Anorexia nervosa: how people think and how we address it in cognitive remediation therapy

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Background: Cognitive remediation therapy (CRT) for anorexia nervosa (AN) is a new working model for severely ill patients. It has been adapted from various resources, taking into account cognitive characteristics of patients with AN, such as difficulties in set-shifting and extreme attention to detail, as well as difficulties in engagement with treatment and in reflecting on their illness. **Aim:** We aim to introduce the elements of a CRT intervention, which we have tailored for AN, and demonstrate it with a case report. **Methods:** The patient presented completed ten, twice-weekly, 30-min sessions of a CRT intervention, which took into account strengths and weaknesses in information-processing styles and focused on the following components: helping patients to think about their thinking/strategies by undertaking simple cognitive tasks; reflecting how they relate to real life; exploring alternative strategies in cognitive tasks; applying new skills and strategies to real-life behaviors; acknowledging and summarizing what was learned during the intervention in the form of a letter. **Results:** After completing CRT, the patient presented had developed awareness of her thinking processes, developed new, more flexible strategies, and found CRT to be useful as a pretreatment before commencing further psychological interventions. **Conclusion:** CRT has the potential to increase the effectiveness of further psychological interventions for AN.

There is currently little evidence to support treatments of anorexia nervosa (AN) [1,2]. Existing treatments such as cognitive–behavioral therapy (CBT), interpersonal therapy, cognitive–analytical therapy and pharmacological therapy have a small evidence base and, furthermore, dropout rates are high [3–6]. It is therefore important to be creative in developing new approaches for treatment of AN.

There is growing evidence to suggest that people with AN have difficulties in set-shifting [7,8] and display extreme attention to detail [9,10]. This style of information processing could be one of the maintaining factors of AN, as suggested by Treasure and Schmidt [11]. Two case reports [12,13], one theoretical paper [14], a qualitative study [15] and a pilot exploratory case series study in progress [Tchanturia K *et al.*, Unpublished Data] suggest that cognitive remediation therapy (CRT) could be a potentially appropriate and effective intervention in targeting these cognitive styles and in facilitating further psychological work.

CRT has been successfully implemented in different areas of psychiatry. For example, it has been used to target and increase cognitive flexibility in patients with psychosis [16], as well as in patients with obsessive–compulsive disorders (OCD) [17]. Based on an etiological model of eating disorders [18], we have developed a ten-session,

twice-weekly CRT module for patients with AN, aimed at reflecting on information-processing styles and increasing cognitive flexibility and gistful, holistic thinking. The module aims to achieve this by targeting basic processes of thinking rather than the content of thinking, such as issues of food, shape and weight concern, or emotions. We are currently in the process of conducting a pilot study examining its effects. The aim of this publication is to introduce elements of the CRT intervention, which we have tailored for AN, and demonstrate it with a case report.

Cognitive tasks
Cognitive-flexibility tasks
Cognitive-flexibility tasks are used to increase ability to 'set-shift', or to switch from one stimulus to another. An example of such a task is the 'stroop' task. In this task, participants are required to read across the line saying the color of each word, while ignoring what the word says, and after few trials to switch to saying the word and ignoring the color. Another variation of this task is to read the labels on pictures of objects and after few trials name the objects while ignoring the labels. Other examples of cognitive-flexibility tasks include: going through the alphabet and alternating between generating girls and boys names for each letter ('switching attention'

task); building a tower using 'tokens' of different colors, shapes or sizes, switching between these dimensions ('token-towers' task); drawing 'infinity signs' with two hands ('infinity-signs' task); circling place names while underlining animal words from a list of different words ('embedded-words' task); and reversing the order of a string of numbers ('number-manipulation' task).

Holistic-processing tasks

Holistic-processing tasks are used to increase patients' ability to see the 'gestalt', or the 'whole', as opposed to paying excessive attention to detail. An example of such a task is the 'geometric-figures' drawing task, which is done jointly by patient and therapist. The patient dictates to the therapist what to draw from a complex, unfamiliar figure and the therapist draws by following the patients' instructions. If instructions are too detailed it makes it difficult to draw the shape similar to the original, so describing the figure as a 'whole' is more desirable. Another example of an exercise that requires using a gistful approach to information processing is to generate a catchy title or a few bullet points for an article of text. This task requires the patient to summarize a length of text into a few main points by seeing the 'wood for the trees', or the whole over the detail.

Reflection on task strategies

Identifying the thinking styles of inflexibility and lack of the gestalt is the first goal in CRT sessions with patients with AN. This is done through a process of identifying and reflecting on the strategies used by the patient to complete the tasks within the sessions. Encouragement by the therapist is useful in eliciting this, especially at first, using prompts such as, "What were your strategies for doing this task?", or "How did you approach this task?". For example, after completing a stroop task, where the patient is required to switch between reading an animal word and picture word, a patient may identify her strategy as trying to switch from focusing her attention on the picture to focusing on the word. Another patient may describe her strategy for describing the shape in the geometric-figures task as trying to be "as accurate and detailed as possible".

Reflection on relation to real life

Once patients have reflected on their strategies used in the tasks, they can further identify strengths and weaknesses in their information-processing styles by relating the strategies to situations in their life.

Generating real-life examples

Patients are encouraged to reflect on and link the strategies that were used in the tasks to those used in their lives outside the sessions. In the aforementioned stroop task example, a therapist may ask, "Can you think of a situation where this way of thinking might be useful in real-life situations?" The patient might suggest, "When I'm with my children and I have to do lots of things at once". It may be initially difficult for the patient to generate a real-life example, and the therapist may provide an example if this is the case. However, it is more desirable for the patient to generate their own example, which has more meaning and relevance to them. Some such examples generated by patients involved in our pilot study are demonstrated below. These are taken from the two types of cognitive tasks: cognitive-flexibility tasks and holistic-processing tasks.

Real-life examples: cognitive-flexibility tasks

An example of a patient relating a 'set-shifting' strategy from the task to real life is taken from a patient who underwent CRT as part of our pilot study. She described how the 'switching' in the stroop task was similar to a situation where she returned to a shop to obtain a refund for an item of clothing. However, when she arrived at the counter she was told that they only offered credit notes. In this case, she had to switch to make a new decision on the basis of this new information. Another patient described an example of being in a social context where she was saying something quite serious and someone briefly interrupted her with something humorous. This required an ability to be able to respond briefly to the joke and then return to what she was saying, a strategy similar those required in the CRT switching tasks.

Real-life examples: holistic-processing tasks

Examples of relating holistic/detailed strategies to real life have also been generated by patients in our pilot study. A patient related her strategy of completing the geometric-figures task in a very detailed way to struggling to make greeting cards for Christmas. She would draft the individual cards and proofread them several times, taking a very long time to finalize them. Another example was given by a mother of two who found it extremely difficult to give instructions to her children; she was so detailed that her children and husband were finding it difficult to follow all

the details of her instructions, such as for home tasks, swimming or when helping with school work. These are situations in which a holistic strategy might be more desirable.

Identifying strengths & weaknesses

As more strategies used by the patient in the tasks are related to real life, strengths and weaknesses in thinking processes are able to be identified. The therapist might start to ask if the strategies used in the tasks are familiar or similar to those used by the patient in real life, or what the patient thinks about the possibility of implementing them in real life. A therapist may ask, "Is this way of thinking similar to how you think in real-life situations?" This is useful in demonstrating and acknowledging strengths as well as weaknesses. For example, the patient mentioned previously may say that she is able to do many things at once quite easily and in fact does this often when with her children. This could indicate that this information-processing style is a strength of hers and can be acknowledged as such. By contrast, however, the patient might observe that she is not able to do this easily and becomes frustrated when she has to do more than one thing at a time. This seems to indicate a difficulty in set-shifting, and has been identified as a potential weakness in thinking style. This could then be an area to be targeted for more discussion and intervention.

In another example, while completing the 'line-bisection' task, (in this task, patients are asked to dissect a series of lines in half) a patient may take a long time, being overly concerned with its neatness and accuracy, indicating an excessive attention to detail. The patient might then relate this thinking style as one that is similar to her real-life situations, such as feeling anxious if her clothes were not the same color, or if she did not tidy the entire house before leaving for work each morning, and feeling annoyed at how long this took. This 'perfectionistic' thinking style might then be an area to address, and a more holistic strategy might be employed. However, there could also be a discussion about the advantages of using this thinking style in certain situations, and of the merits of striking a balance.

Learning new strategies

Once weaknesses in thinking style have been identified, the next step is to learn new, more appropriate strategies, first in the tasks and then in real life. After identifying strategies used in the tasks, patients are encouraged to reflect on and try out alternative, possibly more effective, strategies to address tendencies of inflexibility and attention to detail. A therapist could help the patient to do this by asking, "What might have been a more effective way of doing this task?" For example, a patient may describe the inner detail of a figure in the geometric-figures task, displaying an attention to detail over the 'whole', and making it difficult for the therapist to draw the shape from her description. After reflecting on her strategy for doing the task, there may be discussion about a possible alternative way of describing this shape that might be easier for the therapist to draw. If the patient is not able to identify an alternative strategy, the therapist may prompt by describing back to her the way that she had done the task, or by pointing out the large outside shape (a holistic strategy). If the patient does not think this would be easier, it could be useful to try it out by doing the task again and using the new strategy to explore its advantages.

Similarly, a therapist could help the aforementioned patient, who completed the line-bisection task with an excessive attention to detail, to explore other, more advantageous, strategies to approach the task. For example, she could lessen her accuracy by being timed or by drawing as if her child was drawing it. A discussion of the advantages and disadvantages of this new strategy could follow and the patient could practice this new strategy over the sessions. After identifying and practicing new strategies in the tasks, the patient can begin to apply them to real-life situations.

Applying new skills & strategies to real-life behaviors

Once new strategies have been identified and practiced in the tasks, patients can then begin to reflect on transferring their newly learnt strategies to real-life situations. For example, a patient who has learnt a new holistic strategy to describe the shape in the geometric-figures task might be encouraged to reflect on situations in her life where she might apply this. She might be able to think about applying it when she is describing directions to someone, giving a broad, overall picture by describing the main buildings, and not every building along the way. In another example, a patient may be able use her strategy of lessening her need to do the 'line bisection' perfectly to the real-life situation of being able to wear different colored clothing, or not checking

documents for mistakes over and over. The patient described previously who took a long time proofreading her Christmas cards was able to think about implementing a new strategy to draft and finalize the letters after proofreading them only once. Similarly, the patient who was finding it difficult to give instructions because they were too detailed discussed the possibility of finding some simple instructions on the internet (e.g., for tying a shoelace, or swimming instructions) and to practice saying these to her children, or to delegate and explain a small household job for her husband. In this way, she found it helpful to get used to making her instructions simpler, using a more 'holistic' strategy.

Behavioral tasks

In the final sessions, patients can be encouraged to carry out small behavioral experiments between sessions in order to apply the newly learnt strategies to real-life situations. This application from task to real life can generalize and further reinforce the advantages of the newly learnt strategies, and can help the patient to see the benefits of greater flexibility in cognitive processing.

Case description

Sarah (invented name) was a 31-year-old female experiencing her first episode of AN. This was her first admission to an inpatient eating-disorders unit. She had begun to lose weight by restricting her food intake and over-exercising 9 months prior to admission. She had presented to her General Practitioner a few months later and was assessed at an eating-disorders outpatients unit, where she was immediately referred to an eating-disorders inpatient unit. Her BMI on admission was 13.8. BMI is defined as the weight:height ratio and is calculated by dividing weight (in kilograms) by the square of height (in meters). A BMI between 20 and 25 is considered within the normal range for healthy adults. A BMI less than 17.5 fulfils diagnostic criteria for AN. Sarah had no history of anxiety or depression. Prior to admission, she had worked as a media manager at a dance school and she also enjoyed dancing regularly. She was asked to leave her job for health and safety reasons; however, she did not wish to leave her job and at the time of admission she wanted to return to work as soon as possible. She had a supportive partner with whom she had been for 10 years. Before AN onset, her

weight had been stable. Inpatient treatment consisted of occupational therapy, community-group sessions, dietician-group sessions, as well as structured meals. Prior to commencing CRT, she had never received any therapeutic/psychological treatment. Sarah remained in inpatient care while undergoing the 10 weeks of CRT.

Identifying strategies in tasks

The first couple of sessions were used to familiarize Sarah with the tasks, setting and therapist (Natalie Pretorius). After each task, Sarah was encouraged to think about the strategies she used while doing the task and to discuss the advantages and disadvantages of these, as well as possible alternatives. This enabled her to begin exploring strengths and weaknesses in the flexibility of her thinking style. It became evident that Sarah was able to identify her thinking styles towards the tasks more easily as the sessions went on. In fact, she started to 'try out' alternative strategies in order to test if they were more effective than others. For example, despite describing the geometric figure globally, she had a discussion with the therapist about alternative strategies, such as describing the inner detail first. In the next session, she tested this out by deliberately describing the inner detail first. She commented that this did feel more difficult to do and that describing the outside first seemed to be a better strategy.

Relating strategies to real life

In sessions three and four, Sarah was encouraged to think of how the strategies she used in the tasks were similar to thinking styles that she used in real-life situations. Again, she found this easier to do as the sessions progressed. Some of her examples are as follows: switching between seeing layout of the blocks of text and reading actual text when at work (stroop task); switching from being at work to going to a dance class at the same place (embedded words); switching between grammar and structure when proofreading a paper (stroop task); estimating the size of a screw when carrying out renovations (line-bisection task); describing one or two main buildings as opposed to every building on the way when describing directions to someone (geometric-figures task); being shown how to tie a shoelace in a different, easier way by a partner (number-manipulation task). Of note, not only did Sarah find it easier to identify her thinking strategies and generate examples as the sessions progressed, but she also

became better at doing the actual tasks. For example, in the number-manipulation tasks, she was markedly better by the later sessions, and was doing them faster and more accurately.

Developing awareness

Around this time, Sarah started to become more aware of rigidity in her behaviors on the inpatient ward. For example, Sarah said that a nurse had commented the day before that she always ate her rice pudding from the top of the bowl, a behavior that Sarah had not noticed before. The nurse suggested that she try eating it from a different side of the bowl. Although Sarah was able to do this, she noticed that the next day she ate from the top again. Sarah and the therapist discussed the benefits of being aware of these kinds of habitual behaviors.

Identifying themes in thinking style

Sarah actually completed most of the tasks quite well from the beginning, and as a result, any inflexible thinking styles were not initially apparent. She used appropriate strategies, and the real-life examples she was generating involved strategies that she seemed to be already familiar with and regularly used in domains such as at work, at home or through dance. However, in Session 5, Sarah commented that, although she hadn't initially thought that she was rigid in her thinking, she had observed that she had been approaching the tasks in the same way most of the time. Therefore, in the next few sessions, the therapist encouraged her to deliberately carry out some of the tasks in very different ways in order to further explore different strategies and identify any potential inflexible thinking styles. It was through this that three main issues emerged regarding Sarah's thinking style:

- Her need to get things right/perfect
- Her difficulties in switching attention
- Her difficulties in identifying emotions

Need to get things right/perfect

Sarah's need to get things right was demonstrated while doing variations of the line-bisection task and the infinity-signs task. For example, after doing a timed variation of the line-bisection task, she commented that she didn't feel the need to be as 'measured' in finding the middle of the lines, and did not care so much about the accuracy. Sarah identified this way of thinking as similar to how she thinks in real-life situations, where she experiences the need to be perfect and to get

things right. She related this process of having to change the way of doing something in order to achieve the same result to a real-life example of having to reduce the accuracy of a document to meet a deadline at work. In these situations, she still felt the need to keep going back to correct the document and make it perfect, despite the fact that any changes in it at the final stage would mean redoing other procedures.

Similarly, performing the infinity-signs task with her eyes closed led Sarah to experience a feeling of 'letting go' and to not care as much about its neatness, which contrasted with her need to do it 'right' when her eyes were open. This prompted discussion about her tendency to have trouble 'letting go' when she thinks she's wrong, and gave an example of having an argument with a colleague at work and not being able to stop thinking about and continually stewing over it.

Switching attention

Issues of 'switching attention' also arose through the set-shifting tasks such as the stroop task and the embedded-words task. Sarah related strategies used in these tasks to times when she was interrupted when reading or absorbed in something, and told the therapist of her feelings of annoyance in these situations. She said that, although she was able to make the switch, she did not like doing it, and found it irritating and difficult.

Identifying emotions

A further issue that arose was Sarah's inability to discuss emotions. She was always very good at the 'main-idea' task, where she had to summarize a long passage of text in a few key points. She discussed this preference to dealing with facts and not paying attention to irrelevant details or addressing emotions. As this module of CRT was not targeted at addressing food or emotions, this was not explored further. However, identifying this issue turned out to be a valuable insight for Sarah, and was something that she took forward to her psychology sessions after CRT finished (see Sarah's feedback letter).

Transferring strategies to real life

After having identified Sarah's thinking styles, the therapist helped Sarah to explore how some of the effective strategies that had been learnt in the tasks could be applied to real-life situations. For example, they discussed how she could apply the strategy of 'letting go' in the infinity-signs

task when working on documents at work, to be able to not go back to correct it again and again, but to be able to feel well if was not perfect.

Similarly, the therapist and Sarah discussed strategies that she could use to deal with situations of having to switch her attention from one thing to another. Her strategy when switching in the stroop task was to make the decision to switch to reading the color of the words from what was written, without letting the previous color distract her. They discussed how she could use this same strategy in situations such as switching from reading to answering the phone, or being interrupted by a colleague when working.

Behavioral tasks

In the last few sessions, the therapist and Sarah discussed some behavioral tasks that Sarah could try to implement between sessions in order to implement some of the new strategies she had learned over the course of CRT. They designed a task where she could try to complete the week's ward menu once in pen, instead of doing several drafts in pencil first. They talked about the strategy she would use to do this; she said that she would try to look at the 7 days of the menu as a whole first before starting with the particular days, and would try not to go back and keep correcting it. In the next session, she commented that, although it was a lot harder than she had expected and it had taken her a couple of attempts, she had, in fact, managed to do this.

Sarah also attempted other behavioral tasks, such as buying a different newspaper and reading it in a different place from where she usually did, although she did this quite easily and did not find it particularly challenging. However, in her letter she identified potential behavioral tasks for the future, which might be more challenging for her (see Sarah's letter).

Letters & reflections

In Session 9, the idea of end-of-treatment letters were introduced. The therapist asked Sarah to write down her perceptions and experiences of CRT, focusing on what she felt she had learnt and anything that she felt could be improved. The therapist wrote a letter in return to Sarah, summarizing the sessions.

In the final session, Sarah and the therapist read and discussed the letters. Sarah had started her further psychological work with a clinical psychologist 1 week before the CRT sessions had finished, and had already begun to address

some of the issues that had emerged through the CRT sessions. For example, she had already started addressing her perfectionistic tendencies and her inability to talk about feelings and emotions. She commented that CRT was a 'gentle' way to start to think about things, as opposed to talking about feelings immediately, which is something that she would have found particularly difficult. In this way, she thought that CRT led quite nicely into her next stage of therapy. Her feedback letter illustrates this (see below).

Sarah's feedback

Sarah's feedback highlighted effects of CRT for her in terms of:

- Developing awareness
- Issues of perfectionism
- Switching between stimuli
- Inability to identify feelings
- Behavioral tasks identified for the future
- Using CRT as an introduction to other psychological therapy
- Her overall impression.

Quotes from her feedback letter are shown below to illustrate these issues.

Developing awareness
"…As the sessions went on I became more and more aware of my thinking and why I had made those particular choices. [The therapist] encouraged me to challenge the way I carried out the tasks, acknowledging that there were many different approaches and this led to me trying different strategies for the tasks."

"…We started to use the exercises to identify behaviors rather than activities, which was illuminating as I entered into this … believing I wasn't rigid in thought patterns or behavior."

"I realized that many patterns I have, I am not aware of, like the example of eating the rice pudding from one edge of the bowl, this is something I was unaware of, but something that I was very able to change when it was brought to my attention".

Perfectionism
"…Returning to tasks in this way [checking repeatedly] may not always be the healthiest thing to do, and in some cases it may be better to leave the task; being content in the knowledge that it was completed to the best of my ability under the circumstances, rather than dwelling on the feeling that it wasn't good enough and then needing to go back to improve it."

Switching attention

"…We talked a lot about my ability to switch between two tasks … We explored this further by using examples of being interrupted from reading a document at work by a colleague. Usually, I would view this as an intrusion, however a more positive way to see this would be to view this as an active choice; I am giving my attention to this other activity rather than seeing it as a reactive or passive action of being disturbed. I can see the benefits of approaching situations in this way as it may enable me to be more flexible and amenable instead of being annoyed at the supposed intrusion."

Addressing feelings/emotions

"The tasks, which demanded that I pick out factual information and key points to be communicated, illustrated to me that this is how I conduct myself in everyday life, always trying to communicate the facts and not giving time, or in some cases importance, to the things that surround those facts. This could lead to me ignoring pleasantries or feelings, making it easy for people to misinterpret my direct approach for rudeness."

Behavioral tasks for the future

"One observation I made was that when building the tower with the colored shapes [token-tower task], the prevailing choice I made was to never pick the same object as the previous one and this made me consider that I was rigid in my flexibility. This could be identified in choosing to have a different breakfast everyday, or by not wearing the same clothes or same shoes on consecutive days. So perhaps these are challenges I could identify for the future."

CRT as an introduction to other treatment

"My experience of CRT has been very positive and I can really see the benefits of using this approach as an introduction to other types of therapy. I had never had any sort of therapy before and I held a lot of preconceptions about what therapy was and what it could offer me. I felt absolute fear at the thought of a therapist actually saying, "Tell me about your childhood and your relationship with your parents"; but also held onto blind faith, that therapy would offer some sort of epiphany, that all my questions would be answered, that I would be able to pinpoint exact points in time and relationships that brought me to this point. It is becoming clear that neither of these presuppositions are true and they are based on my lack of understanding of therapy.

One of the reasons that I feel CRT has been so beneficial to me is that I have come to a place now, after ten sessions, where I can pick up things in psychology. In my initial psychology assessment I was able to talk rationally about my desire to make things as good as I possibly could, perhaps with tendencies of overachievement and aspirations to perfection – this tendency was identified in CRT through the time-limited and eyes-closed exercises. We also identified my predisposition to relate to things rationally and practically in a very action-orientated way, perhaps at the detriment of my emotional side – this was identified in CRT with the exercise where I was asked to summarize a letter into three or four key points. I feel that I am much more accepting of these ideas because they had already been brought to my attention through other means, that is, CRT.

I feel that it was a real achievement to gain such insight in my initial psychological assessment and I believe this was very much due to the level of understanding and acceptance of therapy that I gained through this experience of CRT. Without CRT it would have taken me a much longer time to accept these tendencies, but now I feel confident to explore these issues further in psychology."

Overall impression

"I really enjoyed the CRT research and I appreciated the complexity of the tasks. At times I felt the tasks were a little repetitive, but I realize now that it was this that enabled me to pinpoint strategies and make connections between the tasks and examples of my behavior. I feel I have learnt a lot in this short time and that it is still a lot more to explore. I am disappointed that we can't continue the research, but perhaps this introduction will enable me to be more self-aware and more able to challenge my routines and behavior."

Sarah's BMI over the course of CRT

Figure 1 shows Sarah's BMI plotted over the course of ten, twice-weekly CRT sessions. The 2 weeks pre- and post-CRT are also shown. As shown, Sarah's BMI increased steadily from 15.0 to 16.2 over the twice-weekly CRT sessions. At 8 weeks post-CRT, Sarah was discharged from an eating disorders inpatient program with a BMI of 16.2, and 12 weeks post-CRT her BMI was 16.1.

Discussion & conclusion

This paper has described the elements associated with a ten-session module of CRT, which has been developed for patients with severe AN. We

Figure 1. BMI for Sarah at inpatient admission 2 weeks pre-CRT, over ten twice-weekly CRT sessions, and post-CRT 1, 2, 8 and 12 weeks.

CRT: Cognitive remediation therapy; S: Session.
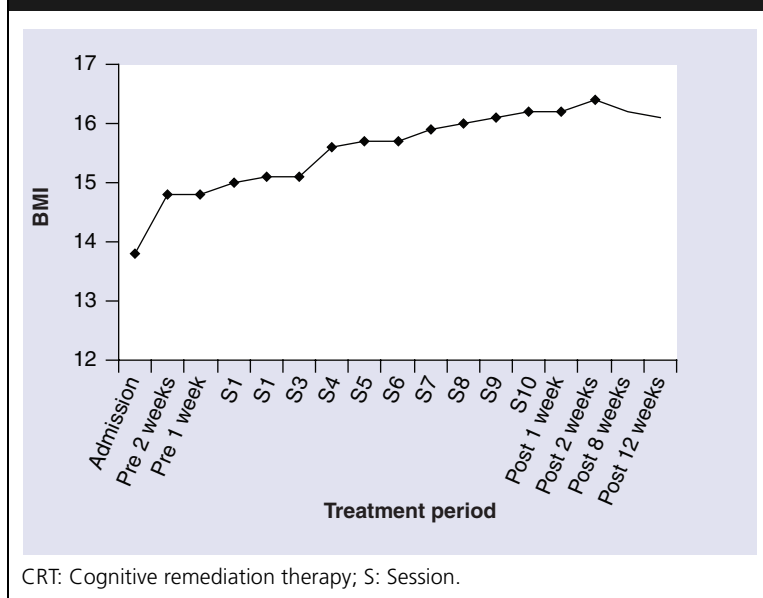
have also demonstrated the intervention with a case report. Over the CRT sessions, the patient presented here (Sarah) engaged with the therapist, developed some awareness of her thinking processes, and developed new, more flexible strategies to implement in her life outside the CRT sessions.

Sarah's experience also supports the potential of CRT in facilitating the effectiveness of further psychological interventions. Sarah started CBT sessions with a psychologist in the final week of CRT, and she felt that CRT had helped her in these sessions. It is possible that CRT provided Sarah with the metacognitive skills to be able to utilize a more complex psychological intervention (such as CBT), which requires the ability to set-shift and to think globally. Furthermore, the absence of issues involving food, body shape or emotions from CRT may have provided her with the enjoyable and non-threatening environment that was needed in order to engage in CBT. Further research needs to be done to determine whether CRT enhances further psychological interventions in this way, and which variables are targeted. We are in the process of conducting a pilot study examining neuropsychological and other changes in patients after completing CRT, which we hope will add more information about which measures change after the intervention.

However, it would be presumptuous to conclude that CRT was responsible for the increase in Sarah's BMI over the 10 weeks. There were many factors that may have influenced this, including occupational therapy and community and dietician group sessions, as well as structured meals, which she received as part of her inpatient treatment. However, the fact that her BMI stopped increasing but remained stable after finishing CRT until 12 weeks after discharge provides some support for the intervention.

We are aware of the limitations of case reports in terms of generalizability of findings. For example, we propose that CRT may be effective for severely ill patients, such as Sarah, as it is a simple, engaging intervention, which targets basic cognitive processes; however, a less intensive version of the intervention may be suitable for patients with less severe symptoms, such as those in outpatient settings. Future

Executive summary

- Anorexia nervosa treatment needs a more creative approach in order to increase the effectiveness of psychological treatment.

- One of the possible ways to intensify effects of available psychological interventions is to introduce cognitive remediation therapy (CRT) as a pretreatment intervention.

- CRT is widely used in psychosis, attention-deficit/hyperactivity disorder, aging and brain-lesion treatment packages.

- CRT for anorexia allows us to explore how patients think, rather than what they think.

- CRT allows patients to reflect and learn about their thinking processes.

- CRT gives patients a sense of achievement and helps them to adapt new behavioral strategies in real life.

- We described the elements of a ten-session CRT module developed by our group and demonstrated it with a clinical case presentation.

studies using case series and randomized treatment trials will allow us to address the following questions: Is CRT an effective intervention for AN? Is it useful for inpatient and outpatient client groups, for both adults and adolescents, and for early- and late-onset patients? Should it be offered as a pretreatment package before further psychological interventions or blended in with available psychological interventions? Ongoing research in our group will allow us to explore the value of CRT in the treatment of AN.

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