after the therapist’s statements have been erased.)

1.7 Assessing reliability
Two coders will normally code the transcripts. One coder, termed the primary coder, will code all the transcripts. The second coder will independently code a proportion of the transcripts. This allows a measure of reliability to be calculated—i.e. the extent to which the two coders agree on the identification and categorisation of the statements of interest.

The following sections elaborate on each of these categories of statement in turn and in addition provide guidance for coding tone in terms of affectivity.
2.0 Arguments and Evidence

2.1 Overview
The goal here is to identify instances where clients generate arguments and evidence in spontaneous speech, i.e. engage in informal reasoning. Instances of arguments and evidence are completely open – the reasoning process does not have to be about anything in particular. So, the client could be reasoning about giving up drink, the problems of social isolation, fuel tax, divorce and so on. There are no restrictions, and the reasoning does not have to be about the client's circumstances, illness or desired behaviour changes.

Coding can be thought of as occurring in two stages. The first stage is the extraction of the arguments and evidence from the transcripts and the second stage is the categorisation of the extracted arguments and evidence statements into arguments and evidence types (objective, alternatives, based on others' opinions, moral and personal/anecdotal).

A further layer of categorisation is required in that statements of arguments and evidence may be complex and include a number of different reasoning steps. For instance "if I do X then Y happens and that is because of Z", or "if I do X then Y happens, and Y is made worse by Z" are more complex than "if I do X then Y happens". A simple category of argument and evidence includes just one step. A more complex type includes more than one step.

Coder are required to:
1. Identify and extract arguments and evidence
2. Categorise the arguments and evidence in terms of type of argument (personal, objective, others, alternatives, moral). The categorization should be done on the core set of arguments and evidence produced by the primary rater.
3. Rate the arguments and evidence as simple or complex. The complexity rating should also be done on the core set of arguments and evidence produced by the primary rater.

2.2 Definition of arguments and evidence
The work on causal attributions is helpful in guiding the identification of reasoning processes (Barrowclough, DATE: Brewin et al., 1988; Stratton et al., 1986). An attributitional statement has been defined as: "A statement which explains or explores the reasons or causes for a particular event or class of related events, where event refers to a reported outcome or behaviour or situation."

Using the above as a guiding template, a broad definition of a statement including arguments and evidence is that it should contain information which backs-up, explains or explores the underlying reasons for a cognition which is held by the client. A cognition, in this case, is an opinion, belief, perception or attitude. Essentially, the statement should answer a 'why' question – 'why do I have this attitude', 'why do I feel this way', 'why do I hold this belief', 'why does this happen to me?', 'why did I see it this way'. A simple and very abstract way of expressing this is:

- Why does X happen? X happens because of Y.
- X causes/leads to Y (I can't sleep because I keep thinking of stuff)
- X covaries with Y (When I worry I can't sleep)

This may become more complex, for instance:
IF X occurs then Y happens and that is because of Z
(X and Y represent the trigger or stimulus and the outcome and Z represents the mediating factor. For example, When I worry I can’t sleep and that’s because I keep turning things over in mind and I can’t shut them out.)

As will be elaborated in below, one level of the coding involves categorising arguments and evidence in terms of their complexity.

2.21 Identifying arguments and evidence
Initially, the main task of the coder is to identify causal or IF X then Y statements. From the causal attribution work, two necessary requirements for statements to be identified as a causal attribution were identified as:
1. Specific reference must be made to an event or class of events.
2. A cause or reason for the occurrence of the event must be given or explored or inferred.

Adapting this to informal reasoning work, for a statement to be classed as arguments and evidence it should satisfy three criteria:
1. It should answer a why question
2. It should indicate a cognition which is held by the client
3. It should provide information which explains or explores the cause of a cognition
   a. X causes or leads to Y which leads to Z (e.g. when I worry, I keep going over and over things in my head and then I can’t sleep)
   b. Not X leads to Y because of Z (e.g. if I don’t drink then I have less arguments with my wife because I don’t get as angry)
   c. Not X leads to not Y (If I don’t drink then I don’t get angry)
   d. X leads to not Y (If I drink I can’t face my mother)

2.211 Spotting ‘why’ questions
At the outset it should be understood that the informal/everyday reasoning literature gives participants ‘problems’ which they need to reason about (Kuhn, Shaw and Felton 1997). This might be whether the Bank of England should reduce interest rates, the extent to which the hike in energy charges is defensible, whether increased accessibility to over-the-counter drugs to induce miscarriages in early pregnancies is justified and so forth. The MIDAS data set differs in that evidence of reasoning is being extracted from therapy sessions and the subject about which the reasoning can occur is unrestricted. This can make spotting ‘why’ questions difficult because there are no key words to look out for. Furthermore, the participants have psychosis which may make the identification of reasoned statements difficult because statements may well be reasonable when viewed from the client’s perspective.

For example:

"
"...I just think I’ve got it for a purpose, you know. There’s some underlying reason that I don’t
know, some hidden agenda of God’s I don’t know about that he thinks I should have schizophrenia."
"
The reason for the client having schizophrenia is placed in God’s hands.

Identifying the why question can help to distinguish argumentation from description. For example:

C: It’s like I could understand why it’s not acceptable for everybody but for certain people I think [they] could let it out on prescription. [Client 4017]

As this statement stands the client is giving no reason why drugs should be let out on prescription, so it is not an example of informal reasoning. Similarly:

C: that’s when my heart broke and I don’t think God would hold that against me, you know (victim of childhood abuse)

This is just a statement there is no reason given for why would held that against them.

2.2.12 Identifying cognitions held by the client

This is important when identifying whether a section of dialogue contains one, possibly elaborated argument, or whether it contains more than one argument.

For example, the dialogue in the box below shows that one section of dialogue is simply about the co-variation between worry and anxiety. The cognition is what precipitates worry and this cognition is the same for both of the client’s statements.

C: I think I don’t mind at all, I don’t care but when the anxiety’s up that’s when I start worrying about little things that are going on.

T: Hmhm

C: But when the anxiety’s not there I just don’t care its no worries to me. It’s when its in my head that I’ve got worries, that I’m concerned. That I’m thinking this and I’m thinking that

However, for the example in the box below, there are three arguments (each highlighted in a different colour).

T: I was impressed last time that you, you’d sort of recognised that being on your own and dwelling on things was something that wasn’t really helpful and making a lot of effort to go over and get into the routine of going to your mum’s and also getting support from your friends. That those were things that you’d, you’d sort of cut yourself...
2.2.13 Spotting causal information

It is helpful to think about simple 'rules' of reasoning when identifying informal reasoning. As stated in section 2.2.1 this can be abstracted into variations of X causes Y. However, these 'rules' will not be expressed in a robotic or formulaic manner in spontaneous speech, so there is considerable skill involved in identifying statements of cause and effect.

Work on causal attributions identifies three ways in which causal information may be expressed, namely, explicitly, explorative and inferred. The same classification can be applied to statements containing arguments and evidence. It is important that all three classes of expressing causal information are identified and included.

a) Causes are explicitly given.

Sometimes arguments and evidence may be very clear and explicitly stated: causes and events or cognitions are linked by causal connectives (because, so, that's how, this is why, due to, therefore etc.) This is similar to IF X THEN Y types of reasoning, e.g.:

IF I think X then I feel Y
IF I do X then this makes me feel Y
IF someone does X to me then I react by doing Y
IF I fail to do X then I can't do Y, and so forth.

In order for causal material to be placed in this category there must always be a link word (or words), otherwise the material will be placed in the inferred category below.

Examples of explicit causes:

C: Unless it's [schizophrenia] a punishment for my sins, which I don't think so because Christ is precipitation for sins, he's there to stand in the place of those sins.
X (punishment by god) is not the cause of Y (schizophrenia) because of Z (Jesus).

C: Although I keep wanting assurance from God, I am still loved. I think it's 'cause I don't feel love from anywhere else.
b) Causes are explored
Sometimes the client will not be certain about the causes of their cognitions. They may be searching for answers and put forward suggestions for their beliefs/thoughts/feelings.
Different reasons may be put forward and/or the client may feel ambivalent about suggested explanations.

Examples of exploratory causes:

C: It's like I'd been, I'd been getting paranoid for, for years. That's when I started getting treated recently, over the past two years. But nothing on the scale that it is, you know. I don't know if it's got worse because of me or because of the drugs but I don't think the drugs have helped at all.

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c) Causes are inferred
In spontaneous dialogue, informal reasoning, i.e. the production of arguments and evidence often seems to be inferred. The coder may infer that the client is making a causal attribution due to the juxtaposition of the cognition with the causal information. There must still be an implicit IF X then Y rule, or there should be inferred co-variation in that an increase/decrease of X leads to increase/decrease of Y (this can be X increases as does Y; X decreases as does Y; X increases and Y decreases; X decreases and Y increases).

The dialogue produced by the therapist may often produce an important part of this juxtapositioning. As shown by the third example below, the inference may be based on a concrete example given by the client rather than an explicit ‘IF.....THEN...’ type of statement.

It is important that dialogue is not over-interpreted. For example:

“I began to get ill when my grandmother came to stay”
There is no indication here that the illness was triggered by anything connected with the Grandmothers stay. However, it is also important to look-out for statements which are in the context of not needing to explain that something happening, such as a death of a close friend or family, is usually distressing. So…...

"My father died. I got increasingly depressed and drank more and more."

...can be interpreted causally because the death of the father is associated with grief which caused the depression and the increased drinking. This doesn't need to be spelt out because it is common knowledge that death and grief go together.

Examples of inferred causes:

Example 1
T: You're worried that something might happen to you if you're out walking and
C: The fact, more getting lost and stuff like. I've been attacked and it's like, anything like that happening.
In this case the client is giving evidence for the idea that they may not be safe out walking.

Example 2
T: Mmm. Heroin was a way of
C: Just escaping. Just helping me chill out. It's like, it killed the pain in my back, so I took it again.
Heroin caused the pain to diminish – there's no explicit causal relationship here but the inference is clear.

Example 3
C: Like, hospital's scare me as it is so I definitely don't want to go into hospital. If there was somewhere where I could go and have a rest for a week or two, I'd probably take that option.
T: Mmm. you were asking me last, last week if, if that was possible.
C: Yeah but not in hospital 'cause it's like, they don't look at the illness, they look at the drugs. And it's like straight away, smackhead, and that's the way they look at it and they do.
In this case, even though the client is using a because clause, the reason is given by example. Hospitals stigmatise and that's why the client wishes to avoid them. The stigmatisation is inferred from the example given in the dialogue - "And it's like straight away, smackhead, and that's the way they'd look at it and they do."
2.3 What to exclude

It is important to consider whether all three criteria for arguments and evidence are present i.e.;
1. why question
2. cognition held by client
3. explanation/exploration

Hence the following types of statements should not be included as arguments and reasoning:

- Descriptive statements that have no ‘why’ question.
  
  I’ve been feeling really awful. I just cry and cry. Every morning I actually wake up crying.

- Why questions that have no associated cognitions.
  

- Lack of a cause – why questions with no explanations or explorations.
  
  I’ve been trying to cut down on my drink. I can’t though. I don’t know what it is that stops me being sensible.

- Juxtapositions of events or cognitions that have no implied cause or covariation between events/cognitions.
  
  I’ve been feeling tired. I’ve been seeing the occupational therapist.

2.4

Worked examples:
The following examples work through the three criteria for identifying arguments and evidence.

Example 1:
C: I know he can’t stand sin and people who sin he has to turn away from because he, it sickens him so. And that’s why he had to turn away from me but I’ve said I’m sorry now.

Why question: why God turned away from client
Cognition: God turning away from client
Cause: sin sickens God; client sinned; God turned away from client

Example 2:
C: Although I keep wanting assurance from God, I am still loved. I think it’s ‘cause I don’t feel love from anywhere else.

Why question: why do I want reassurance

Cognition: assurance seeking

Cause: needs assurance because not loved

Example 3:
C: Yeah, I think I still love her, deep down. ‘Cause it broke my heart this morning when I thought about it. ‘Cause she’s with this other man for the rest of her life.

Why question: why do I think I still love her

Cognition: feelings of love

Cause: became upset when thinking of wife

2.5 Categories of argument and evidence
Research on informal reasoning has identified different types of argument and evidence that people produce to back-up statements relating to their beliefs. These different types of argument can be graded from the most objective where people cite a claim and support it with independent, evidence-based findings, to anecdotal where people draw on personal experiences and subjective report (Kohn, Shaw and Felton 1997). See box 2.1 for an example of an objective argument and evidence base (it has been shown that X causes Y), an anecdotal argument and evidence base or one which is based on value judgement (I believe that if you do X you get Y, it is wrong to do Y), an argument based on what sub-groups of people within society may believe (X types of people will be opposed to Y), and alternatives (X could be replaced by Y, an alternative to X is Y).

Box 2.1
Objective statement: “The decision to invade Iraq was hasty and ill-thought out. The resources available to troops were inadequate and were not carefully planned for. Troops had insufficient food, medical supplies, ammunition and many appeared to be poorly briefed.”

Anecdotal statement: “The decision to invade Iraq was hasty and ill-thought out. I had a feeling of dread the minute I heard about the invasion plans. The Iraq war was no exception. My own experiences of conflict lead me to oppose any suggestion of a military invasion of this country.”

Beliefs held by sub-groups of people: “The decision to invade Iraq was hasty and ill-thought out. Leading left-wing political parties in Britain, France and Holland all indicate that they were opposed to the war from the outset.”

Alternatives: “The decision to invade Iraq was hasty and ill-thought out. Other strategies could have been attempted. For instance, negotiations could have been initiated with the threat of embargos if non-humanitarian policies were persistently pursued by the Iraqis.”
An additional category of reasoning style may also include evidence from others which describes a situation where the arguer lends credence to their position by using the views of others, for example, "The decision to invade Iraq was hasty and ill-thought out. My sister has read numerous reports in newspapers and magazines, watched documentaries on this situation and she says that all seem to have a very negative view of this war."

The issue to be addressed with respect to the MI project is how to apply this way of coding and categorising everyday or informal reasoning to those with psychosis in a therapeutic context.

2.51 Development of a coding scheme for arguments and evidence for people with psychosis.

The coding scheme which has developed is taken from the informal reasoning literature which is set in an educational context and includes the following categories:

- Objective
- Personal/anecdotal
- Alternatives
- Evidence from others
- Moral/societal

The category of 'evidence from others' has been adapted from the original category 'beliefs held by sub-groups of people. A strict adherence to the original category implies that X should be true because a group of Y says so, e.g. 'alcohol is bad because psychiatrists say so.' This seemed somewhat limiting in the current context and so was expanded to mean that 'evidence' could be given from any individual, group or agency.

The category of 'moral/societal' was an addition to the original coding schemes from Kuhn and co-workers. This was data-driven, as in some cases it seemed that beliefs were based on moral or religious dictums. For example

"I can't commit suicide because it's wrong. People will judge me. God will judge me. I will have sinned."

Box 2.2 gives examples of each of these categories of arguments and evidence. Notes in blue text indicate the reasoning underlying the coding decision if that decision is not entirely straightforward.

<table>
<thead>
<tr>
<th>Box 2.2</th>
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</thead>
<tbody>
<tr>
<td>T=therapist</td>
</tr>
<tr>
<td>C=client</td>
</tr>
<tr>
<td>Argument category</td>
</tr>
<tr>
<td>Objective/Research</td>
</tr>
<tr>
<td>Personal/Anecdotal</td>
</tr>
<tr>
<td>-------------------</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>X causes Y to happen (Y can be feelings as well as experiences)</td>
</tr>
<tr>
<td>I can't do X because Y happens to me.</td>
</tr>
<tr>
<td>Doing X means you can't do Y</td>
</tr>
<tr>
<td>X is not happening because of Y</td>
</tr>
<tr>
<td>Don't want to do X and this</td>
</tr>
</tbody>
</table>
leads me to feeling Y (and doing' avoiding doing Z).

you know. That's what puts me off about going to places like that [don't want to do X (going out of house)... and this leads me to feeling ... Y (put off) Evidence is personal]

X would still happen even if Y occurred.

I get paranoid but even if they put me on a high dose, it would still happen, I think.

I don't want to be like X because of Y

C: It's like, but I just don't wanna end up like my mam 'cause she's house bound. She won't go out at all.

C: I've not got nothing against people with schizophrenia but I just don't want the label.

T: No. There's negative things about the label that you don't want.

C: Yeah. It's like I want to eventually start work again and it's like people will look at your application form and say "no chance."

[T doesn't want the label (X) because of rejection of work applications (Y)]

"My sister says that it's bad for me and I should stop".

Evidence from others

X says it is bad for me to do Y.

"But they took it as if I was a drug addict and in their eyes a drug addict breaks in cars and steals the radios and breaks in houses and steals the TV's and breaks in the school where I was working. That's a drug addict to them. So I was a drug addict".

X says Y has characteristics A,B and C and I am Y.

X sub-groups of people or individuals know the cause of Y.

"T: They, they'd be clear in their mind what's the cause of schizophrenia.

C: Yeah, they'd say it was the devil. Comes to steal, cheat and destroy, you know."

Because of X, individual or sub-group of people do Y.

"T: It's, things are so difficult that your own health or your own well being doesn't come into the picture at all."
C: Yeah, my own safety doesn’t. It’s like, my brother’s took all the sharp knives away ‘cause he knows what I’m like with knives.”

Religious teachings say it is wrong to do X (can be implied)

“I can’t commit suicide without committing myself to hell, you know.”

Alternatives

“I’d rather spend my money on…..”

“T: The, the drugs would cost money and that would be something that would straight away be a problem. C: Yeah, yeah. Because the money could be spent on better things like shopping or clothes or paying a bill or anything.”

C: You don’t get it? Two or three, or even one on the free view, so it costs me sixty pound. And I’d rather spend my money. I’d rather spend sixty pound on getting an airing fitted in.

T: Yeah; yeah.

C: than spending sixty pound that you waste up a wall.

“it is wrong to go out and get drunk every night”

Societal/Moral

“I think I wouldn’t do it, no. Having to kill people’s a terrible thing. You shouldn’t have to do it.”

| 2.512 When is a statement backed up by evidence, personal or objective? |
|--------------------|--------------------------------------------------|
| The following example “But I feel because it’s a mental illness, I’m cut off from the rest of the world” could be formulated as “I feel that because of Y, I am X-ed.” This seems a straightforward personal judgment. |
| But, if the statement were written as “But I feel because it’s a mental illness, I’m cut off from the rest of the world. People won’t look at me. Friends I once had don’t ring me up” then this is better than the first statement because it contains evidence from observations. However, those observations are still personal. |
| If the statement were written as “But I feel because it’s a mental illness, I’m cut off from the rest of the world. I was reading that many people with psychosis feel stigmatized and alienated from |
society. I feel like that too” then this is an objective form of evidence because although personal
there is a link with research findings, hence it is objective.

2.5.13 How to classify religion
The issue here is whether arguments and evidence which are rooted in religion be categorised as
‘others’ because a deity indicates that X or Y is the thing to do, or whether it is categorised as
‘personal’ because it is a personal viewpoint. The way around this is if the statement is based on
something concrete – e.g. what a priest/minister/bible says - then it classed as ‘other’, but if
the evidence is based on personal experience – e.g. god told me last night ….. then it is classed
as ‘personal’.

If the statement is based on a religious dictum – e.g. “it is wrong to do X because I will have sinned
and I’ll go to hell” then this is classed as moral/religious.

2.5.2 When to categorise arguments and evidence
Of the two coders, one is designated as the primary coder. That is, that individual codes all the
transcripts, the second coder codes a proportion of those transcripts and reliability is assessed. The
arguments and evidence statements identified by the primary coder should be classified into five
categories by each coder independently.

2.6 Complexity of the arguments and evidence
The dialogue containing the arguments and evidence differs in the complexity of the argument
given. Complexity can be thought of as the number of different ‘steps’ presented which validate
the argument or give evidence of the validity of the argument. Arguments and evidence should be
classified as either basic (contains 1 step), coded as 1, or complex (contains more than 1 step)
coded as 2. It should be noted that these are separate reasoning steps rather than elaboration.

A basic argument would be in the form of X causes Y

| e.g. “when she leaves the house I feel angry” |

A more complex argument would be in the form of X causes Y because of Z

| e.g. “when she leaves the house I feel angry because I feel she’s rejected me” |

The extra steps may often refer to emotions, thoughts and feelings. So, in the above example, the
feeling of rejection leads to anger.

A complex argument must have two or more distinct steps.

Examples from the transcripts are provided in box 2.5 below:

| Box 2.4 Complexity of the arguments and evidence |
| Basic level 1 arguments: |
"It’s like, but I just don’t wanna end up like my mum ‘cause she’s house bound. She won’t go out at all"

"Yeah, I needed it ‘cause I wasn’t on the methadone scripts at all so the methadone scripts help me an awful lot"

"But I just don’t worry about everything (when on heroin)"

"That’s probably from being paranoid (good ideas)"

Complex, level 2, arguments
"he also takes my mind off things ‘cause he goes on about his day and what he’s been doing when he’s been going out and it’s just nice to hear other things"

"Just escaping. Just helping me chill out. It’s like, it killed the pain in my back, so I took it again (regarding heroin)"

"Because the money could be spent on better things like shopping or clothes or paying a bill or anything (than drugs)"

"But you can’t do that when you’re on drugs, ‘cause one, you need your drugs to be there so you don’t wanna go on holiday and two, you’d rather spend the money on drugs"

2.6.1 When to code complexity
It is often the case that it is not possible to define exactly when a piece of dialogue evidencing informal reasoning begins and ends, especially as context is important in evaluating such statements. Hence, complexity should be coded using the primary coders extraction of the arguments and evidence.

2.7 Categorising versus quantitative scoring of arguments and evidence
Previously, arguments and evidence were given a score which reflected apparent quality and objectivity. So, objective evidence was given the highest score and personal/anecdotal the lowest. This imposes a somewhat hierarchical scheme. This may seem sensible in the context of educational research but in a clinical setting, it seemed more appropriate to count the overall number of arguments and evidence provided and also to count the number of arguments in each category for each client.

2.8 Arguments and evidence which also indicate the client’s mood state.
A statement cannot be categorised twice, i.e. it cannot count in the arguments and evidence section and also in the negative/positive statements section. However, on some occasions a statement reflects both reasoning and affective state. Hence, two sub-categories were created:

- Arguments and evidence plus negative state
- Arguments and evidence plus positive state
It is important that the arguments and evidence are embedded with positive and negative statements in such a way that they cannot be split.

For instance, in the example below the not being a bad lad is a positive statement but cannot be split from the 'because' clause – the X and the Y are linked:

C:…… So now rather than, I think to myself that I’m not such a bad lad… because I’ve got a few mates now who want to bother with me and if they didn’t like me, they wouldn’t bother with me.

However, in the following example, the negative statement can be separated from the reasoning statement:

C: I’ve been feeling really down this week, I still feel down. I keep thinking: ‘Maybe I’m better’. I don’t want to get into another situation where I’m feeling like this. I don’t want to be doing this again.

The statement in green summaizes current feelings whilst the statement in pink explains why the client has been feeling down in a way which can be separated from the first statement.

Similarly, in the example below the positive future statement (in pink highlight) can be separated from the reasoning statement (in green highlight).

T: What about if you carried on sort of using heroin and?
C: I would be familiar with anything I know how. Or if I did lose just a problem family, it’s like, I don’t want that at all because those memories I’ve had have not been brilliant and I don’t want that for my children. So I’ve thought about that a lot. I think, maybe I’d be stronger and I wouldnt think twice about it. I mean I’ve stopped, what I mean is I’ve stopped. I don’t want them to go through what I’ve gone through. I want to be involved with them and be a good part of their life.

More examples are provided below in box 2.4

<table>
<thead>
<tr>
<th>Box 2.3</th>
<th>Arguments and evidence plus negative statement</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Argument category</strong></td>
<td>Arguments and evidence type</td>
</tr>
<tr>
<td>Personal</td>
<td>Y causes X</td>
</tr>
<tr>
<td></td>
<td>[I’m worried that X is going to happen because I do Y]</td>
</tr>
<tr>
<td></td>
<td>Client is currently worried, i.e. in a negative state</td>
</tr>
<tr>
<td></td>
<td>Y causes X</td>
</tr>
</tbody>
</table>
The negative or positive statements may be reflect past mood states, current mood states or predicted mood states of the future. All such statements should be additionally categorised with respect to this time frame (see section 3.2).

Finally, the tone of voice of the client when uttering these statements should be coded (see section 5).
3.0 Negative and positive statements

3.1 Overview
Positive and negative statements generated by the client should be identified in each five minute time window of the transcript. Statements need not be coded if they are neutral. Statement should be further categorised as referring to the past, the present (i.e. mood states in the actual therapy session), and the future.

3.2 Positive and Negative statements
Box 3.1 and box 3.2 give examples of the different types of negative and positive statements which can be identified. The statements have been divided up into sub-categories just as an aid/cue to identifying this category of statement. There is no need to code the statements with reference to the sub-categories. Positive or negative will suffice.

3.21 Client/therapist interactions
Many of these statements may well be identified via reflections from the therapist. For example:

| Therapist: “You’ve been feeling down a lot.” |
| Client: “Yeah” |

This can be counted in the same way as if the client had spontaneously produced the response “I’ve been feeling down a lot.”

3.22 Past, present and future?
Identifying positive and negative statements that refer to the past are easy to spot because they’ll be in the past tense e.g.

| ‘I felt bad when that happened’ |
| ‘It was horrible’ |

Similarly statements that are in the present tense will refer to the time when the statement is spoken, i.e. the therapy session, e.g.

| “I don’t think you’ll find such a bad person, quite the opposite of that really” |

Statements relating to the future will use the future tense, e.g.

| “It’s just a matter of time now and I’ll probably find a woman” |
| “So I’m sure if that’s happened recently others will crop up” |
In the example given below, the statement should be categorized as past because even though the negativity relates to the day of the therapy session, it doesn’t indicate that she still feels negative in the therapy session.

"So I broke down today. Weeping and wailing and weeping, you know. And begging God’s forgiveness."

A client may generate a sentence that refers to two time periods e.g.

"Even when I wake up in the morning, I still feel sad, and I feel good now when I think about it."

The sentence should be split and rated as a statement related to the past (the pink highlight) and as a statement related to the therapy session (green highlight).

3.23 Giving context
It is often helpful to give the preceding dialogue leading up to a positive or negative statement. For example:

T: You smiled.
C: It’s not a smile.
T: It’s a sadness. It’s the memories that are too difficult.
C: It’s too much.

"It’s too much!" is the key statement but the preceding context shows that the client was feeling negative in the session.

<table>
<thead>
<tr>
<th>Box 3.1 Statements reflecting a negative mood state</th>
</tr>
</thead>
<tbody>
<tr>
<td>T=therapist</td>
</tr>
<tr>
<td>C=client</td>
</tr>
<tr>
<td>1 Anxiety/Tension</td>
</tr>
<tr>
<td>&quot;T: You're still feeling a bit anxious or.</td>
</tr>
<tr>
<td>&quot;C: A bit anxious, worried.&quot;</td>
</tr>
<tr>
<td>2 Depression/distress</td>
</tr>
<tr>
<td>&quot;C: Yeah, so I thought a lot about suicide. Well I can’t shake the idea.</td>
</tr>
<tr>
<td>&quot;T: It’s been a real struggle to</td>
</tr>
<tr>
<td>&quot;C: To hang on, yeah.&quot;</td>
</tr>
<tr>
<td>&quot;It’s been lonely since I left.&quot;</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>---</td>
</tr>
<tr>
<td>3</td>
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<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>8</td>
</tr>
</tbody>
</table>

**Box 3.2 Statements reflecting a positive mood state**

<table>
<thead>
<tr>
<th></th>
<th>Positivity</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>&quot;T: ....... You think you're alright with Jesus. C: Yeah, I do. I feel a lot better.&quot;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>&quot;T: And the breaking down and crying has actually been helpful in that you’ve come to</td>
<td></td>
</tr>
</tbody>
</table>
realise that the door is still open.
C: Yeah, yeah, I'm not forsaken. I thought I was.

"I feel I'm at the bottom now so I can only go up unless something terrible happens."

"Right. Well, the week, I've been a bit paranoid most of the week. I've got better as the week's gone on but I started off the week very paranoid and, and stayed in a lot."

2 Optimism for the future

"I think I will be able to stay away from drugs from now on."

"I should be. I could do something. Even if it's only a night watchman's job or something like that. Just sit watching a building all night or something."

"Yeah. But I've said I'm sorry to God for all these things. And I'm sure he forgives me and I can just walk on in newness of life now."

"T: Mmm. What about err, how you'd like things to be in the future ... (client's name)? How
C. I want to start going out, going out again. Socialising, drinking.
T: Mmm.
C: Work and eventually a family. Can't see it just yet but eventually I want to get there."

3 Progress/Strengths

"A lots of change. Its made me feel better."

4 Happiness

"I was well up this week."

5 Positive aspirations

"I've been thinking about doing college courses."

3.3 Care needed over fragmenting dialogue

Sometimes a positive or negative seeming statement may be embedded in a wider dialogue. That wider dialogue gives a context that may re-define the statement.

C: "My family's trust like, it's still not there 100%"

This looks like an implication of a negative state of mind. But taken in a wider context its more like argument and evidence [Being on drugs causes lack of trust from family].
3.4 Insufficient context:

Sometimes it may seem reasonable to infer a that a statement is positive. For example, "One day I might get back into it (music)" suggests a positive outlook with associated positive affect, but there was no statement that directly reflected this.

Finding a situation or a person 'OK' or not distressing is perhaps too neutral to code as positive. For example, "Yeah, he's alright (occupational therapy)" doesn't have any indication that the client feels positive about this.

Sometimes a negative statement, without back-up, is a bit sparse to code as negative. For example: "I just don't enjoy it anymore" may or may not feel that the client is feeling negative. It is possible to cease enjoying something but not feel negative about that.

3.5 Arguments and evidence that contain embedded positive or negative statements

As detailed in section 2.515 sometimes arguments and evidence statements cannot be disentangled from those which convey past, current or future mood states. Hence, such statements should be additionally coded with respect to the time frame of the emotional expression (past, current, future).
4.0 Behaviour change statements

4.1 Overview
Motivational interviewing is a type of therapy which aims to promote behaviour change by addressing and resolving ambivalence to that behaviour change (Rollnick and Miller, 1995). To measure the extent to which the client is moving towards the desired behaviour change it is clearly necessary to have a scheme for measuring the extent to which the client is moving towards changing their behaviours.

4.2 Identifying statements related to behaviour change.
Much work has already been done on the assessment of motivational interviewing skills and the client’s readiness for behaviour change. The scheme adopted for the current study was provided by the Manual for the Motivational Interviewing Skill Code (MISC) Version 2.0 which aims to rate the extent to which the client is able to implement behaviour changes. (Miller, Moyers, Ernst and Arnhin, 2003).

The manual identifies “6 forms of speech that represent movement toward or away.....behaviour change” (p 36 of MISC manual), i.e.

- ability to change
- commitment to change
- desire to change
- need to change
- taking steps towards change
- reasons for change

The ‘reasons for change’ category has already been classified as ‘arguments and evidence’ and is redundant. Hence, five categories of behaviour change should be used to identify behaviour change statements.

- ability to change
- commitment to change
- desire to change
- need to change
- taking steps towards change

4.3 Positive statements only
All statements of behaviour change statements (BCS) should be included as long as they indicate some form of change in a positive direction towards an adaptive or helpful behaviour/goal/aim/ aspiration.

4.4 Identify both general and specific behaviours

[Handwritten notes]
The BCSs can involve specific behaviours (e.g. substance use), other lifestyle changes, purposeful behaviours (such as taking medications, socializing). The BCSs may also be general (e.g. change my life, turn things around, move on). It is important to identify and include both types of statement.

4.5 Types of behaviour
Change statements relating to any kind of behaviour should be identified. Statements related both to problem behaviour (substance abuse, mental health, situations that will decrease substance abuse/increase mental well-being) and those not about the problem behaviour, e.g. “I was tempted to phone the dentist to say I can’t be bothered but I think I should get there and get it sorted” should be identified. However, statements related to target (e.g. substance abuse, psychosis) and non-target behaviours (e.g. dentist, shopping excesses) should be further categorised.

As with the other categories, context will help with the coding process, and sections of dialogue should be entered into the template where helpful. In the case of the transcripts, actions are often used more than verbs. This needs more context to correctly classify the statement.

Examples of behaviour change statements are given in box 4.1 below.

**Box 4.1**

| I think I should get there and get it sorted – Need |
| I’ll definitely go and get them tomorrow ie tablets – Commitment |
| All I can do now is try and do good in my life – Commitment |
| I just wish I could get off drugs – Desire |
| I feel like I should be doing something (purposeful activities implied) – Need |
| I should be maturing a bit……I should grow up – Need |
| I’ve gotta make changes …start getting up and cleaning my pots and taking my laundry…. - Need |
| Its about time I stood up and faced it and said ….I’ll learn something from it and move on – Need |

4.6 Using checklists
The following checklists of words which can act as clues of behaviour change statements have been taken from the MISC manual (p. 41 onwards) and can be used to help identify behaviours change statements:

**Box 4.2 Examples of behaviour change statements and verbs reflecting behaviour change**

**Reflections of ability:**
Absolutely, I can ….; I’m pretty sure I can do it; Very likely, I could do it if I tried; I’m pretty positive I am able; Yes, it’s possible (for me); I think I have it in me; Probably I can do it; I might be able to; I guess I could; I’m sort of good at sticking to things.
I can; I could; I’m positive; I’m sure.

Reflections of commitment:
I swear I will stop this; Nothing will stop me; I’m going to do it [for my family]
I promise /vow /assure /will /shall /dedicate myself.
I pledge /agree /am ready /intend /am prepared /am devote to.
I consent /plan /resolve /expect /concede /intend /look forward to.
I aim /aspire /propose /anticipate /favour /endorse /believe /accept /volunteer /anticipate/ predict / presume.
I mean to /foresee /envisage / assume /bet / hope to / will risk / will try / think I will / I suppose I will / I imagine I will /suspect /contemplate / guess / wager / will see about.

Reflections of desire:
I really want to lose weight; I’ve just about had it with cigarettes; I’m very tired of being overweight; I’d like to get free; I just want to wake up sober; mostly I want to quit; Part of me wants to exercise; I guess I’d like to; I would enjoy being thinner, I’m tired of......; I wish I sort of wish; I would like to; I am motivated to.

Reflections of need:
I definitely have to get off the street; I can’t go on crashing like this; I absolutely have to lose weight; I really have to quit getting messed up like this; I need very much to be sober; it’s really important for me to stop ......; I’ve got to do something about ......; I have to clean up my act; I guess I need to cut down; I need; I must; I have to; I’ve got to.

Reflections of taking steps:
I got rid of all the alcohol from my house yesterday; I went to two AA meetings this week; I tried cooking without butter; I kept good records this week; I stayed away from my drug-dealing friends this week; I bought stuff to jog in; I did a few things to eat better; I thought about just smoking outside, not in the house or car this week.

4.61 Strength of conviction
Note that the change statements differ in their strength of conviction. Statements should be included even if the commitment expressed is low.

4.62 Taking a broad interpretation
It should be noted that these categories can be interpreted broadly. For example:

And I feel like that door’s opened to me, it’s just, it’s down to me.

The statement above alludes to behaviour change in that the client recognizes that the responsibility lies with him/her. This can be interpreted as the first point in the ‘taking steps towards
change' category of statement because without the acknowledgement of responsibility for behaviour change then it is difficult to see how further positive steps could be taken.

4.7 Exclusions:

Box 4.3 shows the type of statements which should be excluded:

**Box 4.3**

*If the statement isn’t about the client:*
“You still have to make the effort” - this is not in first person, therefore not clear if the client thinks it pertains to him”

*If there is no statement directly or indirectly relating to a change of behaviour:*
“I feel guilty that I’m not doing anything” - this is an emotion about absence of positive behaviour, not a statement about change behaviour

*If the statement is in the past and doesn’t relate to current or future behaviour change desires and goals.*
“I thought about taking up dancing” versus “I thought about taking up dancing this week”.

4.8 What to do about the strength of behaviour change statements

It should be noted that in the previous version of the coding manual, coders were required to rate the strength of the behaviour change statement. This is not considered necessary anymore and is too cumbersome.
5.0 Tone

5.1 Overview
The development of a scheme that captures the client’s affective state involves not only identifying statements that reflect positive and negative mood at the time of the therapy session, but also cues from characteristics of the voice.

Initially, the aim was to rate emotional state in each time window using a scale of :

-3  -2  -1  0  1  2  3
Negative Neutral Positive

However, rating voice characteristics proved extremely difficult to replicate across raters. Hence, it was decided to adopt practices in the expressed emotion literature and rate voice characteristics only for positive and negative statements.

5.2 Rating the voice characteristics for positive and negative statements.
The above scale (-3 to +3) should be used to rate positive and negative statements. It may be necessary to rate more than one statement if the expression of affect is spread over more than one utterance. For example:

C: Yeah, so I thought I lot about suicide. Well I can’t shake the idea.
T: It’s been a real struggle to
C: To hang on, yeah.

Here, the client is in dialogue and so it is important to consider aspects of their voice over both utterances.

There is a lack of guidance in the literature concerning the characteristics of the voice that reflect specific emotional states. The work of Pierre-Yves, however, (Box 5.1) does provide some useful clues. There are key variables to consider:

- Pitch
- Variance in pitch
- Rhythm
- Accentuation of syllables
- Rising/descending contours of syllables
- Phoneme duration

From Box 5.1, an attempt can be made to identify voice characteristics that reflect the positive emotions of happiness and comfort and the negative emotions of anger and sadness. Coders should use these cues to identify the level of negativity and positivity expressed by the client for statements identified as having positive or negative content, i.e. give a bimodal rating.
**Box 5.1 Rating voice characteristics (Pierre-Yves, 2003)**

<table>
<thead>
<tr>
<th>Emotion</th>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Happiness</td>
<td>The mean pitch of the utterance is high, has a high variance, the rhythm is rather fast, few syllables are accented, the last word is accented, and the contours of all syllables are rising.</td>
</tr>
<tr>
<td>Comfort</td>
<td>The mean pitch is high but less than happiness, the rhythm is slow, with a high variance of phoneme durations, very few syllables are accented, the last syllable is accented, and the contours of syllables are rising.</td>
</tr>
<tr>
<td>Anger</td>
<td>The mean pitch is high, has a high variance, the rhythm is fast, with little variance of phoneme durations, a lot of syllables are accented, the last word is not accented, the pitch contours of all syllables are falling.</td>
</tr>
<tr>
<td>Sadness</td>
<td>The mean pitch is low, has a low variance, the rhythm is slow, with high variance of phoneme durations, very few syllables are accented, the last word is not accented, the contours of all syllables are falling.</td>
</tr>
</tbody>
</table>

**5.3 Coding the tone and the statements**

It is proposed that a very simple weighting scheme should be used. Statements will be weighted additively. Hence, a positive statement given a rating of 3 will be coded as 3. Likewise a negative statement coded as -3 will be coded as -3. The number of emotionally valenced statements and the cumulative weighted score will be recorded for each time window. An example is shown below in Box 5.2 for negative statements:

**Box 5.2 Hypothetical example of weighted scoring system**

<table>
<thead>
<tr>
<th>Negative Statements</th>
<th>Voice characteristics</th>
<th>Cumulative score</th>
</tr>
</thead>
<tbody>
<tr>
<td>I feel really low; to be honest I can't really talk about...</td>
<td>-3</td>
<td>-3</td>
</tr>
<tr>
<td>&quot;What he said just upset me, keeps playing on my mind&quot;</td>
<td>-2</td>
<td>-2</td>
</tr>
<tr>
<td>&quot;I think he hates me&quot;</td>
<td>-3</td>
<td>-3</td>
</tr>
<tr>
<td><strong>Statement number = 3</strong></td>
<td><strong>Cumulative score = -8</strong></td>
<td></td>
</tr>
</tbody>
</table>

**5.4 Preparation**

Coders **MUST** listen to the first 10 mins of the tape to get an idea of the client's range of voice characteristics, rather than just listen to the statement.
References:

http://motivationalinterview.org/training/MISC2.pdf
### Appendix F: Alcohol Use Disorders Identification Test

#### Alcohol Use Disorders Identification Test: Self-Report Version

**PATIENT:** Place an X in one box that best describes your answer to each question.

<table>
<thead>
<tr>
<th>Question</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. How often do you have a drink containing alcohol?</td>
<td>Never</td>
<td>Monthly</td>
<td>2-4</td>
<td>2-3</td>
<td>4 or more</td>
</tr>
<tr>
<td></td>
<td>or less</td>
<td>times</td>
<td>times</td>
<td>times</td>
<td>times</td>
</tr>
<tr>
<td></td>
<td>a month</td>
<td>a week</td>
<td>a week</td>
<td>week</td>
<td></td>
</tr>
<tr>
<td>2. How many drinks containing alcohol do you have on a typical day when you are drinking?</td>
<td>1-2</td>
<td>3-4</td>
<td>5-6</td>
<td>7-9</td>
<td>10 or more</td>
</tr>
<tr>
<td>3. How often do you have six or more drinks on one occasion?</td>
<td>Never</td>
<td>Less than</td>
<td>Monthly</td>
<td>Weekly</td>
<td>Daily or almost daily</td>
</tr>
<tr>
<td></td>
<td>monthly</td>
<td>Monthly</td>
<td>Weekly</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. How often during the last year have you found that you were not able to stop drinking daily once you had started?</td>
<td>Never</td>
<td>Less than</td>
<td>Monthly</td>
<td>Weekly</td>
<td>Daily or almost daily</td>
</tr>
<tr>
<td></td>
<td>monthly</td>
<td>Monthly</td>
<td>Weekly</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. How often during the last year have you failed to do what was normally expected of daily because of drinking?</td>
<td>Never</td>
<td>Less than</td>
<td>Monthly</td>
<td>Weekly</td>
<td>Daily or almost daily</td>
</tr>
<tr>
<td></td>
<td>monthly</td>
<td>Monthly</td>
<td>Weekly</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. How often during the last year never have you needed a first drink in the morning to get yourself going after a heavy drinking session?</td>
<td>Never</td>
<td>Less than</td>
<td>Monthly</td>
<td>Weekly</td>
<td>Daily or almost daily</td>
</tr>
<tr>
<td></td>
<td>monthly</td>
<td>Monthly</td>
<td>Weekly</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. How often during the last year have you had a feeling of guilt or remorse after drinking?</td>
<td>Never</td>
<td>Less than</td>
<td>Monthly</td>
<td>Weekly</td>
<td>Daily or almost daily</td>
</tr>
<tr>
<td></td>
<td>monthly</td>
<td>Monthly</td>
<td>Weekly</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. How often during the last year have you been unable to remember what happened the night before because of your drinking?</td>
<td>Never</td>
<td>Less than</td>
<td>Monthly</td>
<td>Weekly</td>
<td>Daily or almost daily</td>
</tr>
<tr>
<td></td>
<td>monthly</td>
<td>Monthly</td>
<td>Weekly</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Have you or someone else been injured because of your drinking?</td>
<td>No</td>
<td>Yes but not</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes during</td>
</tr>
<tr>
<td></td>
<td></td>
<td>in the last year</td>
<td>during</td>
<td>during</td>
<td>the last</td>
</tr>
<tr>
<td></td>
<td></td>
<td>year</td>
<td>the last</td>
<td>year</td>
<td>year</td>
</tr>
<tr>
<td>10. Has a relative, friend, doctor, or other health care worker been concerned about your drinking last year or suggested you cut down</td>
<td>No</td>
<td>Yes but not</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes during</td>
</tr>
<tr>
<td></td>
<td></td>
<td>in the last year</td>
<td>during</td>
<td>during</td>
<td>the last</td>
</tr>
<tr>
<td></td>
<td></td>
<td>year</td>
<td>the last</td>
<td>year</td>
<td>year</td>
</tr>
</tbody>
</table>
### Appendix G: Positive and Negative Syndrome Scale

#### POSITIVE AND NEGATIVE SYNDROME SCALE (PANSS)

<table>
<thead>
<tr>
<th>Subscales of the 30-item Positive and Negative Syndrome Scale (PANSS)</th>
<th>7 Negative symptom subscale items</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>7 Positive symptom subscale items</strong></td>
<td></td>
</tr>
<tr>
<td>P1. Delusions</td>
<td>N1. Blunted affect</td>
</tr>
<tr>
<td>P2. Conceptual disorganization</td>
<td>N2. Emotional withdrawal</td>
</tr>
<tr>
<td>P3. Hallucinatory behavior</td>
<td>N3. Poor rapport</td>
</tr>
<tr>
<td>P5. Grandiosity</td>
<td>N5. Difficulty in abstract thinking</td>
</tr>
<tr>
<td>P7. Hostility</td>
<td>N7. Stereotypic thinking</td>
</tr>
<tr>
<td><strong>16 General psychopathology symptoms</strong></td>
<td></td>
</tr>
<tr>
<td>G1. Somatic concern</td>
<td>G9. Unusual thought content</td>
</tr>
<tr>
<td>G2. Anxiety</td>
<td>G10. Disorientation</td>
</tr>
<tr>
<td>G3. Guilt feelings</td>
<td>G11. Poor attention</td>
</tr>
<tr>
<td>G4. Tension</td>
<td>G12. Lack of judgment and insight</td>
</tr>
<tr>
<td>G6. Depression</td>
<td>G14. Poor impulse control</td>
</tr>
<tr>
<td>G7. Motor retardation</td>
<td>G15. Preoccupation</td>
</tr>
<tr>
<td>G8. Uncooperativeness</td>
<td>G16. Active social avoidance</td>
</tr>
<tr>
<td>Severity level (“anchoring point”)</td>
<td>Description of patient function</td>
</tr>
<tr>
<td>------------------------------------</td>
<td>---------------------------------</td>
</tr>
<tr>
<td>1 - Absent</td>
<td>The definition does not apply</td>
</tr>
<tr>
<td>2 - Minimal</td>
<td>Questionable pathology; the patient may be at the upper extreme of normal limits</td>
</tr>
<tr>
<td>3 - Mild</td>
<td>Presence of one or two delusions that are vague, uncrystallized, and not tenaciously held. The delusions do not interfere with the patient’s thinking, social relations, or behavior</td>
</tr>
<tr>
<td>4 - Moderate</td>
<td>Presence of either a kaleidoscopic array of poorly formed, unstable delusions, or a few well-formed delusions that occasionally interfere with the patient’s thinking, social relations, or behavior</td>
</tr>
<tr>
<td>5 - Moderate severe</td>
<td>Presence of numerous well-formed delusions that are tenaciously held and occasionally interfere with the patient’s thinking, social relations, or behavior</td>
</tr>
<tr>
<td>6 - Severe</td>
<td>Presence of a stable set of delusions that are crystallized, possibly systematized, tenaciously held, and clearly interfere with the patient’s thinking, social relations, or behavior</td>
</tr>
<tr>
<td>7 - Extreme</td>
<td>Presence of a stable set of delusions that are either highly systematized or very numerous, and that dominate major facets of the patient’s life. This behavior frequently results in inappropriate and irresponsible action that may jeopardize the safety of the patient or others</td>
</tr>
</tbody>
</table>
Appendix H: Timeline follow back instructions

The Alcohol Timeline Followback (TLFB) method includes a calendar to help people provide retrospective estimates of their daily alcohol, cigarette, and drug use. Several memory aids were developed to help people recall their alcohol, cigarette, and drug use when completing the TLFB.

**DAILY CALENDAR:** The daily calendar provides a temporal framework for recalling events and patterns related to a person’s use of alcohol. Some people have found it useful to consult their personal appointment or date books as aids in completing the calendar. Use of aids is encouraged. Calendar aids have also been used to help people recall relapse episodes.

**KEY DATES:** Use of holidays, birthdays, newsworthy events and other personal events that are meaningful to people can assist recall of alcohol. In this regard, the TLFB calendar and computerized program displays standard holidays on the calendar and, as part of the instructions, asks people to identify their own personal holidays and significant events. These latter events may be generic (e.g., major sporting event, major news events) or idiosyncratic (e.g., person’s own or others’ birthdays, dates of important personal events such as changing jobs, buying a house).

**BLACK AND WHITE DAYS:** People are asked to recall lengthy periods of time when they completely abstained or used alcohol in a very patterned manner (e.g., 5 drinks every day; one to two drinks every Wednesday; eight beers routinely on Fridays and Saturdays), or drank heavily regularly for an extended period of time.

**DISCRETE EVENTS AND ANCHOR POINTS:** Like holidays, use of specific events such as arrests, hospitalizations, illnesses, employment, and treatment participation can be used to help people identify periods of extended alcohol use or abstinence. Anchor points can be used to identify use that occurs during, before and after events (e.g., job loss, marital breakup) or notable drinking episodes (e.g., started using after the death of a close relative). We have found that people remember what they were doing around these anchor dates and can reconstruct their use for substantial periods based on these dates.

**ALCOHOL USE BOUNDARIES:** A boundary procedure establishes upper and lower amounts of use for the time period under consideration. When starting the interview, the interviewer can ask about the greatest and the least amounts consumed on any day in the reporting period. Reporting the greatest amount gives the person permission to admit to high levels of use.
**EXAGGERATION TECHNIQUE:** To avoid vague or nondescript alcohol use descriptions (e.g., "I drank a lot", "I didn't drink very much") people can be presented with an exaggerated minimum or maximum value to help define the amount. This technique is designed to target approximate levels of consumption in difficult cases. For example, if a person reports having drunk "a lot" of beers on a day, but claims an inability to specify what "a lot" means, the interviewer can ask the person "Does 'a lot' mean two beers or 30 beers?" A typical response to this question might take the form of "certainly not 30 beers, more like 12 to 14 beers."

**STANDARD DRINK CONVERSION:** Alcoholic beverages vary in their alcohol concentration and drink size. Also, many drinkers report combined beverages use (e.g., two beers and one glass of wine). Thus, it is important when collecting drinking data to agree on what constitutes a "drink." This problem is dealt with by asking people to report their drinking using a standard drink conversion. Cards showing standard drink equivalents can be used.
**Appendix: I Substantial amendment application**

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**Central Office for Research Ethics Committees (COREC)**

**NOTICE OF SUBSTANTIAL AMENDMENT**

For use in the case of all research other than clinical trials of investigational medicinal products (CTIMPs). For substantial amendments to CTIMPs, please use the EU-approved notice of amendment form (Annex 2 to ENTRCT1) at [http://eudraect.ema.eu.int/document.html?guidance](http://eudraect.ema.eu.int/document.html?guidance).

To be completed in typescript by the Chief Investigator and submitted to the Research Ethics Committee that gave a favourable opinion of the research ("the main REC"). In the case of multi-site studies, there is no need to send copies to other RECs unless specifically required by the main REC.

Further guidance is available in section 5 of our Standard Operating Procedures available at [www.corec.org.uk/applicants/help/docs/SOPs.doc](http://www.corec.org.uk/applicants/help/docs/SOPs.doc).

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### Details of Chief Investigator:

- **Name:** Professor Christine Barrowclough
- **Address:** School of Psychological Sciences (MIDAS) Manchester University Rutherford House, Ground Floor, Unit 4, Manchester Science Park, Lloyd Street North Manchester M15 6SZ
- **Telephone:** 0161 275 8485
- **E-mail:** Christine.barrowclough@manchester.ac.uk
- **Fax:**

### Full title of study:
An evaluation of combined motivational and cognitive behaviour therapy for schizophrenia and substance misuse (MIDAS)

### Name of main REC:
Eastern MREC

### REC reference number:
MREC 03/5/45

### Date study commenced:
October 2004

### Protocol reference (if applicable), current version and date:

---

Notice of amendment (non-CTIMP), version 2.0, May 2004
| Amendment number and date: | 3 (7.07.08) |

Notice of amendment (non-CTIMP), version 2.0, May 2004
Appendix J: Consent to take part in the study

NHS trust headed
paper

Version 3: 07.07.05

Centre Number:
Study Number:
Patient Identification Number for this trial:

CONSENT FORM

Title of Project: An evaluation of treatments for people with mental health problems
and associated alcohol or drug use

CONSENT FOR PARTICIPATION IN TRIAL

Name of Researcher:

Please tick yes/no & initial box

1  I confirm that I have read and understand the information sheet dated ...
    07.07.05. (version 3) for the above study and have had the
    opportunity to ask questions.
    YES  NO

2  I understand that my participation is voluntary and that I am free to
    withdraw at any time, without giving any reason, without my medical care or
    legal rights being affected.
    YES  NO

3  I understand that sections of any of my records held by the Local
    Authority, the NHS, the criminal justice system and other institutions
    may be looked at by people who undertake to maintain
    confidentiality from The University of Manchester/London working
    closely with NHS. I give permission for these individuals to have
    access to my records during my participation in the trial and also
    during the follow up period which may extend to three years. I
    understand that data collection, storage and destruction will me in
    line with the Data Protection Act 1998.
    YES  NO

4  I understand that my GP, my medical consultant and my key worker
    will be informed of my participation in the trial.
    YES  NO

5  I agree to take part in the above study.
    YES  NO

ADDITIONAL CONSENTS

6  I give additional consent to submit a small sample of hair (usually from
    head if acceptable, otherwise eg from leg or wherever is most acceptable
    for you) if requested to do so at one point during the trial. This hair sample
    will subsequently be analysed for street drugs content. Declining to do so
    will not affect my participation in the trial in any way.
    YES  NO

Form 1
7 I give additional consent to submit a sample of breath if requested to do so at one point during the trial. This sample will be analysed for alcohol content. Declining to do so will not affect my participation in the trial in any way. YES...NO... 

8 I give additional consent for a relative or friend (named below) to provide a short interview about my drug or alcohol use. Declining to do so will not affect my participation in the trial in any way. YES...NO... 

Name(s) of relative(s) or friend 

Contact details (phone number & address if available) 

9 I give additional consent for some assessment interviews and sessions with a nurse/psychologist to be audiotaped for the purpose of ensuring the researchers all keep to the same research format. Declining to do so at any time will not affect my participation in the trial in any way. YES...NO... 

9a I give additional consent for the audiotapes to be listened to by the research team for the purpose of understanding more about what happens in therapy and assessment. Declining to do so at any time will not affect my participation in the trial in any way. YES...NO... 

10 I give additional consent for a relative or friend (named above) to provide information about how we get along. Declining to do so at any time will not affect my participation in the trial in any way. YES...NO... 

Name of Patient ______________________ Signature ______________________ Date ____________ 

Name of Person taking consent (if different from researcher) ______________________ Signature ______________________ Date ____________ 

Researcher ______________________ Signature ______________________ Date ____________ 

1 for patient; 1 for researcher; 1 to be kept with hospital notes
Appendix K: MIDAS confidentiality agreement

MIDAS Trial Confidentiality Agreement

Name of Voluntary Researcher: _________________________

1  I confirm that I have read and understood the information provided on protecting patient information (Annex A1 of NHS code of confidentiality)

2  I agree to follow these requirements in any work I undertake for the University Of Manchester

3  I agree that I will not discuss any patient information with anyone outside the direct research team (and only within the research team if necessary for the research)

Please tick yes/ no & initial box

YES….NO…..