

The use of cognitive remediation therapy on a child adolescent eating disorder unit: Patients and therapist perspectives

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Abstract

Cognitive remediation therapy (CRT) is an intervention for anorexia nervosa (AN) that focuses on ameliorating the neuropsychological inefficiencies that underlie the illness. The current literature has reported promising results regarding its efficacy as an intervention for AN. However, there is a scarcity of studies considering the implementation of CRT in a child and adolescent population. This article describes an individual CRT therapy programme for children and adolescents with AN delivered on an inpatient unit for eating disorders. It considers the therapeutic process including the differing viewpoints of the patients and the therapists. The article concludes that CRT can be viewed as an engaging therapeutic intervention that could be useful as an additional treatment for AN.

Keywords

Cognitive remediation therapy, anorexia nervosa, eating disorders, inpatient treatment, children and adolescents

Introduction

Neuropsychological findings in AN

Novel findings in the area of neuroscience suggest new directions in our understanding of the development and maintenance of AN (Brewerton, Frampton, & Lask, 2009; Kaye, Fudge, & Paulus, 2009; Treasure & Schmidt, 2013). AN is a serious psychiatric disorder with major physical complications. The causes of the illness are multifactorial and are not completely understood. Recent research literature integrates existing etiological models with the idea of AN as a brain disorder (Lask & Frampton, 2011). Neuroimaging data have suggested primary dysfunction in regions of the

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brain critical for information processing (Fonville, Giampietro, Williams, Simmons, & Tchanturia, 2014; Fonville et al., 2013), while neuropsychological testing, such as the Ravello Profile (Rose, Davis, Frampton, & Lask, 2011), has shown common and significant cognitive weaknesses.

While some weaknesses revert to normal with weight restoration, others seem to persist, specifically (1) poor cognitive flexibility implied in set-shifting difficulties, defined as the ability to switch from one stimulus to another (Lang, Lopez, Stahl, Tchanturia, & Treasure, 2015; Tchanturia, Davies, & Campbell, 2007; Tchanturia et al., 2011; Tchanturia et al., 2012), (2) weak central coherence, the tendency to focus on the fine detail rather than the bigger picture, failing to 'see the wood for the trees' (Lopez et al., 2008) and (3) visuospatial deficits (Frampton & Hutchinson, 2007; Lask et al., 2005; Lena, Fiocco, & Leyenaar, 2004). It has been suggested that these underlying neurobiological factors might increase the risk of developing AN in the context of other precipitating factors for some people (Nunn, Frampton, Gordon, & Lask, 2008; Rose et al., 2011; Rose, Frampton, & Lask, 2012).

In patients with AN impaired set-shifting leads to concrete and rigid approaches to problem solving and to the perseverance of maladaptive thinking and behavioural patterns (Roberts, Tchanturia, Stahl, Southgate, & Treasure, 2007; Tchanturia et al., 2012; Tchanturia et al., 2011). Weak central coherence results in an excessive preoccupation with detail, order and symmetry, and in relation to the illness, a pathological fixation with calories and fat content, weight gain and loss and detailed exercise routines and practices (Lang et al., 2014; Lang & Tchanturia, 2014; Lopez et al., 2008). Visuospatial deficits can contribute to the distortion of body image (Lask & Bryant-Waugh, 2013; Lena et al., 2004).

Although previous research has made important contributions to the understanding of AN, there is currently little evidence to support effective treatments (Fairburn, 2005) and no recommended first-line treatment (National Institute for Clinical Excellence, 2004). It is possible that the poor prognosis associated with AN is due in part to the fact that previous treatments have not addressed the underlying cognitive weaknesses described above (Nunn et al., 2008). New approaches for the treatment of AN should thus be developed (Treasure et al., 2015).

CRT in the treatment of AN

CRT has shown promise in improving the characteristic neuropsychological inefficiencies and associated thinking styles (Dahlgren & Rø, 2014; Tchanturia, Lounes, & Holttume, 2014). This new approach for the treatment of AN is derived from neurorehabilitation traditions that work with the patient's strengths and weaknesses to improve cognitive functioning and enhance activities of daily living (Tchanturia et al., 2007; Tchanturia, Whitney, & Treasure, 2006). Following its implementation for neurorehabilitation after brain injury and strokes (Cicerone et al., 2011), it has also been suggested as a helpful treatment for schizophrenia (Thorsen, Johansson, & Løberg, 2014; Wykes & Reeder, 2005), attention deficit hyperactivity disorder (O'Connell, Bellgrove, Dockree, & Robertson, 2006), learning disabilities (Broom & Doctor, 1995) and obsessive-compulsive disorders (OCDs; Buhlmann et al., 2006).

For example, in the treatment of schizophrenia, it has been demonstrated that CRT improves working memory, planning skills and flexibility (Thorsen et al., 2014). It is hypothesised that CRT works by training basic brain processes via the proliferation and refining of neural connections, as well as teaching adaptive strategies (Dahlgren & Rø, 2014).

CRT has traditionally been delivered in adult populations through individual or group formats. There is growing evidence for the feasibility of CRT for AN across ages and illness severity. With the emergence of several recent randomised controlled trials (RCTs), new evidence has suggested that the intervention is effective in reducing attrition, enhancing the efficacy of concurrent

treatment and improve cognitive set-shifting (Brockmeyer et al., 2014; Dahlgren, 2014; Tchanturia, Lloyd, & Lang, 2013; Tchanturia et al., 2014).

By addressing the process rather than the content of thinking, CRT can help patients to develop a metacognitive awareness of their own thinking style (Tchanturia, 2015). Preliminary results, mainly from single cases and adult RCT populations studies, have shown improved cognitive performance and reduction in eating disorders (EDs) psychopathology and support the use of CRT as an additional treatment component for patients suffering from AN (Pretorius & Tchanturia, 2007; Tchanturia et al., 2007; Whitney, Easter, & Tchanturia, 2008).

As CRT is still in its developmental phase, further studies to explore its effects in the long-term, taking into account the characteristics of AN (e.g. severity and duration) and its comorbid conditions (e.g. depression, anxiety, autism spectrum disorders and OCD) are needed.

The use of CRT in children and adolescents with AN

Currently there is a paucity of research focussing on the use of CRT as part of treatment for children and adolescents with AN. This appears to be an important population to consider, as their age range overlaps with critical periods of brain maturation and associated plasticity (Telman, Holmes, & Lau, 2013) and also because a substantial proportion of those with AN fall within this age range.

There is little known about the intervention's potential in terms of efficacy in younger AN populations. Findings on neuropsychological impairment in young AN patients are inconsistent, with some studies showing evidence of inefficient processing (Andrés-Perpiña et al., 2011; Lang et al., 2015; McAnarney et al., 2011), while others are unable to find differences between groups (Frampton, Hutchinson, Watkins, & Lask, 2012; Kjærdsdam Telléus et al., 2015). A recent study highlighted that children and adolescents with AN are likely to display a similar cognitive processing style to adults with AN, relative to IQ, showing inefficiencies in set-shifting and central coherence (Lang et al., 2015).

Beside the potential enhancement of cognitive domains, other potential aims of this intervention need to be considered such as applicability of the therapy in inpatient and outpatient settings, patients' experiences, potentiality in improving engagement to the overall treatment and its impact on improving the quality of daily life.

This article reports on the use of individual CRT, as an adjunctive treatment for children and adolescents with AN in an inpatient setting. This article aims to describe the implementation of the CRT intervention. It also reports on the patient experience of the intervention and comments on the therapists' clinical observation of the process. Strengths and weaknesses of this approach are then discussed, and suggestions made regarding how to improve and promote further its clinical application.

The CRT programme

Context

CRT was delivered as part of the therapy programme on an inpatient unit for children and adolescents aged 9–17 years with EDs. As this study was an evaluation of a clinical intervention, it was approved at the service's Clinical Governance forum. Patients consent to participate in all elements of the treatment programme is gained on admission to the service. The therapy was delivered as a part of the multidisciplinary treatment programme. This consisted of individual therapy, family therapy, group psychoeducation and other interventions aimed at supporting families and carers as well as the young person in treatment.

Description of pre- and post-CRT assessment

Before starting a course of CRT, patients were asked to complete a pre-CRT assessment battery, to evaluate their cognitive strengths and weaknesses. This was based upon the 'The Ravello Profile' test battery, developed to ensure a consistent methodology when researching neuropsychological functioning in AN (Rose et al., 2011). After the course of CRT, patients completed the same assessment battery. Although outcome scores will not be presented in this article, a description of the measures used will be given, as it was part of the process of therapy.

The following measures were used:

1. *Rey Complex Figure Test (RCFT)*. The RCFT (Meyers & Meyers, 1995) was used to assess an individual's visual memory and information processing style. The Copy and Immediate Recall conditions of the RCFT are utilised and scored in terms of their accuracy and placement criteria as outlined in the RCFT test manual (Meyers & Meyers, 1995). The copy figure is also analysed to obtain a central coherence score using the method described by Savage et al. (1999). The RCFT has well-established psychometric properties and has been employed previously in adolescents with EDs (Lang et al., 2015; Rose et al., 2011).
2. *Delis-Kaplan Executive Functioning System (D-KEFS)*. The D-KEFS (Delis, Kaplan, & Kramer, 2001) is a battery of neuropsychological tasks used to assess executive functioning in children and adults. It has been found to be a reliable and valid measure of executive functioning in clinical populations (Delis, Kaplan, & Kramer, 2001). Condition 4 of the Colour-Word Interference test, based upon the Stroop task (Stroop, 1935), was delivered as a measure of participants' ability to set-shift and inhibit information.
3. *Behavioural Rating Inventory of Executive Functioning-Self-Report version (BRIEF-SR)*. The BRIEF-SR (Gioia, Isquith, Guy, & Kenworthy, 2004) is an 80-item self-report measure of executive functioning in everyday life scenarios. It consists of eight subscales relating to the constructs of inhibition, behavioural and cognitive shift, emotional control, working memory, planning, organisation of materials and task completion. The BRIEF-SR has been used in a range of clinical populations, including adolescents with EDs (Dahlgren, Lask, Landrø, & Rø, 2014).

Process

The course of individual CRT began at the start of the admission. Trained assistant psychologists administered the therapy. This work was supervised weekly by a clinical psychologist who was trained in the assessment and delivery of CRT. The intervention consisted of eight 45-minute sessions, which were delivered twice weekly. The design was based on the CRT Manual developed by Tchanturia, Davies, Reeder, and Wykes (2010), and some tasks utilised in the session were chosen from the CRT Resource pack developed by Dahlgren, Owen, and Lask (2011), specifically for adolescents with EDs.

Feedback from the individual CRT sessions was provided to the multidisciplinary team as well as to individual and family therapists. It focussed on patients' level of engagement and any evident neurocognitive strengths or difficulties. This feedback provided the team with a complementary view of patients and their presentation – one that was focussed on factors that may perpetuate or alleviate the illness. For instance, if it was apparent that a patient had very strong planning skills, this strength was then factored into the formulation of treatment planning.

Following the completion of CRT, the therapists provided the patients with a letter, which summarised the content of the therapy. Patients were also asked to provide a summary of their views.

Easter and Tchanturia (2011) found that the therapists' letters were both beneficial and motivational for individuals after their course of therapy.

Description of session

At the beginning of a course of CRT, an overview of the patient was made, integrating five components:

1. Their clinical presentation;
2. Their verbal feedback;
3. The psychological assessment completed on admission;
4. The neuropsychological assessment pre-CRT;
5. Their stage of change to allow for a reflection on the goals of CRT.

For example, a patient who was assessed to be at the *pre-contemplation stage* (Prochaska, DiClemente, & Norcross, 1992) and struggled to collaborate with the team could benefit from CRT as a means to enhance therapeutic engagement. Alternatively, one who appeared to be at the *action stage* could be more focussed on the therapeutic work and use the CRT sessions to practise different cognitive abilities as well as improving awareness of their executive functioning.

On the basis of the other four components, a plan including the cognitive domains that could be addressed throughout the eight sessions was devised and was monitored through the supervision process.

Each session was divided into three parts:

1. Reporting and commentary of any homework assigned in the previous session;
2. Exploration of one or more cognitive domains;
3. Assignment of a new homework task.

Homework tasks were likely to be ecologically valid as they were related to the patients' everyday routines (e.g. changing morning routine and organising schoolwork).

The cognitive domains explored during the sessions were cognitive flexibility (the ability to juggle two or more types of information), cognitive inhibition (the ability to inhibit one stimulus and focus on another), central coherence (the ability to integrate information), visuospatial processing and memory (the ability to retain, recall and manipulate information in a three-dimensional space) and planning (prioritising and forming logical successions of events). A collection of games, puzzles and riddles was used to explore these domains. The games were developmentally appropriate and suitably challenging for the age group. These include pen and paper games (e.g. Embedded words and Geometric figures), board games (e.g. Rush Hour[®] (Mastermind Toys, 1996)), Serpentiles[®] (Mastermind Toys, 2008), Tower of Hanoi[®] (Delis et al., 2001)) and media (e.g. The Spinning Dancer[®] (Kayahara, 2003)). The games elicited more than one cognitive domain, hence allowing for broader discussions within the session.

A comprehensive outline of the structure and delivery of CRT for children and adolescents can be found in the CRT Resource Pack (Dahlgren et al., 2011).

The process of tailoring CRT

Based upon the resources developed by Tchanturia et al. (2010) and Dahlgren et al. (2011), the choice of the cognitive domains explored within a session was personalised to the patient. This individualisation was based upon three factors:

1. The outcome of the neuropsychological assessment;
2. The clinical presentation of the patient;
3. Patient feedback within the sessions.

While helping to foster engagement and collaboration within the sessions, tasks were also developed to match the interests of the patient and include a range of puzzles, card and board games. This allowed for the development of a comprehensive treatment plan that targeted the cognitive domains requiring therapeutic input, hence making the sessions individually tailored to the young person's needs.

After completion of the CRT course, an individually tailored letter was presented to the patient. Patients were provided with (1) feedback from the neuropsychological assessment, (2) examples of where they had linked the thinking styles to their real-life situations and (3) suggestions for further practice and exploration. The use of such a personalised letter allowed the patients to consolidate the work completed within the sessions and provided them with reference material to be used after the CRT cycle was completed.

At the end of the course of CRT, cognitive domains addressed over the sessions were discussed, comparing the pre- and the post-assessment results. Particular attention was dedicated to which cognitive areas would need to be improved in the future and the modalities through which real-life tasks could be practised.

Patient and therapist perspectives

Patient feedback

To date, 33 female patients, aged 11–17 years (mean = 15; standard deviation (*SD*) = 1.4), suffering from AN (International Classification of Diseases, Tenth Edition, (ICD-10)) have received this treatment. As a way of evaluating the programme of CRT, all the patients who completed the course of CRT were asked to compile a letter describing their views on the therapy. In all, 14 (42%) of 33 patients responded. It is important to note that this was not a qualitative analysis of patients' experiences; it was an evaluation of the intervention from a patient perspective. The following section outlines comments that were taken from these letters. The feedback is split into four sections.

Positive comments. In all, 10 of the 14 responses made reference to CRT being interesting and fun, particularly when engaged with stimulating games (e.g. Rush Hour® (Mastermind Toys, 1996)) and challenging puzzles (e.g. riddles). Seven respondents reported that CRT provided a useful distraction from worries, particularly around meal times. Two patients identified that solving riddles was useful as it provided an intense challenge that allowed them to learn about her thinking styles more effectively. One patient described her appreciation that CRT was not focussed on the ED.

Perceived improvements in cognitive function. In regard to the stated aims of CRT, six patients made reference to their perceived improvements in both metacognitive abilities and executive functioning. A total of 11 respondents indicated a perceived improvement in relation to central coherence, describing an acquired ability to use different perspectives when assessing a situation. Eight respondents reported that they had learned how to assess a thinking style by considering the pros and cons of that style. They felt comfortable with utilising this technique in the future and acknowledged its value. Another eight respondents stated that they also identified flexibility of thought as an acquired skill – both in relation to understanding that there are different ways in which to think

about a situation, as well as in relation to set-shifting. Six respondents reported having learned that they use different thinking styles according to the situation facing them. In addition, one patient described that they had learned about their own cognitive strengths and weaknesses and indicated that they were not aware of these prior to the delivery of CRT.

Acceptability of the intervention. Some patients offered a view on what they perceived as negative components of CRT. Eight patients reported that they did not understand how CRT helped recovery. Seven patients reported not having been able to relate their work in the CRT sessions with real-life scenarios, hence doubting the therapeutic value of the sessions. Six patients described the sessions as unhelpful, but suggested that the therapy could be of benefit to others.

Suggestions on how to improve CRT. All patients provided suggestions regarding the improvement of CRT. A total of 11 patients recommended the introduction of electronic tablets, as they felt this could add to the enjoyment and would increase engagement. Two patients suggested adding some fun games, indicating a perceived lack of variety within the sessions. Another patient suggested the use of background music, as this reportedly increased her concentration. One patient deemed the course of eight sessions too short and suggested a longer course would have more of an impact.

Therapists' reflections

The assistant psychologists administering the CRT received weekly supervision from a clinical psychologist. Through the process of supervision, thoughts and reflections were discussed and collated.

Strengths of the therapy. Therapists described that the patients engaged well, presenting as enthusiastic and hard working. They were creative, able to have fun and found the games entertaining; this was demonstrated by their humour and laughter. Furthermore, patients were able to engage positively in considering how the games related to real-life topics such as relationships, schoolwork and ED symptoms. This presentation is consistent with adult patients' qualitative feedback on CRT (Tchanturia et al., 2007) and appears to be linked with the safe environment that CRT provides (Easter & Tchanturia, 2011).

Therapists noted that certain tasks were particularly beneficial for developing positive engagement. For the first session, visual illusions were helpful in terms of engagement, as patients appeared to find the task achievable and rewarding. In subsequent sessions, games such as Rush Hour® (Mastermind Toys, 1996) and Serpentes® (Mastermind Toys, 2008) were useful to reinforce positive engagement due to patients having four graded difficulty levels. Hence, patients were able to start playing the games at the level at which they felt proficient before attempting a more difficult level.

Challenges of the therapy. The therapist experienced a number of challenges related to the complex clinical presentation of the patients, often characterised by high levels of anxiety, perfectionistic traits and low self-esteem. When the above dimensions made it difficult for the patients to engage, the length and the structure of sessions were modified to meet the patients' individual needs.

For instance, in some cases, patients felt unable to try the games proposed in sessions. While the exact reasons for this were not clear, low self-esteem is characteristic of this patient group and can mean that patients have difficulties in recognising their abilities and understanding when their strategies are effective (e.g. *'I am not good at this game'*). These challenges appear consistent with those experienced by therapists delivering CRT to adults (Easter & Tchanturia, 2011).

In the cases where there appeared to be insufficient engagement, there also appeared to be a general lack of motivation to take part in all aspects of the therapeutic programme offered by the unit. Patients struggling with regulating their own emotions or showing considerable anxiety reinforced how much emotional aspects of functioning interfere with the ability to use effectively their own cognitive abilities. In this context, a playful setting, the use of humour and fun and the personalised therapy could help decrease anxiety.

In response to these challenges, through the process of supervision, the therapists responded through tailoring and personalising the sessions to the individual, with the aim of helping patients develop self-confidence and improve their level of engagement. For instance, it seemed helpful to develop modified versions of tasks that were based on patients' personal interests and hobbies. An example of this was creating a 'dogs' version of the Stroop test based on a patient's love of dogs. Therapists reflected that the use of personalised therapy and fun materials helped the therapists to face the *impasse* and to move forward with the sessions.

The therapists also asked patients to develop ideas for their own homework tasks. Furthermore, *ad hoc* methods were used to respond to the specific challenge of perfectionism. These included (1) asking patients to leave tasks unfinished, (2) playing the 'Line-approximation task' (Tchanturia et al., 2010) and (3) role modelling playing the games and purposefully making mistakes alongside patients. At the end of the CRT course, reflections on these challenges were summarised in the therapists' letters through the provision of future recommendations on how they could continue to make progress in these areas.

In summary, delivering CRT was experienced by the therapists as enjoyable and rewarding, with a good level of satisfaction. It provided a foundation for patients to tolerate and engage in other therapies, such as individual, group and family therapy. Typically patients with an ED may be highly reluctant to engage in these forms of therapy due to ambivalence regarding change and recovery (Fassino & Abbate-Daga, 2013). However, CRT focuses on the process and not the contents of thoughts, by looking at neuropsychological and cognitive dimensions through the use of simple games. Therefore, CRT does not directly focus on emotionally sensitive topics, and this may increase the confidence and willingness of patients to engage in the therapy (Tchanturia & Lock, 2011). These characteristics make the therapy an alternative therapeutic tool that can be used in conjunction with other treatments.

Limitations and future research directions

This article has aimed to provide an overview of how CRT can be delivered on a specialist inpatient unit for children and adolescents with AN. Within this work, there are a number of limitations to consider. Therapist reflections were based only on clinical observations, and the sample size, although rich in its heterogeneity, was relatively small. Ideally, a larger number of cases ought to be included in future studies to increase the generalisability of the clinical observations. Further research is needed to empirically test the effectiveness of CRT by compiling a quantitative account based on pre- and post-neuropsychological testing.

More studies are needed that employ randomised controlled designs to provide a greater standard of evidence for the effectiveness of CRT in the treatment of EDs. This could also consider whether eight sessions of CRT is a sufficient treatment dosage or whether a longer course of treatment is required. In order to examine the effectiveness of CRT, it may be beneficial to use additional outcome measures. For example, currently no suitable measure of metacognition has been developed. Therefore, it would be beneficial for future studies to develop such a measure based on the structure and method of administration of CRT.

Implications for clinical practice

CRT is still at a developmental stage, and further studies are necessary in order to answer the above questions. Through systematically implementing CRT on an EDs inpatient unit, we have observed some positive features of the therapy. It seems as though it has the potential to (1) enhance the overall engagement in the therapeutic programme, particularly through a playful setting that is not directly focussed on ED symptoms, (2) help patients address some of their cognitive strengths and weaknesses and (3) improve the patients' awareness of their cognitive weaknesses and strengths, hence their metacognitive skills.

There are also several challenges in the delivery of CRT including finding the right balance in the way the therapy is individualised. New tools and games specific to the young peoples' needs should be used in order to elicit engagement, while taking into account the interaction between patients' emotional difficulties and their cognitive abilities. Another challenge was that a group of patients reported that they did not understand the utility of CRT in their life and how it helped with their recovery. In response to these challenges, it may be beneficial for the therapist to more explicitly make connections between the activities in CRT and their applicability in everyday situations. For example, in the feedback letter, at the end of therapy, it may be beneficial to give further examples of how they can continue to use and apply the strategies learned in the sessions to their life and their recovery.

The experience of this approach also raised some questions: (1) whether every patient should be offered CRT or only when specific cognitive weaknesses are assessed, (2) what is the most effective format in delivering CRT, (3) whether its delivery in the ward milieu should be recommended and (4) what length of a CRT course is appropriate to achieve significant clinical and neuropsychological changes.

When the young person reports weaknesses in specific cognitive domains, it may be helpful to extend CRT to the ward milieu by involving nursing staff. This may help young people to apply alternative approaches in their routines when facing difficulties that could improve their overall quality of life. This could allow CRT to be more integrated in the multidisciplinary treatment programme.

Conclusion

Patients feedback and clinical observations suggest that CRT is an engaging therapeutic technique that might be useful as an additional treatment of AN. It can be used at any point in the treatment process and separately from, or in parallel with, other components of the treatment programme. The choice can be based on the capacity of the ED service and therapist and the personal characteristic of the patient. The flexibility within which the CRT can be delivered for both the patient and the service makes this form of therapy an acceptable and accessible type of intervention. Future research is needed to provide rigorous empirical support for the effectiveness of CRT as a treatment for EDs.

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Bryan Lask led the CRT programme outlined in this report during his time as the Medical Director of Rhodes Wood Hospital, London, U.K. His memory inspires us in our work.