# Response to enhanced cognitive behavioural therapy in an adolescent with anorexia nervosa

# Overview of the literature

Eating disorders (EDs) are one of the most common health problems that affect adolescents and young women ([Swanson, Crow, Le Grange, Swendsen, & Merikangas, 2011](#_ENREF_32)). They have a narrow range of onset and are associated with physical and psychosocial morbidity as well as an increased risk of death ([Arcelus, Mitchell, Wales, & Nielsen, 2011](#_ENREF_2)). The aetiology of EDs remains unknown but contemporary theories emphasise the importance of biological, psychological and socio-cultural factors ([Kaye, Fudge, & Paulus, 2009](#_ENREF_23); [Mazzeo & Bulik, 2009](#_ENREF_27)). Long term outcome, particularly for people with anorexia nervosa (AN), remains poor and there is a paucity of good quality treatment research ([Fairburn, 2005](#_ENREF_10)).

EDs are defined by a disturbance in eating habits and weight control behaviour that causes marked physical and psychosocial impairment. The DSM-5 recognises three distinct EDs; AN, bulimia nervosa (BN) and binge eating disorder (BED) ([American Psychiatric Association, 2013](#_ENREF_1)). There is also a residual category of other specified feeding or eating disorder (OSFED) for sub threshold cases. However, it has been argued that the DSM system for EDs is a poor reflection of the clinical reality ([Fairburn & Cooper, 2011](#_ENREF_15)). There are two main reasons for this. Firstly, in both adults and adolescents, the majority of people with EDs fall into the residual category ([Fairburn & Bohn, 2005](#_ENREF_14)). Secondly, ED diagnoses are not static; it have been reported that up to 62% of people who receive an initial diagnosis of AN will cross over to BN ([Tozzi et al., 2005](#_ENREF_33)). In order to be of clinical value, there have been calls for researchers and clinicians to think afresh about ED classification.

One possibility is to take a ‘transdiagnostic’ perspective. Fairburn, Cooper and Shafran have argued that central to all EDs is over-evaluation of eating, weight, shape and their control and it is this core psychopathology that drives ED behaviours ([Fairburn, Cooper, & Shafran, 2003](#_ENREF_18)). Therefore, individuals with any ED may restrict their intake, binge, purge or exercise excessively. What distinguishes the different clinical presentations is the relative balance of over versus under eating. This means that despite equivalent psychosocial impairment ([Welch, Birgegård, Parling, & Ghaderi, 2011](#_ENREF_34)), people with AN maintain a low body mass index (BMI) whilst those with BN have an unremarkable weight.

In line with the transdiagnostic perspective, CBT for BN has been ‘enhanced’ so that it is applicable to all EDs. The aim of ‘enhanced CBT’ (CBTe) is to address over-evaluation of eating, shape and weight ([Cooper & Fairburn, 2011](#_ENREF_8)). The treatment is thought of ‘enhanced’ because whilst the style resembles other forms of CBT, it incorporates novel strategies to target ED core psychopathology such as using self-monitoring records rather than traditional thoughts records ([Fairburn, 2008](#_ENREF_11)). There are two versions of CBTe: focused and broad. Clinicians can choose to adopt the broad version if the case conceptualisation indicates that one or more additional mechanisms are maintaining the ED, such as clinical perfectionism ([Fairburn, 2008](#_ENREF_11)).

As a relatively new treatment, there is limited research examining the effectiveness or efficacy of CBTe. The first study randomly allocated 149 ED participants (BMI > 17.5 Kg/m2) to 20 sessions of CBTe or a wait-list control group ([Fairburn et al., 2009](#_ENREF_16)). Post-treatment, the intention-to-treat analysis revealed that just over 50% of participants had a level of ED symptoms less than one standard deviation above the community norm and this was maintained at 60-week follow-up. Since this initial trial, the results have been replicated in a routine outpatient clinic ([Byrne, Fursland, Allen, & Watson, 2011](#_ENREF_4)). Promising results have also been reported from a preliminary study with adults with AN ([Fairburn et al., 2013](#_ENREF_17)).

To date, little research has been conducted examining the efficacy of CBTe for adolescents. This is surprising given the prevalence of EDs in young people and also evidence that a short duration of illness and younger age of onset is associated with a more favourable prognosis ([Herpertz-Dahlmann et al., 2001](#_ENREF_22)). The largest study to date examining the efficacy of CBTe for adolescents reported that after 40-weeks of CBTe, two thirds of participants with AN who completed the treatment showed significant improvement in weight and ED symptomatology which was maintained at 60-week follow-up ([Dalle Grave, Calugi, Doll, & Fairburn, 2013](#_ENREF_9)). However, CBTe for adolescents has not been compared to CBT-BN or family-based interventions which are the leading empirically supported treatments and recommended by national guidelines ([NICE, 2004](#_ENREF_28)). Therefore, more research is needed to establish whether CBTe is an acceptable, effective and economical alternative for adolescents with EDs, particularly when delivered by routine clinical services.

# Case introduction

K was an academically-gifted 15-year old girl who at the time of referral was in year ten at a girl’s grammar school. K resided with her mum, dad and younger brother. K was referred to a community child and adolescent mental health service (CAMHS) by her general practitioner who was concerned about K’s low weight and reports of restriction and binge eating.

# Assessment

K attended the ED clinic with her mother in May 2014 for the initial assessment. In keeping with the service’s assessment procedure, two qualified clinicians in addition to a trainee clinical psychologist conducted the assessment. A semi-structured interview was conducted to assess the history, severity and frequency of the problem, current level of functioning and risk. In addition, a brief developmental history was taken from K’s mother. It was decided that K would be a good candidate for CBT given her motivation to overcome her eating difficulties. A second assessment was therefore conducted by the trainee clinical psychologist in which the nature and severity of the ED psychopathology was assessed further.

## Current concerns and history of the problem

K’s ED symptomatology began when she was 13 years old, 2 years before presenting for treatment. K began to restrict her food because she wanted to look and feel healthier; for K, being slimmer equated to being healthy. K used the internet to research different foods and as a result started avoiding certain food groups and became vegan. Over the course of 12 months, K’s weight dropped from 50Kg to 42Kg (significantly below what would be expected for her age and height). Concerned about the impact of low weight on her academic performance, K made the decision to try and increase her dietary intake. However, this initiated episodes of binge eating. Consequently, K’s weight fluctuated over the next year. Five months before seeking help, K started using laxatives and vomiting to compensate for binges.

At the time of referral, K weight was significantly below normal for her age and height (on the 11th centile). She was alternating between periods of restriction and episodes of binge eating and purging. K was frequently weighing herself, checking her shape and engaging in driven exercise. K was able to articulate a number of eating, shape and weight related cognitions which focused on her being fat and greedy.

K’s had an insignificant developmental and medical history. However, since the ED, K reported a number of physical concerns such as feeling dizzy and frequent headaches. K experienced secondary amenorrhea between the age of 13 and 14. At the time of assessment, K’s periods had returned although she described them as light and irregular. K reported that her sleep was poor and that she struggled to concentrate at school.

K had noticed a significant deterioration in her mood over the last twelve months. She reported symptoms associated with low mood including tearfulness and reduced interest and pleasure in activities. K had used self-harm in the past however more recently, K said she had not self-harmed and had no desire to do so. Since the onset of the ED, K had also noticed that she was becoming generally more anxious, for example worrying a lot about exams.

Whilst there was no family history of EDs, K’s maternal grandmother was described as an alcoholic. K’s mother felt that there were some parallels between this and K’s ED.

# Hypothesis and aim

It was hypothesised that the ED behaviours (restricting, binging and purging, excessive exercise and shape and weight checking) were a consequence of K’s dysfunctional scheme for self-evaluation which focused on eating, weight shape and their control. The ED behaviours in turn maintained and intensified the importance K placed on her eating, shape and weight.

The primary aim of this case study was to investigate whether CBTe would be an acceptable treatment for K and help obtain her goals of:

* normalising eating patterns and behaviour
* decreasing preoccupation with eating, shape and weight
* reducing psychosocial impairment caused by the ED

# Design

This study employed an A-B single-case experimental design where ‘A’ referred to the baseline and ‘B’ to the intervention phase. The baseline consisted of the seven days between the initial assessment and the CBTe assessment. Daily self-monitoring records aided the evaluation of the intervention in addition to weekly weights and standardized questionnaires (described below). The quality of the intervention was assessed using the Child and Adolescent Practice Scale (CAPS) for CBT ([Stallard, Myles, & Branson, 2014](#_ENREF_30)). The therapist scored in the competent range across all areas assessed by the CAPS. Parental consent and child assent was obtained.

## Primary outcome measures

Self-monitoring records ([Fairburn, 2008](#_ENREF_11)). Dietary intake, ED behaviours (restriction, binging, purging or excessive exercise), as well as any cognitions and emotions that influenced eating were recorded daily. The self-monitoring records were used in two ways (1) monitoring ED behaviours and ‘feeling fat’ (baseline to treatment end) (2) diet micro-analysis (week 1 and 6). Further details are provided in the appendix.

Weight. Recorded each session in Kg.

Eating Disorder Examination Questionnaire (EDE-Q) ([Fairburn & Beglin, 1994](#_ENREF_13)). The EDE-Q is a 28-item self-report questionnaire with four subscales: eating concerns, weight concerns, shape concerns and restraint. These can be summed to create a global score. Higher scores reflect greater eating-related symptoms. The questionnaire has good reliability and validity ([Fairburn & Beglin, 1994](#_ENREF_13)), acceptable internal consistency and test-retest reliability ([Luce & Crowther, 1999](#_ENREF_26)), and has been validated in adolescents ([Carter, Stewart, & Fairburn, 2001](#_ENREF_5)). The EDE-Q was completed at baseline, session 6, session 12 and 8 months after the end of treatment.

## Secondary outcome measures

Two standardized routine outcome measures were completed at baseline, session six and session 12.

Revised Child Anxiety and Depression Scale (RCADS) ([Chorpita, Yim, Moffitt, Umemoto, & Francis, 2000](#_ENREF_7)). The RCADS is a 47-item questionnaire that measures symptoms associated with five different DSM-IV anxiety disorders as well as depression. Separate versions are completed by the parent and child. The RCADS has good reliability and validity in community and clinical samples ([Chorpita, Moffitt, & Gray, 2005](#_ENREF_6); [Chorpita et al., 2000](#_ENREF_7)). Parent and child-rated total anxiety and depression scores are reported.

Strengths and Difficulties Questionnaire (SDQ) ([Goodman, 1997](#_ENREF_20), [2001](#_ENREF_21)). This SDQ is a 25-item questionnaire that measures child adjustment. It is comprised of five subscales; four of which can be combined to form a total difficulties score. There is an impact supplement which gives an indication of impairment caused by the difficulties (ranging from 0-10). Separate versions are completed by the parent and child. A recent review demonstrated the robust psychometric properties of this instrument ([Stone, Otten, Engels, Vermulst, & Janssens, 2010](#_ENREF_31)) Parent and child-rated total difficulties and impact scores are reported.

# Formulation

When K started at a secondary school renowned for its academic excellence, she found it increasingly difficult to maintain her primary school status as ‘top of the year’. This experience challenged her sense of self which was reliant on her academic performance and likely activated core beliefs about ‘not being good enough’. In order to feel ‘good enough’ again, K felt that she needed to improve herself.

K described how being good at sport was valued both by the school and also her peers and so decided that she wanted to invest in improving her sporting ability. As well as starting to run, K began researching about diets to help obtain a more athletic physique. Whilst initially unintentional, K began to lose weight and rapidly started noticing changes in her shape which she described as rewarding; it was something she could achieve relatively easily and have control over, it made her feel superior to the other girls at school and gave her more confidence. Weight-loss therefore positively reinforced the restriction and K’s scheme for self-evaluation became dominated by eating, weight and shape and her ability to control them (Figure 1).

As K’s weight decreased, her mood deteriorated and she began to withdraw socially. K experienced feelings of guilt and anger if she ate something which was deemed unhealthy and would feel anxious if she did not engage in exercise regularly. In addition, she became increasingly preoccupied with her eating, weight and shape and engaged in repeated shape and weight checking. Low weight, preoccupation and checking contributed to the perpetuation of her ED by increasing the importance attached to eating, weight and shape.

When K attempted to eat more she found she was not able to control her intake. It is likely that binge eating resulted from both the physiological effects of starvation combined with feeling as though she had loss control by breaking the highly specific dietary rules she had set herself previously. In line with the cognitive model of EDs ([Fairburn et al., 2003](#_ENREF_18)), binge eating intensified K’s concerns about her shape and weight and encouraged greater dietary restraint and driven exercise, further increasing the risk of binge eating.

A further process which maintained K’s ED was the strategies other than restriction she used to compensate for binges. K believed that vomiting and using laxatives would reduce weight gain. Such strategies undermined the rationale for not binging and temporarily reduced the distress experienced after binging. The behaviour was therefore reinforced.

## Figure 1: Maintenance formulation of K’s ED

**BINGE EATING**

**STRESSFUL EVENTS CAUSING MOOD TO DIP**

**VOMITING**

**LAXATIVE USE**

**LOW WEIGHT**

* Feeling more conscious about my body
* Focusing more on my body
* Body checking
* Weight checking
* Preoccupation with food

**RESTRICTING FOOD**

**DRIVEN EXERCISE**

**BEING THIN AND HAVING LOW BODY FAT IS IMPORTANT** because:

* It means I look sporty and healthy
* I look more like the ‘popular’ girls
* It gives me ‘an edge’ over the other girls who are as academic as me

# Intervention

Treatment consisted of 11 sessions of individual CBTe[[1]](#footnote-1). In line with the ‘focused’ CBTe protocol ([C. G. Fairburn, 2008](#_ENREF_11)), the following strategies were used:

Formulation of the processes maintaining the eating problem *(1-2)[[2]](#footnote-2)*.A visual representation of the processes maintaining the ED was collaboratively developed (Figure 1). This was revised as therapy progressed. The formulation was placed on the table during each session for reference.

Establishing real time self-monitoring *(1 onwards)*. K was asked to start real time monitoring of food and drink consumed, ED behaviours, thoughts, feelings and events. The aim of keeping on going ‘in-the-moment’ records was to help K identify what was happening on a day-to-day basis, distance herself from ED-related cognitions, emotions and behaviours, and learn that patterns which have become habitual over time are amenable to change. Self-monitoring continued throughout treatment and was reviewed at the start of each session.

Collaborative weighing *(1 onwards)*.Each week, K was weighed in session and together the weight was plotted on a graph and trend was interpreted. This provided weekly data on weight and enabled K to learn about her weight and body weight in general. K was encouraged not to weigh herself in-between sessions.

Psychoeducation (2-3). Education focused on eating problems generally, weight, weight checking and binge eating. The aim was to provide accurate information, highlight key maintaining processes as well as health risks associated with ED behaviours. As part of this, K was provided with chapters from Overcoming Binge Eating ([Fairburn, 2013](#_ENREF_12)) and was invited to read and highlight sections which were relevant for her as well as any sections which were unclear..

Regular eating *(1 onwards)*.K was encouraged to adopt regular eating which was defined as three meals and at least two snacks a day. The rationale for this was to provide more structure to her eating habits and to reduce restriction and binge eating. The emphasis was on eating regularly; the content of what K was eating was not challenged.

Motivation to change *(4)*.The pros and cons of change were considered. Three tables were developed which detailed current and future pros and cons of change as well as a conclusions table.

Addressing feeling full *(5-6)*. Feeling full was a particularly aversive experience for K. A number of strategies were employed early on in therapy to help with this including psychoeducation, normalising the internal physical sensation of feeling full and suggesting practical strategies.

Involving significant others. Regular meetings were held with K’s parents. As well as informing them about the nature of the eating problem and treatment, the sessions were used to consider how they could support K’s efforts to change and also it provided the parents an opportunity to voice any concerns they had.

Over-evaluation of shape and weight *(6-10).* As over-evaluation of eating, weight and shape was central to K’s ED, a number of strategies and procedures were used to address this. Firstly, K’s scheme for self-evaluation was identified using a pie chart technique. After identifying the importance that K placed on her ability to control her shape and weight, the risk of evaluating herself in this was considered. An extended formulation was created with K which included the consequences of over-evaluation (Figure 2). Two strategies were used to reduce K’s over-evaluation (1) enhancing other domains of self-evaluation, and (2) addressing the expression of over-evaluation by working on shape checking and feeling fat.

Ending well (11). K’s progress was reviewed and a maintenance plan created.

## Figure 2: Over-evaluation of control over shape and weight



# Results

Figure 3 demonstrates counts of ED behaviours and feeling fat recorded on the self-monitoring records. K’s scores were variable during the baseline phase (A). There was a steep decline in counts during the intervention phase (B); by day 38 (approximately CBTe session 5), counts of ED behaviours and feeling fat had reduced to zero and this remained stable. It is also notable that feeling fat mostly co-occurred with counts of ED behaviours. The diet micro-analysis indicated that between baseline and session 6, total calories and fat being consumed increased (Table 1). Figure 4 shows K’s weight centile chart[[3]](#footnote-3). K’s weight increased from 47Kg in session 1 to 52.2 Kg (39th centile) by session 11.

## Figure 3: ED behaviours and feeling fat during the baseline (A) and intervention (B) phase

ED behaviours

Feeling fat

**(B)**

**(A)**

Figure 4: Weight graph

## Table 1: Outcome measures

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Baseline** | **Session 6** | **Session 11** | **Eight month follow-up** |
| **EDE-Q** |  |  |  |  |
| Restraint | 2.2 | 2.4 | 1 | 2.6 |
| Eating | 3.6 | 3.4 | 1.2 | 2.6 |
| Weight concern | 3.4 | 3.5 | 1.2 | 3.4 |
| Shape concern | 4.75 | 5 | 2.63 | 3.4 |
| Global | 3.49 | 3.55 | 1.51 | 3 |
| **Diet micro-analysis** |  |  |  |  |
| Energy (kcal) | 1876.57 | 2338.53 |  |  |
| Fat (g) | 40.57 | 59.72 |  |  |
| **Parent SDQ**  |  |  |  |  |
| Total difficulties | 17 | 15 | 7 |  |
| Impact | 7 | 2 | 2 |  |
| **Child SDQ**  |  |  |  |  |
| Total difficulties | 18 | 12 | 8 |  |
| Impact | 3 | 3 | 2 |  |
| **Parent RCADS** |  |  |  |  |
| Total anxiety | 81 | 52 | 66 |  |
| Depression | 86 | 65 | 65 |  |
| **Child RCADS** |  |  |  |  |
| Total anxiety | 81 | 75 | 66 |  |
| Depression | 86 | 62 | 56 |  |

K’s global EDE-Q score remained above the clinical cut-off (more than one standard deviation above the norm for adolescent females (Carter, Stewart & Fairburn, 2001)) at session 6 but reduced to below the clinical cut-off by session 11 (Table 1). The ratings on the SDQ given by K’s parents decreased from 18 to 8 for total difficulties and 7 to 2 for impact of difficulties over the course of treatment. K’s ratings showed a similar trend over time. Ratings on the RCADS indicated that K no longer fell in the clinical range for anxiety or depression by the end of treatment (Table 1).

Qualitatively, by the end of treatment K felt as though the ED impaired her less socially and consequently she had noticed improvements in her mood. K also reported having regular menstrual cycles.

Eight month follow-up data indicated that K’s global EDE-scores had increased again and were just within one standard deviation of norms for adolescent females (Global EDE-Q = 3).

# Discussion

The marked reduction in ED behaviours and feeling fat, and increases in weight and dietary intake suggest that progress was made towards K’s first therapy goal which was to normalise her eating patterns and behaviour. Further, there was a substantial reduction in self-reported symptoms of ED, as measured by the EDE-Q, which indicates that other aspects of ED psychopathology, such as over-evaluation of eating, shape and weight and their control, had been addressed. In addition, K was no longer experiencing clinically significant symptoms of anxiety and depression by session 11 of CBTe. However, progress was only partially maintained at eight-month follow-up.

There is little research on the phenomenon of ‘feeling fat’ yet this is something which is central to the maintenance of EDs ([Fairburn, 2008](#_ENREF_11)). From Figure 3, it is clear that for K, feeing fat fluctuated from day to day. This experience was often connected with ED behaviours, such as restricting or binging, which in turn were influenced by K’s mood state (Figure 1). Therefore, as K started regular eating and ED behaviours reduced, reports of feeling fat also declined. This suggests that without specifically addressing feeling fat, the frequency of this phenomenon can be reduced through behaviour change.

There was no change on the scores on the EDE-Q by session 6 despite a rapid decline in ED behaviours. This potentially has implications for the long-term trajectory of K’s ED. Research in adult ED populations has shown that rapid responders to CBTe, operationalised as a reduction in global EDE-Q scores of 1.52 within the first four weeks of treatment, are more likely to achieve full remission ([Raykos, Watson, Fursland, Byrne, & Nathan, 2013](#_ENREF_29)). Using this criterion, K would be considered a non-rapid responder and therefore would have a less favourable prognosis. This may in part explain the increase in global EDE-Q scores at follow-up. However, caution has to be taken when generalising from research conducted with adult ED populations particularly as there is evidence that in adolescents with AN, weight-restoration is a more accurate predictor of long term outcome than EDE-Q scores ([Lock et al., 2013](#_ENREF_24)). In order to aid clinical decision-making, further research in adolescents is needed to examine what factors distinguish good versus poor outcome following CBTe.

There is little guidance on how CBTe should be modified for use with adolescents or equally how it should be modified to fit with the CAMHS service delivery model. As the treatment protocol has been designed for older clients accessing specialist ED services, challenges may arise if CAMHS clinicians directly extrapolate from it. For example, during the first two stages of CBTe, establishing regular eating takes precedence over the content of what it being eaten([Fairburn, 2008](#_ENREF_11)). This could be difficult to uphold when working with young people; even if they are not dangerously underweight, there will be a degree of anxiety about the potential impact that nutritional deficiencies could have on the person’s growth and development. Despite advice from the dietician, the focus for K remained on eating regularly rather than changing meal content. Interestingly, K started eating a wider variety of foods without directly addressing this which supports the CBTe protocol. Nonetheless, this example highlights that more guidance is needed on how and when to modify CBTe for working with adolescents in CAMHS.

A potential difficulty of using CBTe within CAMHS is that the NICE guidelines do not currently recommend it for children and adolescents. For K’s presentation, family-based intervention would be recommended ([NICE, 2004](#_ENREF_28)). Family-based interventions, such as The Maudsley Approach, conceptualise EDs as developing within a family context see parents as a key resource for facilitating recovery ([Lock & le Grange, 2005](#_ENREF_25)). Using this approach with K, her parents would have been encouraged to take responsibility over her eating in the early stages and this would have been gradually given back to K. Only in the final stage of therapy would the underlying issues be addressed and would K be helped to develop a non-ED identity ([Lock & le Grange, 2005](#_ENREF_25)). As in K’s case, family-based approaches are not acceptable to all families ([Dalle Grave et al., 2013](#_ENREF_9)). Both K and her parents said that they had a preference for individual rather than family-work. K’s case therefore supports the proposition that CBTe is an acceptable and useful intervention for adolescents with EDs. Clearly, more outcome research is needed comparing family therapy and CBTe to see whether CBTe is an efficacious alternative to family therapy.

There were some deviations from the treatment protocol. Due to service-level limitations in addition to K’s own time commitments, it was not possible to offer the twice-weekly appointments during the first stage of treatment as is recommended. Given that K was motivated to change and able to achieve early change, it was collaboratively decided that one session per week would be appropriate given the difficulties identified above. Similarly, K completed only 11 sessions of CBT-E. This is a significant deviation from the recommended 20 or 40 sessions ([Fairburn, 2008](#_ENREF_11)). Unfortunately the therapist left the service shortly after the eleventh session. K was offered further sessions from the therapist supervising the case however K felt in a position to keep progressing without further therapeutic input.

The fact that the beneficial effects of treatment were not sustained at eight-month follow-up is perhaps unsurprising given that K received only 11 of the recommended 20 or 40 CBT-E sessions. It is likely that reducing the protocol did not equip K with the techniques to prevent relapse longer term. Further sessions would have allowed more time to address the key maintaining processes: over-evaluation of shape and weight and dietary rules. It is noted in the manual for CBT-E (Fairburn, 2008) that patients are at substantial risk of relapse if these maintaining mechanisms are not sufficiently addressed. The finding reported highlights the importance of delivering the recommended number of sessions.

## Limitations

The brevity of this intervention is a considerable limitation. No standardized measure of psychosocial impairment specifically due to ED features was used; The Clinical Impairment Assessment ([Bohn et al., 2008](#_ENREF_3)) could be utilised to measure this with future cases. Lastly, an A-B design was employed and therefore it cannot be concluded that intervention causedthe changes observed.

# Conclusions

 This case demonstrates how CBT-E led to a rapid reduction in ED psychopathology in an adolescent with AN but the effect were not maintained at follow-up. Whilst caution has to be taken due to the limitations of a single-case study and the brevity of the intervention, it illustrates that CBT-E may be an acceptable and useful intervention for adolescents with EDs.

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# Appendix A

## Additional information on primary outcome measures

### Self-monitoring records

The self-monitoring records were coded for episodes of binge eating (subjective or objective), vomiting, laxative use or restriction (defined as clear under eating such as missing meals or snacks). The total number of these behaviours per day were counted and graphed as ‘ED behaviours’. In addition, the comments and context column was coded for ‘feeling fat’ (or similar statements). Daily counts of ED behaviours and ‘feeling fat’ were graphed and used both in session and also for evaluation of the intervention.

### Diet micro-analysis

Diet micro-analysis was conducted by the dietician in the ED clinic on two occasions. In order to do this, seven consecutive days of self-monitoring records were provided to the dietician with permission from K. Using specialist software, the macro- and micro-nutrient composition of K’s meals and snacks could be calculated and averaged for the week.

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1. K continued to see the dietician and have Care Planning Approach (CPA) reviews alongside the CBTe. [↑](#footnote-ref-1)
2. Numbers indicate the session number. [↑](#footnote-ref-2)
3. The CAMHS ED clinic define good outcome as being above the 25th centile for BMI and having three consecutive menstrual cycles. [↑](#footnote-ref-3)