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ANOREXIA NERVOSA AND EMOTION

Section A: To what extent do the recommended psychological therapies for anorexia nervosa impact emotion? A systematic review.

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MRP Summary

SECTION A

Anorexia nervosa can be maintained by difficulties expressing and regulating emotion. This systematic review aimed to identify whether four therapies recommended for anorexia target and successfully impact emotion regulation. Ten studies met eligibility criteria and were assessed against appropriate risk of bias tools. Studies at low risk of bias indicated that mid-therapy negative emotional expression predicted improved outcomes for CBT-ED/FPT, and emotional avoidance predicted poorer outcomes for MANTRA/SSCM. MANTRA was described as improving emotional connection and acceptance. Tentative evidence indicated that CBT-ED reduced impulsivity but did not improve distress tolerance, however quality was mixed and higher-quality studies are needed. Implications and limitations are discussed.

SECTION B

Sequences of emotion change (from secondary to primary, and maladaptive to adaptive) have been associated with improved outcomes. Emotional expression across phases of an emotion-focused therapy for adults with anorexia nervosa was qualitatively coded for eight participants: four who had recovered and four who had not fully recovered. Findings were then quantitatively analysed. Sequential patterns of change were observed, from secondary to primary adaptive emotions. Recovery was associated with fear of abandonment reducing over therapy and greater primary adaptive emotion expressed, including hurt/grief and acceptance. Not fully recovering was associated with greater need expression over time and self-soothing. Limitations, as well as implications for future research and clinical practice are explored.

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Section A: (7,988 words) (300)

To what extent do the recommended psychological therapies for anorexia nervosa impact emotion? A systematic review.

Abstract

Objectives: Difficulties with emotion regulation (ER) are both a risk and maintenance factor for anorexia nervosa (AN). This review explored whether therapies for AN recommended by The National Institute for Health Excellence and Care (2017) aim to target ER and how effective they are at impacting ER.

Methods: A systematic search of databases PsychInfo, Pubmed, and Web of Science identified any qualitative or quantitative studies including process or outcome measures of emotion for: Cognitive Behaviour Therapy adapted for eating disorders (CBT-ED), Maudsley Anorexia Nervosa Treatment (MANTRA), Specialist Supportive Clinical Management (SSCM), or Focal Psychodynamic Therapy (FPT). Studies were assessed for quality against appropriate risk of bias tools.

Results: Ten studies were found: two for FPT and CBT-ED, five for CBT-ED, two for SSCM and MANTRA, and one for MANTRA. Studies with low risk of bias suggested negative emotional expression mid-therapy predicted improved outcomes for CBT and FPT, and for MANTRA and SSCM emotional avoidance was associated with poorer outcomes. MANTRA was described as enabling greater emotional connection and acceptance. Tentative evidence suggests CBT-ED may reduce impulsivity and does not improve distress tolerance, however further high-quality studies are needed.

Discussion: Regardless of therapeutic approach, this review suggests that expression of negative emotion within therapy is important to facilitate. Implications for research and clinical practice are discussed along with limitations.

Keywords: *anorexia nervosa, emotion regulation, CBT-ED, MANTRA, FPT, SSCM*

Introduction

Anorexia nervosa (AN) is an eating disorder (ED) characterised by restriction of nutritional intake relative to requirements, motivated by intense fear of weight gain and concerns with weight, shape, and body image (American Psychiatric Association; 2013). AN usually takes one of two forms: a restricting subtype (AN-R) or a binge-purge subtype (AN-BP; Serra et al., 2021). Despite multiple recommended therapies for those with AN (National Institute for Health Excellence and Care; NICE, 2017), there are high drop-out rates from therapy (DeJong et al., 2012; Wallier et al., 2009), no particular intervention is superior for adults, and fewer than half of those with AN recover (Watson & Bulik, 2013). Furthermore, AN has the highest rate of mortality compared to other mental health conditions (Nielson, 2001; Smink et al., 2012). People with AN had six times the risk of mortality compared to the general population, with 20-30% of deaths accounted for by suicide (Papadopoulos et al., 2009).

Some have argued the relatively poor prognosis of AN and high attrition may be due to the ego-syntonic nature of AN, in which aspects of AN are believed to be positive, useful, or protective, and therefore become a valued part of one's personality and sense of self (Treasure & Schmidt, 2013). In line with this, AN may initially develop as a way of coping with difficult emotional experiences in the absence of more adaptive emotional regulation strategies (Haynos & Fruzzetti, 2011; Oldershaw et al., 2015; 2019). AN may function to downregulate negative emotions through an increased focus on dietary concerns and weight, and through eliciting controlled and expected responses from others (Treasure et al., 2016). Once established, avoidance of emotion may serve a role in the maintenance of AN (Treasure & Schmidt, 2013; Wildes et al., 2010).

Emotions as adaptive processes

Emotions have been defined as multifaceted processes comprised of a phenomenal experience or ‘feeling’, neurobiological processes, and perceptual and cognitive changes (Izard, 2010). The phenomenal aspect has been described as the “mental representation of the physiologic changes that occur”, mapping the emotion within sensory centres of the brain (Damasio, 2004, p.52). Discrete emotional states have been associated with corresponding changes to attention, learning, memory, reasoning, and problem solving (Tyng et al., 2017). Emotions are thought to adaptively promote physiological states and actions that enable individuals to learn from comparable situations, increasing the likelihood of averting risks and benefiting from opportunities (Damasio, 2004). Emotions tend to be triggered by personally salient stimuli (actual, perceived, or from memory) that, through evolutionary processes, have become associated with survival and wellbeing (Damasio, 2004). Emotional expression also holds a social function in that they can portray a visible signal of one’s internal state and intentions, and can therefore become less functional when one’s internal state is incongruent with one’s emotional expressivity (Davies et al., 2011).

Bottom-up interoceptive awareness of physiological changes are thought to construct an embodied representation of the self, or a ‘material me’ (Seth, 2013). An emotional sense of self has been likened to the “conductor” of an orchestra; a super-ordinate system helping individuals navigate complex experiences of themselves, others, and the world (Oldershaw et al., 2015). Emotional functioning is therefore considered key to healthy functioning. Difficulties with emotion and emotion regulation have been found across many mental health difficulties including depression, anxiety, substance misuse, as well as eating disorders (Berking & Wupperman, 2012; Joormann & Stanton, 2016; Cisler & Olatunji, 2012).

Emotion regulation and AN

Emotion regulation (ER) includes both automatic and intentional processes that impact one's emotional experience in a preferred way (Berkman & Lieberman, 2009).

Various ER models exist including Gratz and Roemer's (2004) multidimensional framework, in which ER is comprised of the ability to (1) access effective emotion regulation strategies (2) control impulses whilst experiencing negative emotion (3) be aware of, accept, and have clarity regarding emotional responses, and (4) engage in goal-directed actions whilst experiencing negative emotions.

An alternative ER framework is Gross' (1998) model which focuses on the *process* of ER at five points: (1) selection (or avoidance) of situations, (2) modifying situations, (3) modifying attention, (4) cognitive re-evaluation of situations (all occurring before the emotion is triggered), or (5) modulating one's response to an emotion (occurring after the emotion is activated). Whilst this framework has been used in AN literature (e.g., Oldershaw et al., 2015), the multidimensional approach has been suggested to map more directly onto research domains relevant to understanding AN and ER, including "alexithymia, distress tolerance [and] experiential avoidance" (Lavender et al., 2015, pp.112-113). Furthermore, it was specifically developed to aid clinical understanding of ER in relation to psychopathology and has been widely used within ED research (Lavender et al., 2015).

Below, quantitative and qualitative evidence are explored in relation to AN and each of the four ER dimensions as defined by Gratz and Roemer (2004).

1. Limited access to effective emotion regulation strategies

Strategies of ER can include reappraisal, reflection, rumination, distraction, expressive suppression, and social sharing (Brans et al., 2013). Whether each strategy is adaptive or maladaptive depends on the situation and factors including but not limited to one's values,

goals, personality, context, and culture. Reappraisal, the reinterpretation of a situation that elicited a negative emotion, has been shown to reduce self-reported negative emotion (e.g. Feinberg et al., 2012; Staudinger et al., 2009) and was associated with reduced activation in areas of the brain associated with emotion generation such as the amygdala (e.g. Goldin et al., 2008). Reappraisal, along with reflection, distraction, and social sharing were associated with increased positive emotional experience (Brans et al., 2013). In contrast, expressive suppression – namely, attempting to inhibit overtly emotional behaviours (e.g., through reducing facial expression or stifling crying or laughter) – and rumination, have been found to decrease self-reported positive emotion but not negative emotion (Brans et al., 2013). Furthermore, in contrast to reappraisal, suppression resulted in increased memories of emotional reactions, mediated by self-monitoring (Richards et al., 2003), and was not associated with any change in the amygdala (Goldin et al., 2008). Consequently, when used repeatedly, some strategies tend to be considered maladaptive (Bean et al., 2021). Adaptive ER is not straightforward, however, and no singular strategy can be considered favourable across all contexts and for all individuals (Gross, 2015). Instead, an individual is most likely to achieve their “idiosyncratic goals” when they can “dynamically adjust the emotion regulation strategies they employ across situations.” (Gross, 2015, p.17).

Reviews by Lavender et al. (2015) and Oldershaw et al. (2015) found that people with AN tend to experience a limited range of adaptive strategies and often rely on maladaptive strategies to regulate emotion compared to healthy controls. Supporting this, Engel et al. (2013) found that higher reported negative emotion for females with AN was associated with subsequent dietary restriction, and following anorexic behaviours (including weighing, eating, and purging), negative emotion significantly reduced. Furthermore, greater emotional avoidance has been found to predict poorer outcomes and drop-out (Carter et al., 2012; Oldershaw et al., 2018; Nyman-Carlsson et al., 2019). People with EDs perceive anger to be

particularly threatening, as it significantly predicted emotional inhibition beyond the effects of body dissatisfaction and depression (Ioannou & Fox, 2009).

AN as a means of suppressing emotion was supported in a qualitative study, where people with AN described using the ED to cope with, distance themselves from, suppress, and regulate emotional experiences (Espeset et al., 2012). Food restriction reportedly reduced difficult emotions, exercise released emotion, and fear was suppressed through dietary restriction, body-checking, and purging behaviours (Espeset et al., 2012).

2. Difficulties with impulse control whilst experiencing negative emotion

Research into AN and emotional impulsivity is limited (Lavender & Mitchell, 2015). Mallorquí-Bagué et al. (2020) found that people with EDs including AN demonstrated higher trait impulsivity compared to healthy controls, however observed no differences in either behavioural or neural measures of emotional inhibitory control. Greater impulsivity was found for individuals with AN-BP (e.g. Atiye et al., 2015; Wolz et al., 2015), but may also be present for AN-R (Favaro & Santonastaso, 2000). Espeset et al. (2012) found that people with AN described experiencing anger that was difficult to control and became self-directed, manifesting through self-harm, self-control, and strict exercise regimes. Given anger may be experienced as threatening, anger in relationships may instead be turned inward and directed towards the person's body (Espeset et al., 2012). Lavender et al. (2015) found evidence of reduced control during emotional distress but highlighted better quality research was needed to corroborate findings as most studies were correlational and cross-sectional.

3. Lack of awareness, clarity, and acceptance of emotional responses

There is considerable evidence that individuals with AN experience alexithymia, that is, difficulties recognising and identifying emotion. A meta-analysis of 44 ED studies (22 for

AN specifically) concluded that difficulties recognising and identifying emotion occur across all EDs including AN, finding large effects (Westwood et al., 2017). Lavender et al.'s (2015) review of the literature also found evidence of reduced self-awareness of emotional states for those with AN. Increased emotional suppression and non-acceptance were found across studies, as well as deficits in the recognition of emotion in others (Lavender, 2015).

Specifically, emotional acceptance significantly improved body dissatisfaction for individuals with bulimia nervosa (BN) but not for AN, suggesting people with AN may have difficulties using emotional acceptance effectively (Naumann et al., 2016). This is supported by qualitative evidence that mindful acceptance of emotions felt overwhelming for people with severe AN, whose attention tended to divert away from emotive material (Rawal et al., 2009).

4. Engaging in goal-directed actions whilst experiencing negative emotions

Finally, there is tentative evidence that people with AN may find it difficult to tolerate distress, resulting in difficulties achieving and sustaining goals. People with AN reported suppressing difficult emotions through avoiding emotion-eliciting contexts such as situations where food is eaten, situations focused on the body, or interpersonal situations (Espeset et al., 2012). Lavender et al.'s (2015) review found evidence that those with EDs avoid situations eliciting emotion, however noted that the research was limited for AN-specific examples. Avoidance of anxiety-provoking situations is considered a maintenance factor perpetuating anxiety, whereas by confronting anxiety-provoking situations fear tends to habituate (NICE, 2013). Suppression of emotion through avoidance, whilst an attempt to cope, may inadvertently drive the anxiety associated with these contexts leading to a vicious cycle of increasing dependence upon AN to manage difficult emotions (Oldershaw et al., 2019).

ER as a potential target in psychological interventions for AN

Haynos et al. (2014) found that unlike BMI, ED severity, and other variables, only ER failed to improve for individuals with AN undergoing therapy with no ER focus. Emotion-focused therapies for AN have been found to be acceptable and feasible, although additional controlled studies are needed to establish their efficacy (Sala et al., 2016). As above, there is evidence that people with AN experience difficulties using adaptive ER strategies, reducing impulsivity, understanding and accepting emotion, and tolerating distress to pursue goal-directed behaviour (Lavender et al., 2015). ER difficulties can present as both a risk and a maintenance factor for AN (Davies et al., 2011; Oldershaw et al., 2019) and difficulties with ER may predict clinical outcomes (Oldershaw et al., 2018). Together, this indicates the importance of psychological therapies for AN attending to the multidimensional improvement of ER. In the United Kingdom, psychological therapies recommended for AN include ED-adapted Cognitive Behaviour Therapy (CBT-ED), The Maudsley Anorexia Nervosa Treatment for Adults (MANTRA), Specialist Supportive Clinical Management (SSCM), or Focal Psychodynamic Therapy (FPT; NICE, 2017). These are briefly explored below including any included targets of ER.

CBT

CBT for AN takes multiple forms, including CBT without specific adaptation or CBT-ED, an umbrella term for eating disorder adapted CBT that can include enhanced CBT-E and CBT adapted for AN (CBT-AN; Murphy, 2020). CBT-E was developed originally for BN but has developed into a transdiagnostic ED intervention including AN (Fairburn et al., 2009). Overvaluation of weight and shape and their control are considered the core ED psychopathology (Murphy et al., 2010). Therapeutic change is achieved through formulating maintaining factors and corresponding cognitive and behavioural changes (Fairburn et al.,

2008). CBT-E contends that for *some* individuals, the ED (and other behaviours including self-injury or self-medication) helps them cope with adverse moods (Murphy et al., 2010). For this group, mood intolerance is a maintaining mechanism necessary to target (Fairburn, 2008). A module on mood tolerance aims to help individuals to learn to identify mood-related triggers, cognitively reappraise and accept moods, and to use mood modulatory behaviours (Fairburn, 2008). The NICE guidelines advise that CBT-ED interventions should include mood regulation and monitoring of associated feelings (NICE, 2017).

MANTRA

MANTRA was developed as a manualised therapeutic programme specifically for AN (Schmidt et al., 2018). In contrast to CBT, beliefs about weight and shape are not considered the central difficulty in AN. Instead, AN is perpetuated by a cognitive-interpersonal model consisting of four biological and psychological risk and maintenance factors: the social-emotional domain, thinking styles, identity, and relationships (Startup et al., 2021). MANTRA includes a module aiming to enhance emotional and social wellbeing, including psychoeducation and exercises about emotion functions, how emotions guide us to needs, beliefs about emotion, and managing overwhelming or extreme emotion (Schmidt et al., 2018). MANTRA's workbook includes a working with emotion chapter, to enable emotion regulation particularly within interpersonal contexts (Startup et al., 2021).

SSCM

SSCM was originally developed as an active AN intervention to compare against other models however was found similarly beneficial or superior (McIntosh et al., 2006) resulting in its inclusion within NICE (2017) recommendations. SSCM includes aspects of clinical management and supportive psychotherapy, and is administered by ED health professionals

(Schmidt et al., 2013). SSCM focuses on weight restoration, resumption of typical eating patterns, and psychoeducation around nutrition and weight. SSCM does not generally aim to improve ER however aspects of the intervention and its aims can be chosen by the service-user.

FPT

FPT is a time-limited, standardised form of psychoanalytic psychotherapy characterised by a non-directive therapeutic stance and an absence of advice-giving (Dare et al., 2001). FPT supports individuals to address the ED's impact on relationships, conscious and unconscious influences of family history on its development and maintenance, along with issues of transference and countertransference (Dare et al., 2001). Zipfel et al. (2014) standardised FPT into three phases: (1) building therapeutic alliance, addressing positive beliefs about AN, and building self-esteem; (2) relationships and the ED, and (3) transferring gains to wider life and managing endings. Whilst developing ER is not an explicit task, FPT does aim to induce increased emotional arousal within sessions (Zipfel et al., 2014).

Aims

The relationship between AN and ER highlights the need for psychological therapies for AN to address ER deficits to break the cycle of over-reliance on AN to cope with difficult emotional experiences (Oldershaw et al., 2015). To date, it is unclear how effective the four recommended therapeutic models for AN (CBT-E, MANTRA, SSCM, or FPT; NICE, 2017) are at impacting emotion, even where this is a goal of therapy. This systematic review of the literature therefore aims to examine the impact of these interventions on any measure of emotion. The studies meeting eligibility criteria are summarised, synthesised, and critically reviewed, with implications for clinical practice and research and limitations considered.

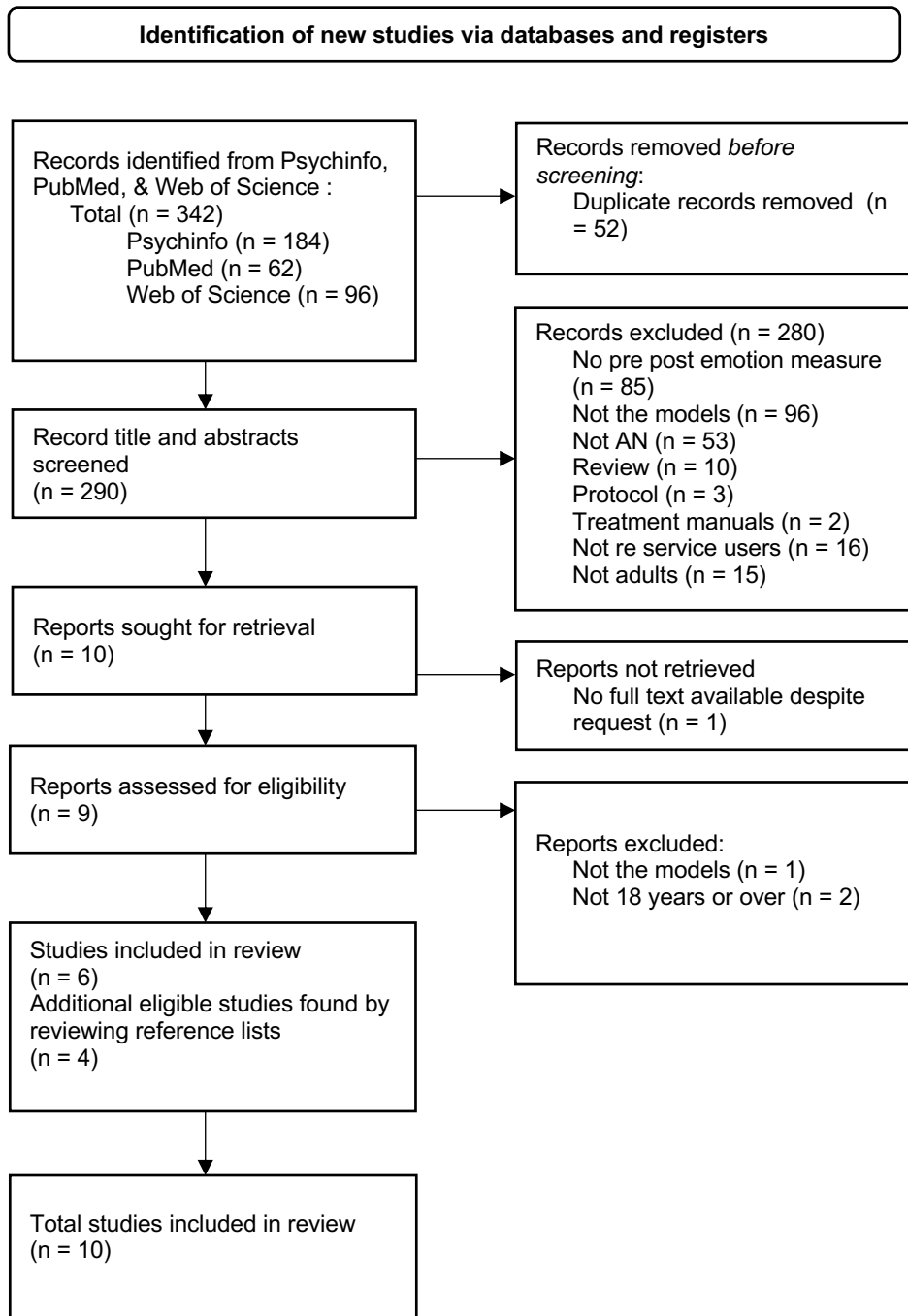
Methods

Literature search

Literature searches were conducted across PubMed, Web of Science, and PsychInfo databases, up to and including 11/03/2022 with no other date limits. Search terms used Boolean operators: (((CBT OR (cogniti* AND behavio*)) OR (mantra OR maudsley) OR (SSCM OR (specialist AND supportive AND clinical AND management)) OR (psychodynamic OR FPT)) AND (anorexi* OR anorec*) AND (emotion* OR feelings OR affect)). Searches included synonyms and acronyms to ensure relevant papers were identified. Truncated terms using * were included to widen searches. Searches were filtered by clinical trial and case report, peer reviewed journal, and adults over 18. Titles and abstracts were initially reviewed, with the full text (where available) reviewed for articles meeting eligibility criteria. Forward and backward searching was completed by searching citations and reference lists of accepted studies. Figure 1 indicates the number of articles found at each stage.

Figure 1:

Studies identified using an adapted PRISMA diagram for new systematic reviews (Page et al., 2021).



This review

Ten studies were included in this review with inclusion and exclusion criteria found in Table 1. This review aimed to identify the impact of each therapeutic model individually on emotion. Therefore, the review is structured by therapeutic model, then by research design, and finally, chronologically from oldest to most recent.

Table 2 summarises the studies and key findings of these studies.

Table 1:

Inclusion and exclusion criteria for eligibility of studies

Inclusion criteria	Exclusion criteria
Population: Studies with adults over 18	Population: Studies with children under 18 or children and adults with no differentiation in results
Participants with diagnosis of AN (studies with AN that included atypical AN (>18.5 BMI) or Eating Disorder not otherwise specified (EDNOS) were included as NICE (2017) recommend treatment based on most similar ED (i.e. EDNOS-AN subtype)	Participants without diagnosis of AN (e.g. another ED) or studies with no clear differentiation of which ED in results
Intervention: Studies with CBT (all subtypes included), MANTRA, SSCM, or FPT as intervention	Intervention: Any other intervention
Design and measures: Any completed study with pre and post or process measures of emotion (including randomised control trials, clinical controlled and uncontrolled trials, studies with multiple groups, feasibility trials, single case design studies)	Design and measures: Studies with any other designs, incomplete studies, protocols, or reviews Studies with no outcome or process measure relating to emotion
Published: Studies up to and including 11/03/2022 (no earliest date limits)	Published: Studies published after 11/03/2022
Location: Any	Location: None
Availability: Studies with full text available	Availability: Studies where no full text was available despite request
Language: Studies in English or with available English translation	Language: Any studies in languages other than English and with no translations available

Table 2:

Summary and key findings of studies meeting inclusion criteria, organised by psychological therapy

<u>Studies including CBT and FPT</u>				
Author, year, location, study quality score	Intervention	Design and sample	Emotion outcome / process measures	Relevant findings (emotion measures)
1. Hartmann et al. (2016). Germany. 82%	40 sessions of manualised CBT-E or FPT compared against optimised treatment as usual (O-TAU) in adult outpatients with anorexia nervosa (AN), as part of ANTOP study (Zipfel et al., 2014). Participants were randomised to receive FPT, CBT-E, or O-TAU.	Randomised control trial. Data from 108 participants was available for this analysis. Participants were female outpatients with a diagnosis of AN, aged 18 years old or above.	Intersession Experience Questionnaire measuring inter-session process (ISP). Includes subsection on positive and negative emotions accompanying intersession experiences. ISP completed prior to each therapy session. Endpoint for this study was 1 year follow-up assessment.	Over the course of treatment, for both CBT-E and FPT conditions, high levels of positive emotions were found with little variation over time. Low levels of negative emotions were found with an inverted U shape, namely, with highest negative emotions found mid-treatment. No significant differences were found for negative emotions between outcome categories (recovered, partially recovered, and still ill).

<p>2. Friederich et al. (2017). Germany.</p> <p>77%</p>	<p>Data also from ANTOP study (Zipfel et al., 2014). As above, participants were randomised into 3 groups: manualised FPT and CBT-E, O-TAU. 40 sessions.</p>	<p>Randomised control trial. Analysis based on 89 participants (FPT: 43, CBT-E: 46) due to 21% of recordings being unavailable). Participants were female, 18 years old or above, diagnosed with AN.</p>	<p>Sessions selected from the early, middle, and late treatment phase, based on participant rating of session quality from the Short Inventory for Single Psychotherapy and Counselling. Sessions were then analysed using the Linguistic Inquiry and Word Count (LIWC).</p>	<p>No significant difference in negative emotional expression in any treatment phase for participants in FPT and CBT-E conditions ($p > 0.140$). Across therapy, participant negative emotional expression had a quadratic effect (an inverted V-shape) with increased emotional expression during mid-treatment compared to early and late phases. Increased negative emotional expression predicted greater BMI at end of treatment (and was not moderated by treatment condition) and was just short of significant at 12-month follow up. Increased negative emotion expression predicted lower observer rated ED psychopathology at end of treatment and 12-month follow-up compared to baseline but did not predict self-report ED symptoms. Positive emotional expression at mid-treatment did not predict BMI at end of treatment or follow-up. Greater expressions of sadness and anger at mid-treatment predicted greater BMI at end of treatment whereas anxiety did not.</p>
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Studies just including CBT

<p>Author, year, location, study quality score</p>	<p>Intervention</p>	<p>Design and sample</p>	<p>Emotion outcome / process measures</p>	<p>Relevant findings (emotion measures)</p>
<p>3. Hay et al. (2018). Australia,</p>	<p>Manualised CBT-AN versus adapted CBT-AN which included an</p>	<p>Multisite two-armed randomised control trial. 78 participants,</p>	<p>Exercise Beliefs Questionnaire (EBQ) which includes subscale</p>	<p>There were significant improvements in all outcomes including EBQ over time, however there were no significant differences between treatment groups. At 6-</p>

<p>United States, and United Kingdom.</p> <p>77%</p>	<p>embedded module of Compulsive Exercise Activity Therapy (LEAP). comprised of psychoeducation and cognitive restructuring of exercise beliefs plus reformulating maintenance factors of exercise including affect regulation. 34 outpatient sessions for CBT-AN. 2 sessions of CBT-AN, then 8 LEAP sessions, then 24 CBT-AN sessions for the LEAP group. Twice weekly sessions for 4 weeks, weekly thereafter.</p>	<p>18 years old or above, meeting DSM-5 criteria for diagnosis of AN, BMI 14-18.5, reporting at least one exercise activity during prior month.</p>	<p>of ‘mental and emotional functioning’. Assessed at baseline, the end of phase one, mid-therapy, end of therapy, and at 3 months and 6 month follow up.</p>	<p>months 20 (52.6%) of LEAP and 15 (37.5%) of CBT-AN participants had a BMI of >18.5. 22 participants (28%) were in ‘remission’ (scoring within 1 SD of community norms for Global EDE BMI >18.5. Subscale of ‘mental and emotional functioning’ was not specifically reported.</p>
<p>4. Fioravanti et al. (2014). Italy.</p> <p>33%</p>	<p>Individual CBT, approximately 40 hour long sessions, compared against healthy controls.</p>	<p>Nonrandomised controlled trial 102 adult (18-60) participants with an ED, 28 with AN restricting type (AN-R) and 35 with AN binge/purge type (AN-B/P), compared against a control group of 86 healthy</p>	<p>The emotional eating scale (EES) measured at baseline (T0), at the end of treatment (T1), and at 3 year (T2) and 6 year (T3) follow up.</p>	<p>A significant reduction in EES scores was found for participants with AN-B/P. No significant change found for participants with AN-R. Participants with cocaine or amphetamine use did not improve on EES. With regard to EES subscales, for AN-B/P there was a significant decrease for anxiety ($b = -.23$; $p < .05$) and depression ($b = -.27$; $p < .01$). For AN-R participants no significant variation was found. There was no association between baseline emotional eating and outcomes.</p>

participants.

<p>5. Cassioli et al. (2021). Italy.</p> <p>44%</p>	<p>CBT-E – >40 1:1 sessions (median 42) plus regular outpatient evaluations with psychiatrists and dietitians for 12 months. Sessions were weekly until final phases then every two to three weeks.</p>	<p>Non-randomised controlled trial. 120 female patients with DSM-V diagnosis of AN, aged 18-65 years. N= 105 re-evaluated after 1 year (12.5% drop out rate). Compared against 81 healthy controls who were female, aged 18-65, absence of any ED according to DSM-V.</p>	<p>Difficulties in Emotion Regulation Scale (DERS; (Gratz & Roemer, 2004). Measured at admission (T0) and re-evaluated after one year (T1).</p>	<p>At baseline (T0) participants with AN scored higher for emotional dysregulation than healthy controls ($d = 1.37$). At follow-up (T1) overall DERS scores had significantly improved (-0.29), and within Goal and Impulse subscales, but not to extent of healthy controls. Participants with higher DERS scores at T0 achieved less EDE-Q improvements. Longitudinal variations in DERS significantly predicted EDE-Q latent change score (so improvements in emotional regulation improved in ED psychopathology), but not vice versa. Presence of childhood trauma predicted reduced improvement on EDE-Q mediated by higher baseline DERS scores.</p>
<p>6. Byrne et al. (2011). Australia.</p> <p>58%</p>	<p>CBT-E – 20-40 1:1 sessions with a clinical psychologist. No control group.</p>	<p>Single-arm uncontrolled cohort study comparing participants with AN against BN and EDNOS. 125 patients, 34 with AN. Patients included BMI <17.5. 50% drop out rate for AN (17/34) but later AN</p>	<p>Distress tolerance scale (DTS; Corstorphine, Mountford, Tomlinson, Waller, & Meyer, 2007): subscales of Anticipate and distract, Avoidance of affect, accept and manage emotions. Outcomes measured at pre and post treatment.</p>	<p>For AN, the mean number of sessions attended for completers was 46.73 (rang = 26-77) and non-completers 13.45 (range= 1-48). 50% drop out for AN, with 50% those who completed treatment (n=12) achieving full or partial remission. DTS effect sizes for treatment completers: Anticipate and distract (-0.25), Avoidance of affect (0.16), accept and manage emotions (-0.33). None of these were statistically significant indicating no improvement in distress tolerance following the intervention. DTS reported for whole group including BN and EDNOS. Further analysis of</p>

		sample is reported as n=12.		those with high baseline DTS scores indicated their DTS scores did not improve on this measure.
7. Draxler and Hiltunen, (2012). Sweden.	14 sessions of modified CBT-E, mostly weekly, lasting for 8 months with a 4 month follow up. Modifications aimed to increase motivation, self-esteem, and perceived control of eating.	Single case design. Case study (n = 1), adult woman with AN.	Positive and negative affect scale (PANAS). Measured at the start of treatment, at 6 months (near conclusion) and at 12 months (follow-up).	Over time the participant's affective personality characteristics altered from being in the self-destructive quartile, to being in the high affective quartile near to the conclusion of therapy. At follow-up, the participant scored highly in the quartile for self-actualisation.
58%				

Studies including MANTRA and SSCM

Author, year, location, study quality score	Intervention	Design and sample	Emotion outcome / process measures	Relevant findings (emotion measures)
8. Schmidt et al. (2012). United Kingdom.	Compared MANTRA against SSCM. Both groups consisted of 20 weekly sessions and optional additional sessions dependent on clinical need and severity. Each group	Two arm randomised control trial. 72 adult (18 years old and over) outpatient participants with a DSM-IV diagnosis of AN or EDNOS.	Clinical Impairment Assessment Questionnaire (CIA) – includes questions regarding emotion. All measures completed at baseline, 6 months, or 12 months.	CIA scores improved significantly in both groups over the course of therapy for both groups. There were no between group differences. Results for individual questions regarding emotion were not reported.
86%				

	had 4 additional monthly follow-up sessions.	34 participants randomised to MANTRA and 37 to SSCM.		
9. Oldershaw et al. (2018). United Kingdom.	Comparison of two psychological interventions: MANTRA and SSCM. Participants randomly assigned to one of the groups. Both consisted of 20 weekly individual sessions over 6 months followed by 4 monthly follow-up sessions.	Randomised control trial. 71 adults presenting with AN (34 randomised to MANTRA, 37 to SSCM).	Emotional processing measured through: Beliefs about Emotions Scale (BES); Silencing the Self scale (STSS); and the DTS. Level of emotional awareness scale (LEAS). Assessments completed at baseline before therapy commenced (T0) and once therapy was complete after 6 months (T1).	Weight at end of treatment was significantly predicted by baseline avoidance of affect, with higher emotional avoidance associated with lower weight. Greater baseline levels of cognitive avoidance of emotion and lower baseline emotional acceptance and management (DTS) predicted greater ED psychopathology at post-treatment. Poorer emotional processing was associated with poorer psychosocial functioning. A reduction in self-reported dysfunctional beliefs about emotion was associated with improvements in eating disorder symptomatology.
86%				

Studies just including MANTRA

Author, year, location, study quality score	Intervention	Design and sample	Emotion outcome / process measures	Relevant findings (emotion measures)
10. Startup, et al. (2021).	Integrated individual and group based approach to	An uncontrolled, feasibility case	Qualitative group feedback obtained post-	Through thematic analysis 5 themes were identified including “Bringing MANTRA concepts to life”,

United Kingdom.

90%

MANTRA, incorporating theories of emotion regulation, dramatherapy, and experiential treatments such as schema therapy. 20 weekly 90 minute group sessions, plus 2-8 individual sessions

series with qualitative post-group interviews. 4 groups (n=29). Participants were adults (over 18 years old), had a DSM-IV diagnosis of AN or Other Specified Feeding Disorder and BMI <18.5. 27 participants completed the intervention (attended 70%) of group sessions.

intervention using semi-structured questions with responses including reflections regarding emotion.

including qualitative responses around benefit of using chair-work, objects, music, movement and space to connect to emotions and express difficult emotions to the group. Another theme was “A space to be authentic, vulnerable, and understood”, which “was felt to increase connection with their own emotions and reduce shame and isolation, however it required careful management from therapists in order to reduce the negative consequences of being ‘triggered’ by others”. Additionally, through listening to others’ experiences of AN and through sharing their own experiences they “felt less ashamed about their eating disorder”

Quality assessment tools

As the search identified five designs, study quality was assessed using appropriate quality assessment tools. RCTs were assessed using the Critical Appraisal Skills Programme (CASP) quality assessment tool for RCTs (CASP, 2020). Single-arm uncontrolled studies were evaluated against the cohort version (CASP, 2018a), and the qualitative case series was evaluated against the qualitative checklist (CASP, 2018b). CASP tools were chosen to aid the synthesis due to similar wording across the tools. The RCT CASP has 11 items assessing validity of design, methodological soundness, results, and local impact (CASP, 2020). Item 4b ('Were investigators 'blind' to the intervention they were giving to participants?') was omitted due to not being applicable for psychological interventions as opposed to pharmaceutical trials. The cohort version of the CASP has 12 items and the qualitative version has 10 items, assessing validity of results, the results, and local impact (CASP, 2018). An adapted CASP with scoring was applied to aid comparison across studies: criteria fully met (scoring 1), partially met (scoring 0.5), and not met or unclear whether met (scoring 0).

NRCTs were assessed against the Cochrane Effective Practice and Organisation of Care (EPOC) risk of bias criteria which are considered suitable for these designs (Ma et al., 2020). The EPOC has 9 items denoting either low risk of bias (scoring 0) versus high or unclear risk (scoring 1). The EPOC and CASP tools were also appropriate as they were each respectively endorsed by NICE (2022). Single-case designs were assessed against the Single-Case Reporting Guideline in Behavioural Interventions (SCRIBE; 2016), a 26-item measure where studies either meet criteria (scoring 1) or not (scoring 0). This was appropriate as although there is no gold-standard tool it enables critical evaluation and review of single-case design studies (Lobo et al., 2017). Final scores were converted to a percentage indicating overall risk of bias for each study in relation to relevant criteria for each design. These

percentages are suggestive only and should be considered alongside the critical analysis provided in the review below.

Table 3:

Respective study quality assessments using appropriate risk of bias tools: studies 1, 2, 3, 8, and 9 were assessed against the RCT CASP, studies 4 and 5 against the EPOC for non-randomised controlled trials, study 6 against the cohort CASP, study 7 against the SCRIBE checklist for single-case designs, and study 10 against the qualitative CASP.

Study	1. Hartmann et al. (2016)	2. Friederich et al. (2017)	3. Hay et al. (2018)	4. Fioravanti et al. (2014)	5. Cassioli et al. (2021)	6. Byrne et al. (2011)	7. Draxler and Hiltunen (2012)	8. Schmidt et al. (2012)	9. Oldershaw et al. (2018)	10. Startup et al. (2021)
Design	CBT-E, FPT vs O-TAU	CBT-E, FPT vs O-TAU	CBT- AN vs LEAP	CBT vs HCs	CBT-E vs HCs	CBT-E	CBT-E	MANTRA vs SSCM	MANTRA vs SSCM	MANTR A
	RCT	RCT	RCT	NRCT	NRCT	Cohort	Single case	RCT	RCT	Qualitati ve
Design (risk of bias tool)	Item									
RCT, (CASP, 2020)	1. Did the study address a clearly focused research question?									
	Yes	Yes	Yes					Yes	Yes	
	2. Was the assignment of participants to interventions randomised?									
	Yes	Yes	Yes					Yes	Yes	
	3. Were all participants who entered the study accounted for at its conclusion?									
	Yes	Yes	Can't tell					Yes	Yes	
	4. Were (a) the participants, (b) investigator and (c) people assessing/ analysing outcomes 'blinded'?									
	In part, N/A, yes	In part, N/A, yes	Yes, N/A, yes					No, N/A, yes	No, N/A, yes	
	5. Were the study groups similar at the start of the									
	Yes	In part	In part					Yes	Yes	

randomised controlled trial?

6. Apart from the experimental intervention, did each study group receive the same level of care (that is, were they treated equally)?

Yes

Yes

Yes

Yes

Yes

7. Were the effects of intervention reported comprehensively?

In part

In part

Yes

Yes

Yes

8. Was the precision of the estimate of the intervention or treatment effect reported?

Yes

Yes

Yes

Yes

Yes

9. Do the benefits of the experimental intervention outweigh the harms and costs?

Can't tell

Can't tell

In part

In part

In part

10. Can the results be applied to your local population/ in your context?

Yes

Yes

Yes

Yes

Yes

7.
Fioravanti
et al.
(2014)

6.
Cassoli
et al.
(2021)

**NRCT
(EPOC,
2017)**

1. Adequate random sequence generation?

High risk

High risk

2. Allocation concealment?

High risk

High risk

3. Blinding?

Unclear
risk

High risk

4. Incomplete outcome data addressed?

Unclear
risk

Low risk

5. Free of selective reporting?

Low risk

Low risk

6. Free of other bias?	High risk	High risk
7. Baseline outcomes similar?	Low risk	Low risk
8. Free of contamination?	Low risk	Low risk
9. Baseline characteristics similar?	High risk	High risk

**8.
Byrne
et al.
(2011)**

Cohort (CASP, 2018)	Did the study address a clearly focused issue?	Yes
	Was the cohort recruited in an acceptable way?	Yes
	Was the exposure accurately measured to minimise bias?	In part
	Was the outcome accurately measured to minimise bias?	Can't tell
	5 (a) Have the authors identified all important confounding factors?	In part
	5 (b) Have they taken account of the confounding factors in the design and/or analysis?	Can't tell
	6 (a) Was the follow up of subjects complete enough?	No
	6 (b) Was the follow up of subjects long enough?	Can't tell

7 What are the results of this study?	Yes
8. How precise are the results?	Yes
9. Do you believe the results?	Can't tell
10. Can the results be applied to the local population?	In part
11. Do the results of this study fit with other available evidence?	Yes
12. What are the implications of this study for practice?	In part

**9.
Draxler
and
Hiltunen
(2012)**

Single-case design (SCRIBE, 2016)	1. Identify research as single-case design in the title	Yes
	2. Summarise research question, population, design, methods including intervention, target behaviours, results and conclusions in abstract	Yes
	3. Describe scientific background to identify issues under analysis, current knowledge and gaps in knowledge base	Yes

4. State purpose/aims of study, research question, and hypotheses	Yes
5. Identify the design and describe the phases and phase sequence and, if applicable, criteria for phase change	Yes
6. Describe any procedural changes that occurred during the investigation	No
7. Describe any planned replication	No
8. State whether randomisation was used, and if so, describe the randomisation method	In part
9. State whether blinding/masking was used, and if so, describe who was blinded/ masked	No
10 State the inclusion and exclusion criteria, if applicable, and the method of recruitment	No
11. Describe the demographic characteristics and clinical (or other) relevant features, ensuring anonymity	Yes
12. Describe characteristics of the setting and location where the study was conducted	No

13. State whether ethics approval was obtained and indicate if and how informed consent and/or assent were obtained	No
14. Operationally define all target behaviours and outcome measures, describe reliability and validity, state how they were selected, and how and when they were measured	In part
15. Describe any equipment and/or materials used to measure target behaviour/s and other outcome/s or deliver the interventions	Yes
16. Describe intervention in each phase, including how and when they were administered	Yes
17. Describe how procedural fidelity was evaluated in each phase	No
18. Describe and justify all methods used to analyse data	In part
19. Report the sequence completed, including the number of trials for each session for each case	Yes
20. Report results, including raw data, for each target behaviour and other outcome/s	No

21. State whether any adverse events occurred for any participant and the phase in which they occurred	No
22. Summarise findings and interpret the results in the context of current evidence	Yes
23. Discuss limitations, addressing sources of potential bias and imprecision	In part
24. Discuss applicability and implications of the study findings	Yes
25. If available, state where a study protocol can be accessed	Yes
26. Identify source/s of funding and other support; describe the role of funders	Yes

**10.
Startup
et al.
(2021)**

Qualitative (CASP)	1. Was there a clear statement of the aims of the research?	Yes
	2. Is a qualitative methodology appropriate?	Yes
	3. Was the research design appropriate to address the aims of the research?	Yes

4. Was the recruitment strategy appropriate to the aims of the research?	Yes
5. Was the data collected in a way that addressed the research issue?	Yes
6. Has the relationship between researcher and participants been adequately considered?	No
7. Have ethical issues been taken into consideration?	Yes
8. Was the data analysis sufficiently rigorous?	Yes
9. Is there a clear statement of findings?	Yes
10. How valuable is the research?	Yes

Study	1. Hartmann et al. (2016)	2. Friederich et al. (2017)	3. Hay et al. (2018)	4. Fioravanti et al. (2014)	5. Cassioli et al. (2021)	6. Byrne et al. (2011)	7. Draxler and Hiltunen (2012)	8. Schmidt et al. (2012)	9. Oldershaw et al. (2018)	10. Startup et al. (2021)
Overall criteria met	9/11	8.5/11	8.5/11	3/9	4/9	7/12	15/26	9.5/11	9.5/11	9/10
Overall percentage of criteria met	82%	77%	77%	33%	44%	58%	58%	86%	86%	90%

Critical Review

Overall, high heterogeneity was found for the ten studies in Table 2. Study quality was mixed, ranging from 33% to 90% of criteria met. Below, study quality and emotion-related findings are summarised (with FPT and CBT, and SSCM and MANTRA combined due to study format) before they are reviewed in relation to design and methodology.

Summary of emotion findings

FPT and CBT

Hartmann et al.'s (2016) RCT, which met 82% of criteria indicating low risk of bias for this particular design, found that during CBT-E and FPT negative emotions were primarily elicited within mid-therapy. Friederich et al. (2017), which met 77% of RCT criteria, went further, linking emotional expression within the same dataset to outcome. They observed no differences in negative emotional expression between CBT-E and FPT, but for both therapies greater pre-therapy negative emotional expression predicted greater post-therapy BMI. Observer-rated ED severity reduced at the end of treatment, however subjective ratings did not, and greater sadness and anger expressed at mid-treatment predicted greater BMI at post-treatment (Friederich et al., 2017).

For CBT, Hay et al.'s (2018) RCT (meeting 77% of RCT criteria) found that CBT-AN with an additional module on reconceptualising exercise beliefs as a form of ER (LEAP) was no better than standalone CBT-AN at improving maladaptive beliefs about exercise (but both groups improved maladaptive exercise beliefs overall). As the emotional functioning subscale was not reported it is not possible to determine whether inclusion of LEAP impacted this domain specifically. Fioravanti et al.'s (2014) NRCT was at high risk of bias, meeting just 33% of criteria relevant to this design, finding that following CBT, emotional eating reduced

for individuals with AN-BP but not AN-R compared to healthy controls. Cassioli's (2021) NRCT met just 44% of relevant criteria, finding that after CBT-E the AN group had reduced ER difficulties including around goals and impulses, but not to the extent of healthy controls. ER improvements were associated with improvements to ED severity, but childhood trauma predicted reduced improvement to ED severity which was mediated by greater difficulties with ER at baseline.

The two final studies for CBT both met 58% of criteria for their respective designs indicating moderate risk of bias. Byrne et al.'s (2011) cohort study had high drop-out rates and for the half of participants with EDs who completed CBT-E (50%) there was no improvement in distress tolerance, and no AN-specific results reported. Furthermore, the subset of individuals with higher distress intolerance at baseline showed no improvement through therapy. Finally, Draxler and Hiltunen's (2012) single case design study using modified CBT (with adaptations to improve motivation, self-esteem, and perceived control of eating) found a shift from baseline high destructive tendencies, to high affective at the end of therapy, to self-actualisation at the end of therapy.

MANTRA and SSCM

Schmidt et al.'s (2012) RCT, which met 86% of RCT-relevant criteria indicating low risk of bias, found that clinical impairment and ED psychopathology improved for both MANTRA and SSCM, however emotion-related questions were not reported therefore each therapeutic model's impact is unclear. Oldershaw et al. (2018), which met 86% of study quality criteria, used the same dataset, and as SSCM and MANTRA participants did not differ at baseline the groups were combined. Greater baseline behavioural emotional avoidance predicted lower post-therapy weight, and greater baseline cognitive emotional avoidance and less emotion acceptance predicted greater ED severity after therapy. Poorer

emotional processing was associated with poorer psychosocial functioning and reduced self-report dysfunctional emotion beliefs were associated with improvements in ED severity.

The final study for (group-based) MANTRA met 90% of study quality criteria, indicating low risk of bias for studies of qualitative design (Startup et al., 2021). MANTRA helped participants express difficult emotions with the group, helped increase connection with their own emotions, and reduced shame and isolation. However, careful therapeutic management was needed to minimise feeling emotionally triggered by others in the group. Below, issues relating to design are further considered.

Design

FPT and CBT

Two studies included FPT, and seven included CBT. Two from the same dataset compared CBT-E against FPT and healthy controls in an RCT (Hartmann et al., 2016; Friederich et al., 2017). Another RCT compared CBT-AN against LEAP, which was CBT-AN plus a module on reformulating exercise beliefs, e.g. to cope with difficult emotions (Hay et al., 2018). Two studies compared CBT (CBT-E or CBT) against healthy controls in NRCTs (Fioravanti et al., 2014; Cassioli et al., 2021). One cohort design study (Byrne et al., 2011) and one single-case design study (Draxler & Hiltunen, 2011) evaluated CBT-E.

RCTs are considered a ‘gold-standard’ design, able to examine the causal effects of an intervention when compared to a control group through the process of randomising participants to an intervention and a controlled group (Hariton & Locascio, 2018). Randomisation minimises bias through balancing participant characteristics so that differences in outcome can be attributed to the intervention (Hariton & Locascio, 2018). Adequate randomisation of groups was achieved in the two FPT and CBT-E RCTs

(Hartmann et al., 2016; Friederich et al., 2017) and the remaining CBT RCT (Hay et al. 2018). Although the procedure was not outlined for Hartmann et al. (2016) or Friederich et al. (2017), both referred to the original Zipfel et al. (2014) study which outlined a covariate-adaptive approach and “minimisation approach (to optimally allocate a treatment to a particular patient based on his or her prognostic factor combination) with the biased-coin technique to avoid a deterministic treatment allocation” (p. 128). Hay et al. (2018) achieved randomisation through only the allocating investigator accessing a website that stratified groups by site, subtype of AN, psychotropic usage, and psychotherapy within 12 months. Additionally, Draxler et al. (2012) chose their single-case participant at random however the process of randomisation was not explained. With only one participant there was rigorous detail of the intervention (Draxler et al., 2012), resulting in high replicability on an individual level (Kazdin, 2016), however, without greater numbers and a control group generalisability is limited. None of the other CBT studies attained randomisation.

FPT and CBT studies except Draxler and Hiltunen (2012) benefited from similarity to NHS services as they were conducted with adults with AN in outpatient community mental-health settings. Draxler & Hiltunen (2012) did not report their setting but noted that after eight sessions the participant’s parents paid for therapy, potentially impacting their motivation. This may reduce generalisability to an NHS context. Studies were from various locations; only one was UK based, potentially reducing cultural specificity. The locations for FPT and CBT were Germany (Hartmann et al., 2016; Friederich et al., 2017). CBT studies were Australia, USA and the UK (Hay et al., 2018); Italy (Fioravanti et al., 2014; Cassioli et al., 2021), Australia (Byrne et al., 2011), and Sweden (Draxler & Hiltunen, 2012).

SSCM and MANTRA

Three studies included MANTRA: two were RCTs comparing against SSCM using the same dataset (Schmidt et al., 2012; Oldershaw et al., 2018), and one study was a case series design that obtained qualitative emotion data (Startup et al., 2021). As with the RCTs highlighted above, strengths of the two MANTRA and SSCM RCTs include that through this design they achieved appropriate randomisation of participants into groups, conducted intention-to-treat analyses, and benefited from comparison against SSCM, an active therapeutic control group (Schmidt et al., 2012; Oldershaw et al., 2018). All three MANTRA studies were conducted within NHS outpatient clinics in the UK which increases their generalisability to local contexts (Schmidt et al., 2012; Oldershaw et al., 2018; Startup et al., 2021). Whilst randomisation processes undertaken within the RCTs enabled causal conclusions to be drawn (Hariton & Locascio, 2018), Startup et al.'s (2021) qualitative study allowed for a more nuanced understanding of participants' attitudes in relation to a group adaptation of MANTRA.

Methodology

FPT and CBT

For FPT and CBT-E, Hartmann et al. (2016) and Friederich et al. (2017) were partly able to mask participants from which group they were in, with only the O-TAU group aware due to attending a different site and assessors of outcomes were masked. Hay et al. (2018) achieved masking of participants to condition (CBT-AN or LEAP) as well as masking assessors of outcomes. No information regarding masking was provided for Fioravanti et al. (2014), Cassioli et al. (2021), Byrne et al., (2011), or Draxler and Hiltunen (2012).

Each FPT and CBT study used a different measure of emotion. Six studies used self-report measures, with three of these measured at pre, mid, post intervention, and follow-up: Hay et al. (2018) used the Exercise Beliefs Questionnaire (EBQ) with a subscale on mental and emotional functioning; Fioravanti et al. (2014) used the Emotional Eating Scale (EES); and Draxler and Hiltunen (2012) used the Positive and Negative Affect Scale (PANAS). Cassioli et al. (2021) used the Difficulties in Emotion Regulation Scale (DERS) measured pre intervention and after one year, and Byrne et al. (2011) used the Distress Tolerance Scale (DTS) at pre and post treatment. For FPT and CBT, Hartmann et al. (2016) measured intersession process including emotions via a self-report Intersession Experience Questionnaire (IEQ) completed prior to every therapy session. Only one study did not use self-report data: Friederich et al. (2017) used text analysis software, the Linguistic Inquiry and Word Count (LIWC), on transcribed sessions from early, middle and late phases of treatment to identify frequency of emotion words expressed.

Whilst Hartmann et al. (2016) found no baseline differences, Friederich et al. (2017) found that co-morbid anxiety disorder was more frequent in the CBT-E and O-TAU conditions compared to FPT. Hay et al. (2018) found that participants based in the UK were older but found no other significant baseline differences. Fioravanti et al (2014) found statistically different baseline outcomes and characteristics, entering these as covariates. Cassioli et al. (2021) found significant baseline outcome differences and accounted for this through using an age and BMI-adjusted analysis of covariance, however baseline characteristics were also significantly different potentially impacting results. Similarly, Byrne et al. (2011) found lower minimum and maximum weight at baseline and greater likelihood of prior ED-related hospitalisation for participants with AN compared to BN or EDNOS.

Various analyses were reported: regression (Hartmann et al., 2016; Friederich et al., 2017; Hay et al., 2018; Cassioli et al., 2021); analysis of variance (Fioravanti et al., 2014);

paired t-tests, Wilcoxon signed-rank tests, and McNemar's tests (Byrne et al., 2011); and visual analysis, descriptive analyses and measurements of clinically significant improvement (Draxler & Hiltunen, 2012). Power calculations and confidence intervals were reported for Hay et al (2018) but not for Hartmann et al. (2016) or Friederich et al. (2017), however standard error or standard deviation was reported. Byrne et al. (2011) did not report on power but did include confidence intervals. Fioravanti et al. (2014) and Cassioli et al. (2021) note that their low sample sizes may have reduced power.

Attrition prior to ending therapy varied: 9.5% (Fioravanti et al., 2014), 12.5% (Cassioli et al., 2021), 22% (Hartmann et al., 2016; Friederich et al., 2017); 38% (Hay et al., 2018), and 50% for Byrne et al. (2011). However, Byrne et al. (2011) later report in table format that the AN group was 12 participants out of 34, i.e. a dropout rate of 65%. Unintended consequences, harms, and cost-benefit analyses were consistently absent within all studies.

The three RCTs met most quality assessment criteria, however two found no differences between CBT and FPT (Hartmann et al., 2016; Friederich et al., 2017), suggesting their findings require replication separated by intervention to identify each psychological therapy's specific impact on emotion.

Two CBT studies (Byrne et al., 2011; Draxler & Hiltunen., 2012) obtained moderate risk of bias. Additional research of higher quality is required that attends to masking, any procedural changes that occurred during therapy, clear inclusion and exclusion criteria, and which more completely describe the setting to determine whether their results can be corroborated. Although both were free of selective reporting and Cassioli et al. (2021) met additional criteria through addressing incomplete data, the two NRCTs (Fioravanti et al., 2014; Cassioli et al., 2021) did not randomise groups or compare against an active control. They achieved the lowest proportionate ratings of quality suggesting that their findings should be taken with caution.

SSCM and MANTRA

Both RCTs for SSCM and MANTRA masked outcome assessors from participant condition, as assessors only guessed 53.3% correctly (Schmidt et al., 2012; Oldershaw et al., 2018). Neither masked participants from condition. No significant baseline differences were observed for the RCTs (Schmidt et al., 2012; Oldershaw et al., 2018), adding credibility to the results. Although both RCTs were from the same study, each used different self-report measures of emotion. Schmidt et al. (2012) used the self-report Clinical Impairment Assessment (CIA) Questionnaire including emotion questions and measured at baseline and month 12. Oldershaw et al. (2018) used the Beliefs about Emotions Scale, Silencing the Self Scale, and the DTS, measured at baseline and six months post-therapy. For Startup et al. (2021), emotion findings were obtained through qualitative group feedback following semi-structured questions.

Schmidt et al. (2012) used linear mixed modelling, Oldershaw et al. (2018) used forward stepwise regression, and Startup et al.'s (2021) qualitative case-series was conducted using thematic analysis. Given the high proportion of criteria met for Schmidt et al. (2012) and Oldershaw et al. (2018), findings can be accepted. However, future RCTs would benefit from reporting adverse or unintended consequences and cost-effectiveness, which were not reported in any study. Further controlled studies are required to corroborate findings and provide distinction between SSCM and MANTRA. For Startup et al. (2021), the relationship between researchers and participants was not considered, which, given they conducted the group, may have introduced bias. Despite this, all other criteria were met and so findings can be accepted. Further qualitative research should expand and corroborate findings for subjective experiences of MANTRA.

Discussion

Summary

Difficulties with ER are observed across multiple dimensions for people with AN. This review therefore sought to evaluate the impact of the four recommended therapies for AN (CBT-ED, MANTRA, SSCM, and FPT; NICE, 2017) on emotional dysregulation. ER was defined across four dimensions: accessing effective ER strategies; impulse control whilst experiencing negative emotion; clarity, awareness, and acceptance of emotion; and goal-directed actions whilst experiencing negative emotions (Gratz & Roemer, 2004). Ten studies met eligibility criteria (Table 1). These were summarised (Table 2), assessed against appropriate risk of bias tools (Table 3), and synthesised in a critical review. Below, the findings are discussed in relation to each of the ER dimensions and study quality, followed by implications for future research, clinical practice, and limitations.

1. Limited access to effective emotion regulation strategies

Several studies focused on the use of adaptive and maladaptive strategies for ER, including positive and negative emotional expression and suppression (Hartmann et al., 2016; Friederich et al. 2017; Oldershaw et al., 2018), exercise (Hay et al., 2018), emotional eating (Fioravanti et al., 2014) and distraction (Byrne et al., 2011; Oldershaw et al., 2018). Other forms of ER such as cognitive reappraisal, rumination, and reflection (Brans, 2013) were not included.

Studies with low risk of bias for CBT-E and FPT (Hartmann et al., 2016; Friederich et al. 2017) and MANTRA and SSCM (Oldershaw et al., 2018) demonstrated emotional suppression was associated with poorer outcomes. Hartmann et al. (2016) and Friederich et al. (2017) found that for FPT and CBT-E, participants expressed more negative emotion mid-

treatment and this predicted improved BMI and observer-rated ED severity, but not self-reported ED severity. FPT, unlike CBT-E, specifically aims to increase emotional expression. As FPT and CBT-E studies were grouped, findings must be reported together, but overall, it appears that both did support an increase in negative emotional expression particularly at mid-treatment. The expression of negative emotion may be associated with improved ED severity through rendering “maladaptive emotion regulation mechanisms (such as dietary restraint)” unnecessary” (Friederich et al., 2017, p.110).

The contrast between self-report and observer-rated outcomes may relate to evidence that individuals with AN experience impaired bottom-up interoceptive awareness of bodily sensation (Gaudio et al., 2014), which may impact subjective experience of the ED and can endure even following weight-restoration (Zucker et al., 2013). Alternatively, the disparity between observer-rated and self-report outcomes could be due to the ‘head-heart lag’, a phenomenon critiquing CBT in which change occurs cognitively but is not felt emotionally, often maintained by shame or self-criticism (Stott, 2007). This may impact subjectively experienced ED-severity despite objective changes to weight or BMI.

Given individuals with AN can find anger threatening and it can become self-directed (Espeset et al., 2012), perhaps greater expression of anger counteracted self-directed anger and reliance upon AN as a form of emotional suppression. With sadness, perhaps expression of sadness, grief, or loss might have functioned to express traumatic pain or conflict that may have otherwise been located within the body (Kolnes, 2012), potentially requiring downregulation through AN-related emotional suppression.

For MANTRA and SSCM, increased baseline behavioural avoidance of emotion was associated with lower posttreatment weight, and greater baseline cognitive avoidance was associated with greater posttreatment ED severity (Oldershaw et al., 2018), supporting the hypothesis that tackling emotional avoidance is a crucial component of therapy. MANTRA

aims to develop the social-emotional mind, and SSCM has no specific goals around emotion. For MANTRA, the qualitative study provides additional evidence of achieving this goal as individuals felt group-MANTRA enabled expression and connection with emotion. These findings from studies for all four psychological models, all with low risk of bias, highlight the importance of supporting individuals with AN to express negative emotion and reduce reliance upon suppressing emotion, regardless of approach.

The extent to which other forms of ER are evidenced is more limited. Despite reconceptualising exercise as a strategy for ER, Hay et al. (2018) did not find improvements in exercise beliefs adding the additional LEAP module to CBT-AN. However, as the mental and emotional functioning subscale was not reported, it is unclear whether CBT-AN or LEAP impacted this in particular. Fioravanti et al. (2014) found that CBT improved emotional eating (eating or restricting is used as a way of coping with difficult emotions) for individuals with AN-BP but not AN-R. This study was however at risk of bias so findings should be interpreted cautiously. Byrne et al.'s (2011) study found that that CBT was not able to reduce reliance upon avoidance of emotion or anticipating and distracting from negative emotion, although this study was also at moderate risk of bias so again results must be accepted only tentatively.

2. Difficulties with impulse control whilst experiencing negative emotion

In terms of the capacity to avert impulsivity to engage in goal-directed behaviour regardless of emotional state, only Cassioli et al.'s (2021) single-arm study for CBT included this as an outcome, finding an associated improvement in goals and impulses. However, this study was found to be at high risk of bias, and as it was a correlational study no causation can be inferred. None of the other studies were focused on impulsivity and goal directed behaviours despite emotional state, and as such there are no findings about the impact of

FPT, MANTRA, or SSCM on this aspect of ER. This finding fits with Lavender et al.'s (2015) conclusion that better quality research is required to corroborate findings that during distress people with AN can experience a loss of control, and extends it by highlighting a lack of research into this specific facet of ER within therapy. None of the psychological therapies included in this review specifically aim to improve impulsivity or goal-directed behaviours.

3. Lack of awareness, clarity, and acceptance of emotional responses

Several studies explored awareness and acceptance of emotions. Draxler and Hiltunen's (2012) single-case design identified negative and positive emotion, finding that the participant's emotions shifted from self-destructive, to highly affective following therapy, with the client expressing self-actualisation at follow-up. Self-actualisation is comprised of emotions that enable growth, change, and the pursuit of goals (Kiaei, 2014). This study was found to be at moderate risk of bias and was a single-case design so additional high-quality studies are required to corroborate these findings.

The RCTs for MANTRA and SSCM found similar improvements on CIA scores (Schmidt et al., 2012), which includes questions regarding the person's experience of feeling particular emotions. However, these questions were not reported so it is unclear how MANTRA or SSCM impacted the experience and acceptance of emotion specifically. For Oldershaw et al. (2018), greater emotional acceptance was associated with improvements in eating disorder symptomatology. Whilst not explicitly in this domain, the qualitative group MANTRA study found that individuals felt able to connect with emotion, which may suggest increased emotional acceptance. These findings can be considered particularly robust given the low risk of bias, however given the small sample size and lack of control group the findings may not be representative of a wider population with AN. For this specific sample however, MANTRA succeeded in enabling participants to connect with their emotions and

therefore suggests that MANTRA has potential to achieve its aim of developing the social-emotional mind. For FPT, there was no evidence in either of the studies relating to this facet of ER.

4. Engaging in goal-directed actions whilst experiencing negative emotions

One of CBT's therapeutic goals is that for individuals experiencing complex distress or mood intolerance, an additional component will help target this. However, only two CBT studies measured the construct of distress tolerance (Byrne et al., 2011; Draxler & Hiltunen, 2012). Byrne et al. (2011) found that for participants with high baseline distress tolerance, this did not improve following the CBT-E intervention. Whilst Byrne et al. (2011) suggest this could relate to inadequate outcome measures for this complex construct, an alternative interpretation is that CBT's addition of a mood intolerance module fails to achieve its goal of improving tolerance of moods for whom this is a problem. Indeed, potentially the component is "not potent enough" to address distress intolerance (Byrne et al., 2011, p.225). This may relate to evidence that interventions without a focus on ER failed to improve ER, despite all other variables improving (Haynos et al., 2011). Perhaps, a bolt-on approach to a primarily cognitive-behavioural intervention is also not sufficient to improve mood intolerance, however with a lack of robust studies this interpretation requires corroboration. Also, results were not separated by ED so it is not possible to ascertain the specific AN findings.

Draxler and Hiltunen (2012) observed initial self-destructive emotional tendencies for their participant, which although not conceptually identical to distress tolerance, could be interpreted as implying distress was not well tolerated resulting in self-destructive actions. Through adapted CBT this shifted in emotional quality eventually to self-actualisation. However, given the moderate risk of bias found, the single-case design approach, and the

adaptations made, it is not clear which specific variables may have caused improvement from self-destructive tendencies.

No other studies included measures for distress tolerance and so there is no evidence for the impact of MANTRA, SSCM, or FPT on distress tolerance capacities. However, none of these studies aimed to specifically impact ability to tolerate distress.

Implications for research

Despite seven of the ten studies including CBT, it was pooled with FPT for two studies, another did not report specific emotion subscales, and the remainder of studies had moderate to high risk of bias suggesting that further robust, controlled studies are required to corroborate the extent to which CBT is able to impact dimensions of ER. The finding that CBT was unable to improve distress tolerance (Byrne et al., 2011), apart from tentative results in a single-case design study (Draxler & Hiltunen; 2012), is of concern given it is a treatment goal of CBT (Fairburn, 2008). Further research should test adaptations of the distress tolerance module to ascertain ways to improve it for service users. Furthermore, no qualitative studies were obtained for CBT, FPT, or SSCM, so alongside quantitative approaches, future research would benefit from understanding the subjective experiences of individuals undergoing these therapies in relation to emotion, particularly to identify qualitative explanations for the discrepancy in findings that are objective or observer-rated versus self-report. Further research should also seek to understand the mechanisms of action underlying emotional change over time within therapies, which has the potential to improve effectiveness (Sala et al., 2016).

Further RCTs would benefit from separating MANTRA findings from SSCM to identify whether MANTRA specifically meets its goal of developing the social and emotional mind. Given the robust qualitative findings (Startup et al., 2021), future studies would benefit

from identifying whether themes of connection and expression of emotion are corroborated in controlled settings with a larger sample size. It is crucial that future studies report all subscales and questions relating to ER to enable evaluation of their impact.

Additional research is needed to ascertain who the psychological approaches might differ in impact for different populations experiencing AN, e.g. those with atypical AN (with a BMI >18.5), to see how ER can be impacted for those who are weight restored, given that individuals with AN experience intense fear of gaining weight (American Psychiatric Association, 2013) and that starvation and other aspects of AN may no longer be functioning to downregulate emotion (Treasure et al., 2016) suggesting a risk for relapse. Many of the studies were with primarily female, white, participants in their twenties and thirties: further research would benefit from ensuring the impact of therapies for AN on ER is understood for participants bearing in mind that emotional expression can present differently depending on social and cultural norms (Hareli et al., 2015).

Clinical implications

Clinicians should continue to conduct research in real-life clinical settings to explore the impact of each of these recommended therapies (NICE, 2017) on aspects of ER.

Clinicians supporting individuals with AN may benefit from attending to how these four ER dimensions present for participants within sessions as appropriate, in a person-centred way, to best support that individual to address ER difficulties that may maintain AN. Particular attention to facets of ER should be paid to individuals rated as having high baseline difficulties with ER to mitigate negative associations with outcome. Clinicians may benefit from holding in mind the function AN can hold for individuals with AN, in terms of suppression of negative emotion, and should feel confident that supporting service users to

express of negative emotion, particularly within mid-treatment, can have positive associations with outcome.

Limitations

Study level limitations

The CBT-E RCTs with the lowest risk of bias (Hartmann et al., 2016; Friederich et al., 2017) pooled results between the CBT-E and FPT groups and therefore a key limitation for these studies is that the mechanisms of emotional change cannot be located with either one of these psychological models over the other, thus limiting the conclusions once can draw specifically about their respective impact on ER. Furthermore, the third RCT for CBT-AN (Hay et al., 2018) did not report their emotion measure specifically and so again no conclusions can be drawn regarding the impact of CBT on emotion for people with AN. Regarding the remaining four CBT studies, all had moderate to high risk of bias, and therefore, again, any results must be interpreted with caution and further corroboration is required.

Both RCTs for MANTRA and SSCM were rated as meeting a relatively high number of quality criteria. However, one did not specifically report emotion questions (Schmidt et al., 2012). The only RCT to provide evidence for the impact of MANTRA on emotion pooled the group with SSCM, and therefore, like with studies combining CBT-E and FPT, it is not possible with the available data to fully determine the impact of MANTRA or SSCM on ER from controlled studies.

Review limitations

High heterogeneity was found with the ten studies which led to difficulties synthesising studies due to the presence of multiple therapeutic interventions, outcome measures, and

research designs. Furthermore, the heterogeneity of research designs required the use of multiple risk of bias tools, creating difficulty in synthesis. Risk of bias tools assessed each study against criteria for each respective design and were not devised for comparison between different designs. Some risk of bias tools may be more stringent or lenient than others within the various topics assessed, potentially limiting the validity of comparisons. Therefore, whilst the percentage system (Table 3) was used for ease of understanding heterogenous data, certain designs (e.g., RCTs) were more robust in minimising bias through processes required by the design (e.g. randomisation, comparison against a control group; Hariton & Locascio, 2018). This increases the confidence with which causal conclusions can be drawn from the RCTs' findings, in contrast to the uncontrolled and qualitative studies included in this review, despite some of those (e.g. Startup et al., 2021) being deemed high quality for their respective design. Another limitation is that the research supervisor of the main author is an author on two of the papers included in the review (Oldershaw et al., 2018; Schmidt et al., 2012), which may have introduced bias in favour of these papers, which were both found to be of relatively high quality. This was managed through use of the quality assessment tool which was standardised across all the different RCTs included, as well as via the author adopting a self-reflective stance in which conscious effort was made to manage the impact of potential bias through repeated, critical checking of the data and conclusions drawn.

Conclusion

There is evidence that emotional dysregulation is a risk factor for developing AN, as well being a maintaining factor during acute phases (Oldershaw et al., 2015; Cassioli et al., 2021). In this systematic review of the literature, ten studies were reviewed to ascertain whether the four recommended therapies for AN (NICE, 2017) are associated with improvements across

dimensions of ER: including ability to use adaptive strategies, to avert impulsivity despite experiencing negative emotion, to accept and understand emotions, and to tolerate distress (Gratz & Roemer; 2004). Robust evidence was found that negative emotional expression at mid-treatment for CBT and FPT predicted improved clinical outcomes, and that for MANTRA and SSCM avoidance of emotion was associated with poorer outcomes. Consequently, regardless of therapeutic approach it seems vital that therapists support individuals with AN to learn ways to express negative emotions to break the cycle of reliance upon AN and AN-related behaviours to manage difficult emotions. One study found evidence that CBT may improve impulsivity and goal-directed behaviour, however this was at moderate risk of bias and therefore additional robust studies are needed to corroborate findings relating to impulsivity. There is tentative evidence that MANTRA may support individuals to connect with and express emotion, which (along with SSCM) was associated with improved outcomes. Finally, there is tentative evidence that CBT may not be able to sufficiently target distress tolerance for individuals who experience it despite this being a goal of therapy.

In general, the evidence for each facet of ER was relatively sparse within the literature, study quality was mixed, and many of the more robust studies pooled results across multiple psychological therapies limiting the specific conclusions that can be drawn. Despite this, studies included generally support the notion that targeting ER in therapy is important, and that higher difficulties with ER at baseline can negatively impact outcomes. Further corroboration and replication is needed to firmly establish the impact of each psychological therapy on the four dimensions of ER. High quality RCTs, qualitative studies, and studies of the process of emotional change are needed to ensure that ER is sufficiently targeted within the recommended therapies for AN.

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Section B (Word count: 7,999) (452)

How is emotional processing across an emotion-focused therapy for adults with anorexia nervosa associated with outcome?

For submission to Psychotherapy Research.

Abstract

Objective: This study explored the mechanism of emotional change for an emotion-focused therapy for adults with anorexia nervosa. **Methods:** This was a mixed methods design with a sample of eight participants (n = 4 recovered, n = 4 not fully recovered) who underwent a specialist emotion-focused therapy (SPEAKS) for anorexia nervosa. Emotional expression was sampled for six entire therapy sessions across three phases (early, middle, late) for each participant using the Classification of Affective Meaning States process measure, enabling minute-by-minute observation of expressed emotional states. Complementary data analyses were used: graphical and descriptive to identify group differences, analysis of variance to examine emotional change across therapy, and linear mixed models to identify sequential patterns. **Results:** Sequential patterns were observed, from secondary to primary adaptive emotions. Recovery was associated with fear expression being highest in early therapy and gradually reducing, and with greater expression of primary adaptive emotions (hurt/grief, acceptance, and total primary adaptive emotion). Not fully recovering was associated with greater needs expressed over time and greater self-soothing. **Conclusions:** This study found that sequential emotional processing occurred for those undertaking SPEAKS, with different patterns of change observed for those who recovered versus those who had not fully recovered. However, there were various methodological limitations. Implications for future research and clinical practice are discussed.

Keywords: anorexia nervosa; emotion-focused therapy; emotional processing; process research; change mechanism research

For submission to Psychotherapy Research Journal.

Introduction

Anorexia nervosa (AN) is characterised by emaciation and self-starvation (through restriction and/or purging behaviours) in the context of intense fears around weight, shape, and body image (American Psychiatric Association, 2013; Bulik et al., 2005; Walsh, 2013). Risk factors for developing AN include adolescence, being female, family history of an eating disorder (ED), temperament, low self-esteem, history of abuse or neglect, amongst others (Oldershaw et al. 2019). AN is observed primarily in societies where pursuit of thinness and weight loss are valued (Walsh, 2013). Although AN has the highest mortality rate of mental health difficulties (Harris & Barraclough, 1998), no specific psychological therapy is superior (Watson & Bulik, 2013), with attrition ranging between 30 and 70% (Carter et al., 2012). A recent meta-analysis found no significant differences in outcomes between specialist therapies versus active controls (van den Berg et al., 2019). There is an urgent need to understand how therapeutic change occurs and what may be a barrier, to develop more effective therapeutic approaches for individuals with AN.

Anorexia nervosa and emotional difficulties

Emotions are multifaceted processes with an adaptive function, enabling individuals to avoid current and future threats and seek environments that meet one's goals (Damasio, 2004). When congruent with intentions and internal state, emotional expression also provides an important social function (Davies et al., 2011). Empirical evidence suggests that individuals with AN experience difficulties expressing and regulating emotional states, which may underpin its development and maintain AN once established (Haynos & Fruzzetti, 2011; Oldershaw et al., 2019). A systematic review found that people with AN had difficulties accepting emotional experience, maintaining control whilst distressed, and experienced reduced emotional self-awareness (Lavender et al., 2015). People with EDs were found to

engage in increased emotional suppression and to avoid emotion-eliciting environments. Although lacking AN-specific examples (Lavender et al., 2015), Oldershaw et al.'s (2015) systematic review found that people with AN engaged in greater experiential avoidance and emotion suppression, particularly to avoid conflict, compared to healthy controls. People with AN also exhibit poorer awareness and clarity of emotion, higher disgust and shame, increased reliance on maladaptive strategies to regulate emotion, and less use of adaptive strategies in contrast to healthy controls (Oldershaw et al., 2015)

Emotion as a mechanism of change in AN

There is evidence that developing emotion regulation skills is associated with improved outcomes for people with AN, whereas difficulties with emotion relate to poorer outcomes (Oldershaw et al., 2018). This suggests emotion is an important mechanism of change, that is, the process of *how* change occurs (Kazdin, 2007). A recent review (Malik-Smith, 2022) found that within NICE (2017) recommended AN therapies, increased expression (particularly of mid-therapy negative emotion) predicted improved clinical outcomes, whereas greater emotional suppression predicted poorer outcomes. In Rowsell et al.'s (2016) study of 108 adults with AN, improved emotional clarity and ability to engage in goal-related behaviours whilst distressed were associated with greater reductions to ED psychopathology over time.

Qualitative research, including grounded theory, found that over time individuals began to view AN as an attempt to manage emotions that had become ineffective (Drinkwater et al., 2022). When transitioning towards growth and recovery, emotions began to be perceived as having meaning and value, with greater connection to emotional expression and experience (Drinkwater et al., 2022). In another study exploring what maintained change after residential treatment, women with AN reported that identifying and expressing emotions promoted

healthy recovery, and connecting with others in recovery helped promote acceptance (Cockell et al., 2004). Increasing the experience of positive emotions also helped individuals develop an identity separate from the ED. Assertive emotional expression reduced urges to engage in ED behaviours (Cockell et al., 2004).

In another qualitative study, recovery from severe AN was associated with shifting from self-criticism and guilt, through to self-compassion and acceptance whereas individuals who had not recovered felt they were to blame for their experiences (Hannon et al., 2017). Others who had progressed further towards recovery identified self-criticism as problematic and were being increasingly accepting and compassionate to themselves. Learning to tolerate and accept uncomfortable feelings was considered a mechanism of change for some individuals (Hannon et al., 2017).

As people with AN can perceive emotions as overwhelming (Sala et al., 2016), therapies aiming to develop an emotionally expressive sense-of-self, such as emotion-focused therapy (EFT), may enable individuals to break the cycle of AN as a way of downregulating aversive emotional experiences (Oldershaw et al., 2019). Rather than focusing on weight restoration directly, it is hypothesised that ED psychopathology (including weight) will improve indirectly through developing the capacity to express and accept emotional experiences. A systematic review found that emotion-focused interventions for AN that specifically target emotional change within therapy are both feasible and acceptable to individuals with AN, and initial studies appear efficacious; however further controlled studies are required (Sala et al., 2016). Furthermore, mechanisms of action underlying emotional change need further investigation (Sala et al., 2016).

Sequential emotional processing

Across various psychological difficulties, emotional expression in specific sequences has been observed, with sequential emotional processing associated with positive clinical outcomes (Pascual-Leone, 2018). Sequential emotional processing is based on EFT theory whereby emotions are key to the construction of the self (Pascual-Leone & Greenberg, 2007). Patterns of emotional experience (emotion schemes) develop through the interaction between a person's environment and their early emotional expression, including caregiver response to emotional experiences (Greenberg, 2010; Sala et al., 2016).

EFT classes emotions as either primary or secondary, adaptive or maladaptive (Greenberg & Paivio, 1997). Primary emotions are immediate, fundamental responses to a situation, enabling organisation towards action to meet one's needs (Greenberg & Bolger, 2001). This could include grief following loss, or anger following a boundary violation. Primary maladaptive emotions are also immediate responses but reactivate unhelpful cognitive-affective memory schemes that usually develop from prior traumatic experiences (Shahar, 2014). Primary maladaptive emotions can feel 'stuck'; a familiar core pain or repeated narrative, that does not help the person meet their true needs (Shahar, 2014).

Secondary emotions occur in response to a fundamental primary emotion. For example, if someone felt hurt but aggressively lashed out, the secondary (conscious) emotion would be lashing-out anger, with hurt the primary emotion (potentially hidden to awareness). Secondary emotions may develop with a protective or defensive function (Choi et al., 2016), for example through childhood contexts where primary emotional expression felt unsafe or unacceptable. Becoming stuck expressing secondary emotions may distance a person from their primary reactions, underlying core unmet needs, and helpful actions required to meet those needs. EFT involves *changing emotion with emotion* (Greenberg, 2021; Pascual-Leone & Greenberg 2007), through activation and transformation of secondary emotions to reach

underlying core, maladaptive pain, to ultimately access primary adaptive emotional experiences (Greenberg & Bolger, 2001).

Sequential patterns of emotional change have been observed across various mental health difficulties and therapies. Choi et al. (2016) observed greater sequences of change from secondary and maladaptive emotion to primary adaptive emotions for individuals with low mood whose self-criticism resolved following EFT compared to those with unresolved self-criticism. Haberman et al. (2019) observed that individuals with social anxiety undergoing EFT demonstrated reduced shame and a small increase in assertive anger over time, with greater adaptive grief predicting less fear, and greater shame predicting higher subsequent expressions of personal inadequacy. For these studies, the extensive coding process resulted in low sample sizes however data produced was rich (with Choi et al.'s (2016) study obtaining >1000 emotion episodes with only nine participants).

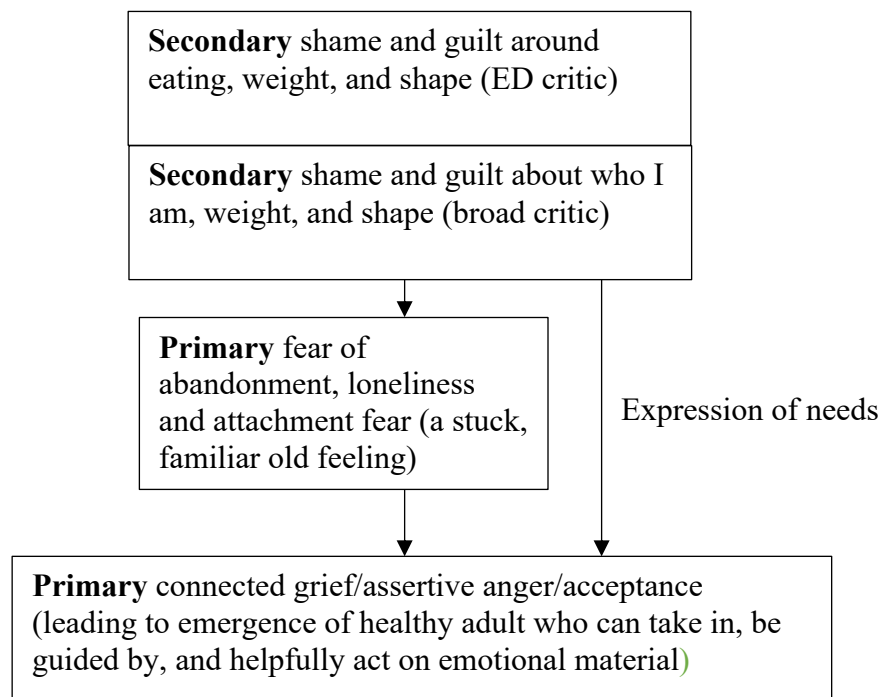
In EFT for trauma, Harrington (2016) observed that greater depth of emotional experiencing in early therapy predicted subsequent primary adaptive emotional expression, suggesting the importance of early emotional engagement. Depth of emotional processing was related to resolution of trauma symptoms and decreased reported distress (Ralston, 2006). Finally, during family therapy for 39 young people experiencing suicidal ideation, improvements were associated with expressing distress then maladaptive shame, rejecting anger then adaptive assertive anger, and assertive anger to adaptive hurt and grief, whereas those who did not improve expressed greater global distress (Lifshitz et al., 2020).

Specialist EFT for AN

In EFT terminology, difficult experiences likely activate maladaptive emotion schemes which increase reliance upon AN to downregulate aversive emotions (Oldershaw et al., 2019; Sala et al., 2016). Without primary adaptive emotions connecting individuals with needs and

helpful actions, individuals with AN are faced with further aversive, overwhelming experiences, leading to a vicious cycle that reinforces AN (Oldershaw et al., 2019). To test this, a feasibility trial of adapted EFT for AN (SPEAKS) was conducted, with the hypothesised model of emotional change from secondary to primary adaptive emotions presented in Figure 1.

Figure 1: Hypothesised model of emotional change in SPEAKS (2019)



Rationale and aims

Given evidence that AN is underpinned by difficulties experiencing, expressing, and accepting emotions, these are important maintenance factors to target. Across multiple mental health difficulties, sequential emotional processing relates to successful clinical outcomes, whereas those not recovering may get stuck experiencing maladaptive distress. To date, no research has explored whether sequential emotional processing occurs for those who recover from AN compared to those who do not fully recover. Therefore, this study aims to explore mechanisms of emotional change for a subset of individuals undergoing a feasibility trial of a

specialist AN-adapted EFT, comparing those who recovered to those who had not fully recovered.

It was hypothesised that:

1. There will be significant differences in the expression of secondary, primary maladaptive, and primary adaptive emotions between those who recover and those who do not fully recover. The recovered group will express significantly more emotion in therapy.
2. The recovered group will demonstrate significant within-group increases across therapy in the primary adaptive emotions: self-soothing, hurt/grief, assertive anger, and acceptance, along with increased expressions of need. There will be significant decreases across phases in secondary global distress and shame, and primary maladaptive fear of abandonment and rejecting anger, as well as negative self-evaluations. Those not fully recovered will demonstrate less within-group changes over therapy.
3. The recovered group in contrast to the not fully recovered group will demonstrate greater predicted sequences of emotional change over time, with the proposed secondary emotions predicting greater subsequent expression of primary maladaptive and adaptive emotions, or secondary emotions predicting greater subsequent expression of needs, which in turn will predict greater expression of primary maladaptive and adaptive emotions.

Methods

Design

This study used archival video data of therapy sessions from a single-armed, within-groups feasibility trial of adapted-EFT for AN. The feasibility trial occurred across two NHS adult

community ED services, with intervention-specific measures (including the EDE-Q) collected pre- and post-intervention. The intervention was comprised of approximately 12 months of weekly sessions of adapted-EFT for AN with follow-up assessments at three, six, nine, and twelve months. Due to the pandemic, therapy paused for three months for some participants, who were therefore offered an additional three months (15 months total). The current study used mixed methods including qualitative coding of emotion process and quantitative data analyses, described below.

Participants

For feasibility trial inclusion, participants needed to (a) meet DSM-V Criteria for AN or Other Specified Feeding or eating disorder (OSFED) of Anorexic type, (b) be aged 18 or above, (c) have body mass index (BMI) of $>15\text{kg/m}^2$ and not be losing more than 0.5kg weight per week), and (d) speak sufficient English to undertake talking therapy (SPEAKS, 2020). Exclusion criteria included anyone (a) with considerable physical or psychological risk including suicidality, (b) with a comorbidity taking priority for treatment, (c) with alcohol or substance dependency, (d) participating in another trial, (e) with a learning disability, or (f) pregnant (SPEAKS, 2020). Recruitment was achieved through assessing consecutive referrals to two outpatient ED community mental health teams against inclusion/exclusion criteria.

Participants in the current study

The current study recruited eight participants consenting to the feasibility trial, with additional consent obtained for this study. Inclusion and exclusion criteria are displayed in Table 1. Prior studies have categorised outcomes into ‘recovered’, ‘partially recovered’ and ‘not recovered’ groups, defined by post-therapy ED Examination Questionnaire (EDE-Q)

scores and BMI (e.g. Fairburn et al., 2013; Schmidt et al., 2015). Scores were ranked and the most ‘extreme’ recovered or not recovered cases were selected. Greater weighting was given to the EDE-Q (the primary SPEAKS outcome measure). Four per group were chosen based on feasibility and similar research (Choi et al., 2016; Haberman et al., 2019). By data collection, insufficient participants met ‘not recovered’ criteria, which were therefore widened to include the ‘not fully recovered’ group.

Table 1: Inclusion and exclusion criteria for participants in the current study

Inclusion	Exclusion
Consent obtained to participate in this study	Consent not obtained to participate in this study
Anyone who had completed their 12-month follow up appointment following SPEAKS including post-therapy completion of EDE-Q and recording of BMI, and, from these:	Anyone who had not yet completed their 12-month follow up appointment and therefore did not have a post-therapy EDE-Q or BMI recorded.
The eight most extreme cases meeting the criteria for either: <ul style="list-style-type: none"> (a) Recovery: defined as post-therapy BMI of >18.5 kg/m² and EDE-Q global score of < 2.77 ($n = 4$); or, (b) Not fully recovered: which included any not recovered participants, defined as BMI ≤ 17.5 kg/m² and EDE-Q > 2.77), plus additional participants meeting criteria for partial recovery: BMI <17.5 kg/m² and EDE-Q <2.77 or BMI between >17.5 kg/m² and ≤ 18.5 kg/m² or BMI >18.5 kg/m² and EDE-Q >2.77 ($n = 4$). 	Any participants who had completed their post-therapy outcome measures but who did not meet the criteria for inclusion, i.e. those who were not the most extreme cases for recovery/not fully recovered.

The intervention

SPEAKS aimed to enable development of an emotional sense-of-self across five therapy phases corresponding with therapeutic tasks and hypothesised emotional expression (Table 2). This current study aimed to identify emotional expression within the main working phases, approximately corresponding to SPEAKS phases 2, 3, and 4. However, phases were soft, with participants moving between phases depending on their idiosyncratic trajectory.

Table 2: The protocol for therapy in SPEAKS, broken down into five phases alongside hypothesised emotional change, from Oldershaw et al. (2020)

Phase	Therapeutic goals	Hypothesised sequence of emotional expression
1 – Making contact and building a narrative	<ul style="list-style-type: none"> • Build an empathetic relationship • Curiosity and openness about person’s inner world and relationships • Enhance motivation and curiosity towards change • Exploring the narrative of AN • Represent formulation through drawing out or using toys 	Secondary global distress – difficulty in seeing the world through a lens other than AN
2 – Connecting with presenting (secondary) emotion	<ul style="list-style-type: none"> • Connecting with guilt and shame to move from sense of self as defective (external body to internal self) • Client begins to separate from the critical/demanding part of self • Reduce blocks to emotional processing work • Begin to create meaning of the defective internal self, i.e. fear of abandonment and attachment fears • Begin to use chair work 	Secondary shame and guilt in relation to oneself (external self); shame, guilt, and worthlessness about the self (internal self)

3 – Resolution of primary adaptive emotion processes	<ul style="list-style-type: none"> • Primary ‘stuck old feeling’ of fear of abandonment and attachment fears emerge • Linking this to external and internal ways of relating (formulation) • Healthy adult part begins to emerge • Deepening this experience to connect with, express, and transform into primary adaptive emotions of hurt/grief and assertive anger • Use of chair work 	Primary fear of abandonment and attachment fear
4 – Building the resilient and integrated self (the healthy adult)	<ul style="list-style-type: none"> • Parts of the self become more integrated and there is stronger expression of the healthy adult • Grip loosens on the ED through challenging or reducing ED behaviours, instigated by the client • Healthy adult self explores adaptive ways to get needs met • Use of chair work 	Primary adaptive grief, assertive anger, self-soothing, self-compassion and acceptance
5 – Consolidation and ending	<ul style="list-style-type: none"> • Therapeutic ending is worked towards • Evidence that healthy adult is able to navigate situations using emotional information and healthy needs associated with this 	Primary adaptive emotions and agency

Measures

Emotion process measure

The Classification of Affective Meaning States (CAMS) is an observational process measure to identify discrete emotions expressed minute-by-minute (Greenberg & Pascual-Leone, 2005). Emotions are differentiated in the CAMS manual (2005) and ‘decision-tree’ (Appendix A) through criteria including: emotional tone, action tendency, expression (non-verbal actions and arousal), and adaptive and/or specific meaning (Greenberg & Pascual-Leone, 2005). Emotions measured for this study were ‘global distress’, ‘rejecting anger’, ‘guilt/shame’, ‘fear’, ‘self-soothing’, ‘hurt/grief’, ‘assertive anger’, and ‘acceptance’.

‘Negative self-evaluation’ and ‘need expressions’ were coded separately alongside emotion. Previous inter-rater reliability ratings have been considered excellent on average across 18 studies ($k = 0.87$; range 0.59-0.93). CAMS’ reliability is improved by its varied use across multiple mental health difficulties, languages, cultural contexts, and therapeutic interventions (Pascual-Leone, 2018). The CAMS has predictive validity across multiple studies (Choi et al., 2016; Haberman et al., 2019; Kramer et al., 2015; Pascual-Leone & Greenberg, 2007).

EDE-Q

The EDE-Q version 6.0 (Appendix B) is a 28-item questionnaire assessing self-reported frequency and severity of ED severity over the previous 28 days (Fairburn & Beglin, 2008). The EDE-Q generates frequencies of behavioural aspects of EDs, four subscale scores for severity of Restraint, Eating Concern, Shape Concern, and Weight Concern, and a global score (Fairburn et al., 2008). Higher scores indicate greater ED severity, with scores >4 indicating clinical significance (Fairburn et al., 2008). The EDE-Q has good test-retest reliability, inter-rater reliability, internal consistency, and validity in differentiating ED and non-ED cases (Berg et al., 2012). The EDE-Q has acceptable criterion validity and good concurrent validity (Mond et al., 2004).

Procedure

Selection of Participants

Participants were selected from the first two cohorts completing SPEAKS ($n = 22$; approximately two thirds of the feasibility trial) as the final cohort completed SPEAKS too late for inclusion. The research supervisor ranked participants against Table 1 criteria to minimise bias. A second clinician independently rated the not fully recovered group to ensure

the least recovered participants were selected. Only one disagreement occurred, and subsequent agreement was achieved through discussion and reaching mutual consensus.

Decisions around process and criteria occurred prior to ranking cases to reduce bias through ad-hoc inclusion of additional participants. Participant demographic information and pre-post measures are displayed in Table 3 (page 92).

Selection of sessions for coding

Following participant selection, a sample of videotaped therapy sessions were chosen. A sampling procedure was created by the lead author, the research supervisor and Dr Pascual-Leone as it was not feasible to code all sessions given the duration necessary for CAMS coding. Two sessions were selected from each key change-focused therapy phase (phases 2-4), resulting in six sessions per participant. 48 sessions were therefore coded by the lead author.

For each participant, 18 sessions were examined (six per phase with two chosen). For those in therapy for one-year, sessions were viewed either side of the three-month (phase 2), six-month (phase 3), and nine-month (phase 4) follow-up assessments. For those in therapy for 15-months, the six-month follow-up was treated as the three-month follow-up, with sessions viewed either side of the six-month (phase 2), nine-month (phase 3), and twelve-month (phase 4) follow-up assessments.

Next, for each phase, all six sessions were examined to identify presence of both emotional expression and a target event, defined as the client describing an inter- or intra-personal relationship (e.g., with parts of self or another person) which are key to the SPEAKS model. Emotional expression was included to ensure sampling did not inadvertently select sessions unusually containing no emotion, potentially impacting group comparisons.

Finally, sessions were then scored for presence of engagement with the SPEAKS model through a 9-item measure of empathy, the Therapist Empathy Scale (TES; Decker et al., 2014), with the two highest scoring sessions chosen. The Therapist Empathy Scale (TES) score enabled the design to include the client *and* therapist process to ensure sessions revealed therapeutic processes under optimal conditions.

Video sessions were not date-stamped and were uploaded and coded in a random order, therefore the lead author was masked to outcome group and phase. Before unmasking, the lead author guessed which outcome groups each participant was in and achieved 50%, indicating group masking was successful.

Emotion process coding

The lead author was trained to use the CAMS by its developer, Dr Pascual-Leone, in six online training sessions (approximately 25 hours' total). Coding was recorded in Microsoft Excel in a coding template. Once complete, proportions of emotion expressed in relation to overall session time were created (for each emotion at each phase, for each participant), along with creating variables for total secondary emotion (global distress, rejecting anger, and shame), primary maladaptive emotion (fear of abandonment/attachment fear), and primary adaptive emotion (self-soothing, hurt/grief, assertive anger, and acceptance). The coding decision tree can be found in Appendix A (Greenberg & Pascual-Leone, 2005), with the CAMS coding plan in Appendix F. Fear was separated from shame following consultation with Dr Chen Lifshitz, as these were hypothesised to emerge at different phases. Fear was defined to include expressions of loneliness, fear of abandonment, and attachment fear, in line with the SPEAKS model (Table 2). Due to SPEAKS including chair work, where the participant speaks to an empty chair representing a part of themselves or another person, before switching chairs to respond from that perspective (SPEAKS, 2020),

rejecting anger was coded to include self-directed anger, for example, “*you’re* a waste of space”, framed as other-to-self relating. This distinguished it from guilt/shame, which was coded if the person expressed the same criticism but self-to-self relating: “*I* am a waste of space”. These distinctions were considered crucial to the model as SPEAKS aims to elicit guilt/shame through embodying the AN voice.

The unit for coding was one minute and sessions were coded exhaustively. The dominant emotion was coded for each minute, and where either no, insufficient, or mixed emotional expression was observed this was coded as ‘un-codable’. Verbal examples of emotions coded are compiled in Appendix G.

Inter-rater reliability

The lead author trained a second CAMS coder who was not informed of this study’s hypotheses. Coding was practiced until sufficient reliability was reached. Disagreements were discussed and generally decided by mutual consensus however the lead author made final decisions given their additional training. The second coder coded a third of sessions (16 sessions), resulting in 485 emotion codes. As there were more than two nominal emotion categories, it was not possible to calculate inter-rater reliability using Cohen’s *kappa* (Hallgren, 2012). Instead, a two-way mixed effects model intra-class coefficient (ICC) was calculated; an appropriate inter-rater reliability measurement for multiple coded categories where only reliability of two raters is of interest (Koo & Li, 2016). ICC estimates and 95% confidence intervals (CIs) were calculated using SPSS version 27, based on absolute agreement between coders. Average measures are reported as the same data was coded twice (Koo & Li, 2016). The ICC was 0.87 (95% CIs 0.85-0.90), $F = 8.180$ (484), $p < 0.001$. This is considered good inter-rater reliability, close to excellent (namely, above 0.9; Koo & Li, 2016).

Ethical considerations

Ethical approval was obtained through the Health Research Authority (HRA) for the original study, with this study added as an amendment which was approved with no ethical issues (Appendix C). This study used archival video data and pre and post measures already collected within SPEAKS, therefore no additional burden was required.

SPEAKS participants were provided with an updated information sheet with details about this study (Appendix D) in a regular follow-up assessment and were asked to complete an updated consent form (Appendix E). Participants were informed there would be no adverse consequences for participation in SPEAKS if they decided not to consent. All participants provided consent to participate in the current study.

In line with local Trust policies, the supervisor uploaded video-recorded sessions to a secure, password-protected online system, only accessible to Trainee Clinical Psychologists and second coders undertaking SPEAKS studies. All coding was completed in a private setting to protect identities.

This study focused on individualised emotional expression within a 1:1 therapy. Social aspects of EDs are often marginalised within evidence-based therapies due to increased focus, and responsibility for change, centred upon the individual (Holmes, 2018). Another way to challenge AN might be to address sociocultural determinants of EDs, which include gendered expectations around appetite, ideals around the underweight body e.g. relating to prescribed femininity, and cultural norms and expectations around healthy eating and fitness (Holmes, 2018). Although SPEAKS is individualised, it aims to formulate expression of emotion within developmental and social contexts (e.g., expressions of shame may represent internalised societal shame (SPEAKS, 2019). Furthermore, developing an emotional self may challenge cultural expectations surrounding gendered expression of emotion, another social aspect of AN (Holmes, 2018). Whilst social change is also needed, this study's scope was to

evaluate the SPEAKS model of emotional change. A benefit of SPEAKS is that it was conducted in existing community ED teams regularly using 1:1 therapy, therefore it could theoretically be rolled out widely without requiring structural changes to services.

Service-user and stakeholder involvement

SPEAKS was developed with service-user involvement along with families and carers. The SPEAKS research steering group included a member with lived experience of AN and a family member of someone with AN, who provided input to the design, procedure, and running of SPEAKS, and feedback on documents including information sheets. A service-user involvement conference occurred prior to this current study, with space for service-users to provide feedback on SPEAKS and share experiences. Another conference with service-users, families, and carers occurred after SPEAKS had ended. The lead author of this study presented the rationale, initial findings, and prospective plan, and gave space for audience questions, comments, and reflections.

Data analysis

Complementary analyses explored the hypotheses. Graphical representations and independent-samples T-Tests examined differences in emotions expressed between the recovered versus not fully recovered group at each phase, which are appropriate for comparing means across two groups with different participants where data is parametric (Field, 2013).

Changes over time for emotion variables meeting assumptions for parametric data were tested using factorial between/within Analysis of Variance (ANOVA); appropriate with a within-subjects (phase) and between-subjects (outcome group) design plus potential interactions (Seltman, 2014). As there is no equivalent non-parametric test, where assumptions of normality were violated, the remaining emotion variables for each group were

examined using repeated-measures Friedman's ANOVA; appropriate to measure differences across three conditions (phase) for non-parametric data where the same participants have scores at each condition (Field, 2013). T-Tests and ANOVAs were undertaken using SPSS version 27.

Finally, sequences of emotion were tested using hierarchical linear mixed models, as emotion observations were not independent over time but nested within individuals. Mixed models account for non-independence through fixed and random effects, where fixed effects have levels of interest key to the study, applicable if the experiment was repeated, whereas random effects have levels that are not key to the investigation but due to random selection (Seltman, 2014). Participant ID was therefore entered as a random effect to account for non-independence of emotion over time for each participant, with group added as a fixed effect to identify whether group predicted emotion. Linear mixed models were completed using STATA version 17.0.

Through discussion between the lead author and supervisor it was decided that the key aspect of hypothesis 3 was to observe sequential patterns of change. To measure this, lag variables were created to identify predictors of *subsequent* emotional expression, defined as the proportion of that emotion expressed at the previous phase. Lag variables of each emotion were created whilst data was in long format, through reassigning data from each phase to the subsequent phase in a new variable. This enabled analysis of whether an emotion (e.g. guilt/shame) at the preceding phase predicted an emotion (e.g. fear) at the subsequent phase, without having to hypothesise which specific phase emotional change would occur in. This approach was chosen as SPEAKS phases were considered soft and idiosyncratic to each participant, and it was the process of change over the course of therapy (rather than tied to specific phases) that was deemed most important to examine for the refinement of the SPEAKS model.

Furthermore, linear mixed models were deemed most appropriate to test hypothesis three as these models included all data from both groups in one model, increasing power to detect effects (Singmann & Kellen, 2019). Interaction effects between group and emotion predictors were not included as an increased sample size, with some theorising four times as many subjects, is required to detect interactions compared to detecting a main effect in linear mixed models (Leon & Heo, 2009; Kutner et al., 2005). For feasibility reasons, increasing sample size was not possible for this study. Instead, group was entered as a predictor in each model to indicate whether there was a significant effect of each lagged emotion predictor variable on each outcome variable when controlling for group. Furthermore, including group as a predictor enabled exploration of how much the recovered group expressed each outcome emotion when holding lagged predictor emotion variables constant, along with whether these coefficients were statistically significant. For example, if one recovered participant and one not fully recovered participant expressed *equal* lagged guilt/shame, we could observe from these models whether these participants expressed significantly different levels of fear of abandonment in later sessions.

Although the small sample size may indicate problems with power, a statistician was consulted who suggested that although ten participants would be ideal, eight was acceptable (Professor Emsley, personal communication, 2022). Like Choi et al. (2016) suggest, although marginal, this approach can therefore be considered ‘legal’ through obtaining many codes for each participant (McCoach, 2010). In line with prior CAMS studies, given the small sample, the exploratory hypotheses, and to avoid “Type II errors that can prematurely cause the loss of interesting observations” (Choi et al., 2016, p.490), familywise error correction was not used however results meeting Bonferroni correction significance are noted (Field, 2013).

Philosophical approach

This study adopts a critical realist stance, where emotional experiences are considered real entities, however not fully knowable due to the limits of our observation and measurement tools (Zachariadis et al., 2013). Critical realism is a philosophical framework suggesting reality exists beyond that of human knowledge (epistemology), i.e. it does not only emerge through experience (Fletcher, 2017). Although the social, emotional world exists and we can attempt to understand it, some knowledge is closer to reality than others (Fletcher, 2017). The CAMS has limitations as a subjective measure and as each person's expression and understanding of emotion, whilst objectively real, will be impacted by their individual sociocultural context and history. Therefore, in this study, distance from reality may occur at numerous levels: the idiosyncratic expression of emotion by participants (which for those with AN may be experienced differently to others), the subsequent interpretation of that emotion by coders, plus the merging of the two coder's experiences to find a mutual consensus. This suggests the framework is not able to measure absolute truth, however it is deemed close enough to the truth based on its reliability and predictive validity.

Quality assurance and reflexivity

Steps taken to maximise study quality included having an independent coder, who did not know the study's hypotheses, coding a third of videos to establish inter-rater reliability. Creation of clear protocols for selecting participants and sessions aimed to minimise bias. When coding, the lead author maintained a reflexive stance, attempting to hold in mind how their sociocultural experience of emotions (e.g., personal experience of gendered assumptions about acceptable emotions for women to express), may have introduced bias to the coding process. This was managed through re-watching videos and regular use of the CAMS manual

and decision tree (Appendix A) to ground coding in theory and observation. The lead author also held in mind prior experience working with individuals with AN in inpatient settings, potentially leading to coding emotions when others might not have due to lower perceived emotional arousal. This may have led initially to increased unreliability with the second coder, however through discussion agreements were made for subsequent coding (Appendix F).

Results

Attrition and missing data

As the study used archival SPEAKS data there was no attrition, and as completion of pre-post measures was within the inclusion criteria there was no missing data. There was no missing CAMS data as every relevant session was coded fully for emotional expression.

Demographic and clinical outcomes

Demographic information, along with differences in pre and post EDE-Q scores and BMI are displayed in Table 3. As data did not meet assumptions for normality, Mann Whitney *U* Tests were used to test for differences in the pre and post measures between the recovered and not fully recovered groups (Field, 2013). There were no significant differences pre therapy although pre-BMI came close to significance, with the not fully recovered group having a lower initial BMI. As expected, given the criteria applied, there were significant differences between the recovered and not fully recovered group at post therapy in both EDE-Q scores and BMI, suggesting that the splitting of groups was meaningful.

Table 3:

Demographic information for participants along with pre and post therapy measures for EDE-Q and BMI with between groups comparison for these measures

	Both groups <i>M</i> (SD) Count (%)	Recovered group <i>M</i> (SD) Count (%)	Not fully recovered group <i>M</i> (SD) Count (%)	Mann Whitney	<i>p</i>
Age (years)	29.3 (7.23)	27.25	31.5		
Gender					
Female	8 (100%)	4 (100%)	4 (100%)		
Male	0 (0%)	0 (0%)	0 (0%)		
Nonbinary	0 (0%)	0 (0%)	0 (0%)		
Other	0 (0%)	0 (0%)	0 (0%)		
Ethnicity					
White British	7 (87.5%)	3 (75%)	4 (100%)		
Mixed race (Black Caribbean and White British)	1 (12.5%)	1 (25%)	0 (0%)		
Employment status					
Employed	6 (75%)	3 (75%)	3 (75%)		
Student	1 (12.5%)	0 (0%)	1 (25%)		
Missing	1 (12.5%)	1 (25%)	0 (0%)		
Duration of AN	119 months 9.92 years	103 months 8.58 years	135 months 11.27 years		
Extended therapy (15 months due to pandemic)	4 (50%)	1 (25%)	3 (75%)		
<i>Pre therapy measures</i>					
Pre EDE-Q	4.52 (0.73)	4.75 (0.54)	4.28 (0.89)	<i>U</i> = 4.00, <i>Z</i> = -1.183	.237

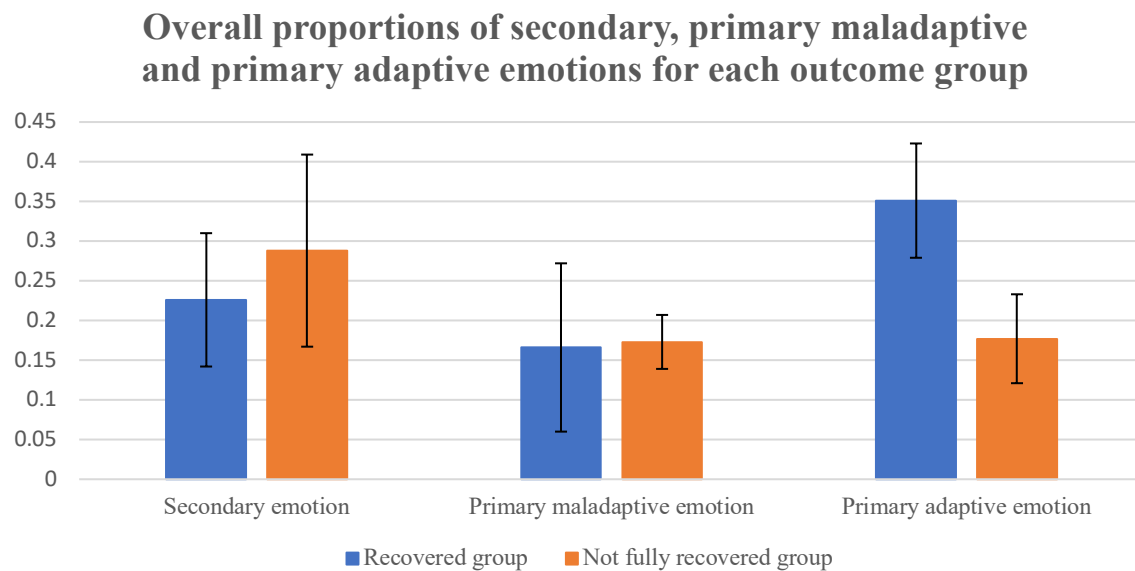
Pre BMI	17.83 (1.34)	18.75 (0.93)	16.92 (1.06)	$U = 1.00,$ $Z = -2.021$.057
<i>Post therapy measures</i>					
Post EDE-Q	3.16 (1.69)	2.06 (1.40)	4.26 (1.23)	$U = 1.00,$ $Z = -2.021$.043*
Post BMI	19.77 (2.58)	21.65 (2.45)	17.89 (0.34)	$U = 0.00,$ $Z = -2.309$.021*

Note: p values marked with a * are statistically significant, rejecting the null hypothesis at $p < 0.05$.

Analysis 1: Differences in overall secondary and primary emotions between outcome groups

Figure 2 displays differences between the recovered and not fully recovered groups' mean proportion of secondary, primary maladaptive, and primary adaptive emotion across the entirety of therapy (confidence intervals representing standard deviations). Assumptions regarding independence of observations, outliers, normal distribution of the dependent variable, and homogeneity of variances (Laerd, n.d.) were met therefore T-Tests were run with emotion the dependent variable and outcome group the independent variable. Although the not fully recovered group expressed somewhat more secondary emotion, there was no significant difference between the groups, $t(6) = 0.84, p = .435$. There was no difference in primary maladaptive emotion, $t(6) = 0.12, p = .908$. However, the recovered group ($M = 0.35, SD = 0.07$) expressed significantly more primary adaptive emotion in contrast to the not fully recovered group ($M = 0.18, SD = 0.06$); $t(6) = -3.83, p = .009$.

Figure 2: Graph displaying the differences between the overall proportions of expression of secondary, primary maladaptive, and primary adaptive emotion for the recovered and not fully recovered groups, with confidence intervals displaying standard deviation.



Analysis 2a: repeated measures factorial between/within ANOVAs to examine emotional change over time

Only guilt/shame met assumptions (normal distribution of dependent variable across each group, homogeneity of intercorrelation, sphericity, no outliers) required for a factorial between/within ANOVA (Laerd Statistics, n.d.). Log transformations did not enable variables to meet assumptions, so all other variables were tested using raw data with Friedman's ANOVAs below.

For the factorial between/within ANOVA, the independent variable included a between-subjects variable (group) and a within-subjects variable (repeated measures of phase). The dependent variable was proportion of shame expressed at each phase. There was a non-significant interaction between outcome group and phase, $F(2, 5) = .982, p = .437$. The result of the main within-subjects effect of phase was also non-significant, $F(1, 6) = 1.526, p = .257$, as was the main effect of outcome group, $F(1, 6) = 1.373, p = .286$.

Analysis 2b: Friedman's ANOVAs to examine emotional change over time

Friedman's repeated-measures ANOVAs identified differences in expressions of remaining emotion variables (fear, negative evaluation, need, hurt/grief, assertive anger, acceptance) across the phases. Friedman's ANOVAs are not able to examine between-subjects effects (outcome group), therefore for each emotion two tests were run, one each for the recovered and not fully recovered groups. Relevant assumptions were met for all variables (continuous dependent variable, non-normal data; Laerd Statistics, n.d.). Independent variable was phase (within-subjects), and dependent variables were proportions of each emotion expressed.

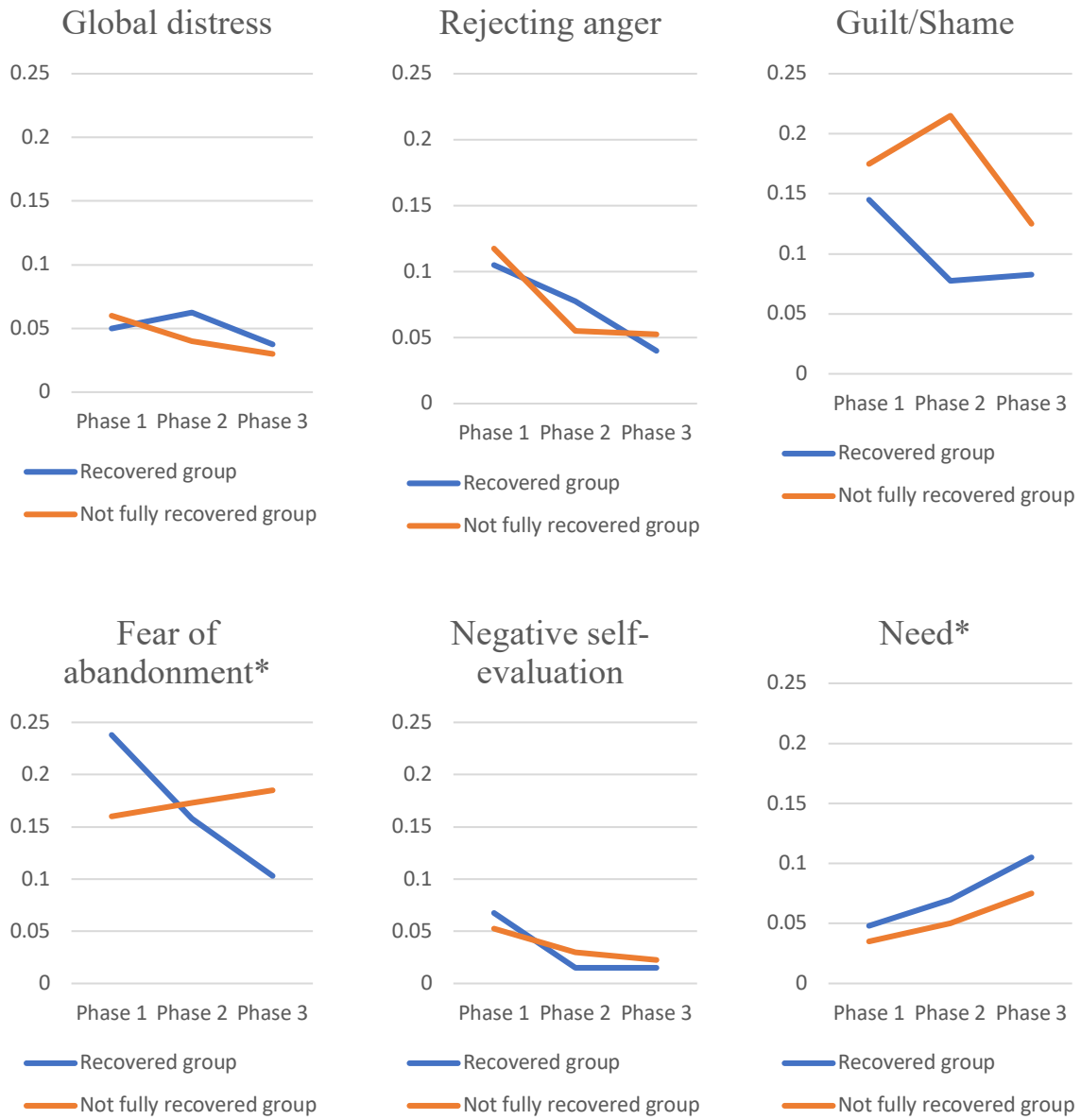
For the recovered group, there was a statistically significant difference in fear expressed over the phases ($\chi^2(2) = 6.500, p = 0.039$). Follow up pairwise Wilcoxon signed rank tests found no statistically significant differences between sets of phases however both phase 1 and phase 2 ($p = .068$), and phase 1 and phase 3 ($p = .068$) came quite close to significance), with less fear expressed in later phases compared to phase 1. There was no statistical difference for the not recovered group.

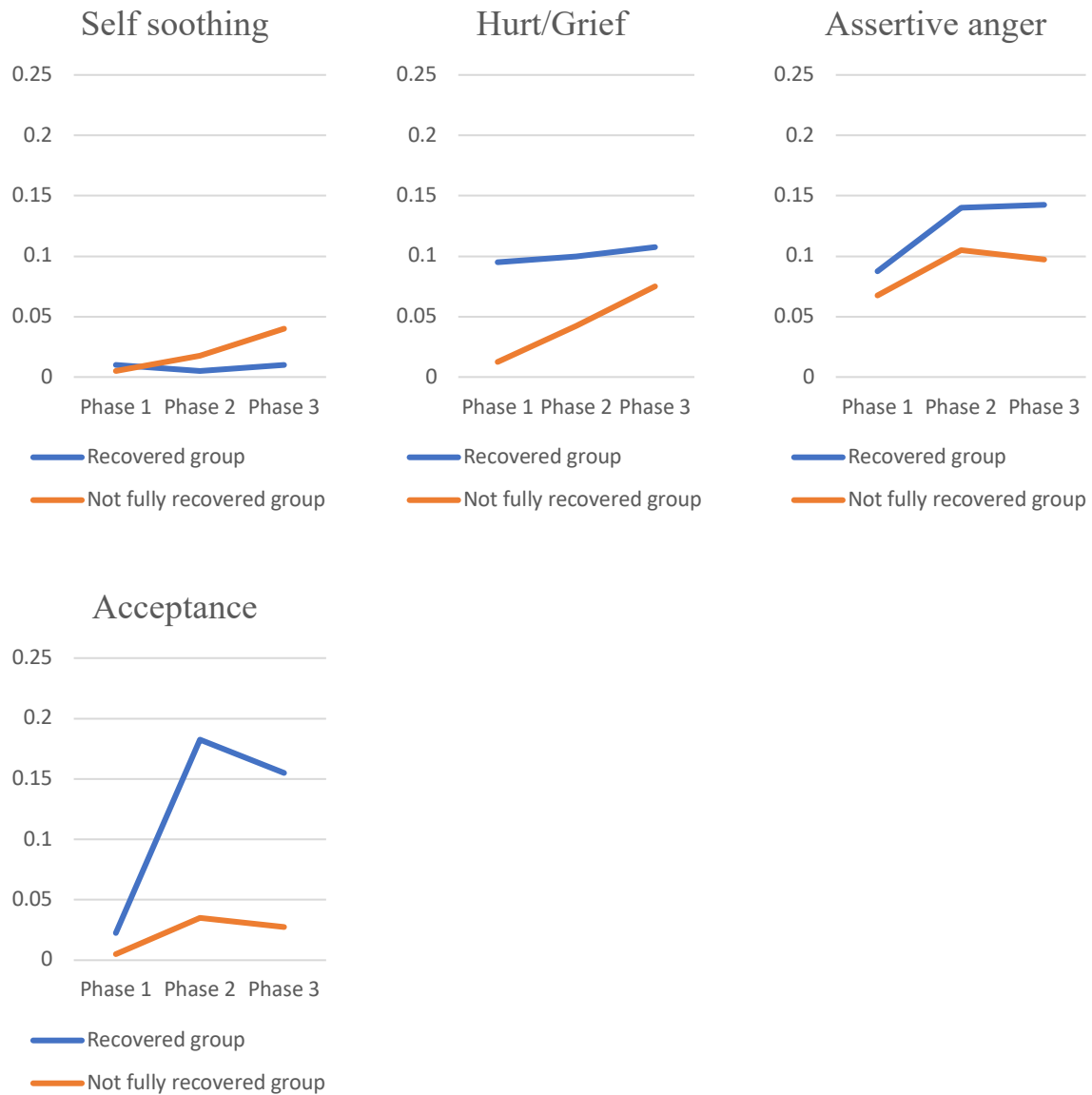
There was a statistically significant difference in needs expressed for the not recovered group ($\chi^2(2) = 7.429, p = 0.024$) with need expression increasing over time, however, follow up pairwise Wilcoxon signed rank tests indicated these were not statistically significant between sets of phases. Changes between phase 1 and 3 ($p = .066$) and phase 2 and 3 ($p = .068$) were close to significance.

Friedman's tests for all other emotion variables (negative evaluation, hurt/grief, assertive anger, acceptance) were non-significant.

Graphs for each emotion, negative self-evaluation and needs are presented in Figure 3, showing the mean expression over the phases for each group.

Figure 3: Graphs showing mean expression of each emotion, negative self-evaluation and needs over time through SPEAKS for the recovered and not fully recovered groups.





Note: Statistically significant differences marked with an * - only differences between fear over time were statistically significant for the recovered group, as well as needs for the not fully recovered group

Analysis 3: linear mixed models to examine sequences of emotional expression

Relevant variables met linear mixed model assumptions (linear relationship between dependent variables and independent variables, homoscedasticity, no multicollinearity, no outliers, and normal distribution of residuals; Laerd, n.d.).

Analysis 3a: Secondary guilt/shame and rejecting anger will predict subsequent primary maladaptive fear, which will predict need expression

Table 4 displays linear mixed models with dependent variables of fear and need, with lagged predictors (including lagged fear to control for fear at the earlier phase). Table 5 indicates that rejecting anger significantly negatively predicted subsequent expression of fear with a medium effect size, indicating that as rejecting anger decreased, subsequent fear increased. Being in the recovered group negatively predicted fear with a medium effect size but was not significant. No other analyses were significant.

Table 4:

Linear mixed model identifying whether secondary emotion predicted subsequent fear and need

Dependent variable	Predictors	Coefficient β	z	p	95% confidence intervals	d
<i>Fear</i>	Lagged Shame/guilt	-0.517	-1.32	0.187	-1.284 0.250	-0.47
	Lagged Rejecting anger	-1.052	-1.96	0.050*	-2.103 -0.001	-0.69 [^]
	Recovered group	-0.085	-1.84	0.065	-0.177 0.005	-0.65 [^]
<i>Need</i>	Lagged fear	0.080	1.05	0.292	-0.069 0.229	0.37
	Recovered group	0.014	0.85	0.397	-0.019 0.046	0.30

Note: p values marked with a ** reject the null hypothesis with the Bonferroni correction applied and are therefore highly statistically significant, * indicates significance of 0.05 without Bonferroni correction. Effect sizes (d) meeting criteria for a medium effect (>0.5) are signified with a [^], and those meeting criteria for a large effect (>0.8) are signified with ^{^^} (Cohen, 1988).

Analysis 3b: Fear or need expression will predict subsequent primary adaptive emotions

Table 5 displays linear mixed models with dependent variables of primary adaptive emotions (individually and together), with predictors of outcome group and lagged fear and need. Lagged variables for each primary adaptive emotion were included to control for earlier

expression. Neither prior expressions of fear or need predicted primary adaptive emotions, however recovery predicted greater expressions of acceptance and primary adaptive emotion overall, and greater acceptance predicted lower subsequent acceptance (all with large effect sizes). Being in the recovered group significantly negatively predicted self-soothing with large effect, indicating that they expressed less self-soothing compared to the not fully recovered group. No other analyses were significant but medium effect sizes were found with recovery predicting hurt/grief and assertive anger.

Table 5: Linear mixed model identifying whether fear or need predicted subsequent primary adaptive emotions

Dependent variable	Predictors	Coefficient β	z	p	95% confidence intervals		d
<i>Self-soothing</i>							
	Lagged fear	0.031	0.94	0.348	-0.34	0.096	0.33
	Lagged need	-0.056	-0.38	0.704	-0.341	0.230	-0.13
	Recovered group	-0.022	-3.19	0.001**	-0.035	-0.008	-1.13^^
<i>Hurt/grief</i>							
	Lagged fear	-0.119	-1.02	0.305	-0.346	0.108	-0.36
	Lagged need	-0.072	0.14	0.887	-0.472	0.328	0.05
	Recovered group	0.052	1.60	0.110	-0.012	0.117	0.56^
<i>Assertive anger</i>							
	Lagged fear	0.039	0.36	0.720	-0.176	0.255	0.13
	Lagged need	-0.083	-0.17	0.868	-1.056	0.890	-0.06
	Recovered group	0.040	1.70	0.088	-0.006	0.086	0.60^
<i>Acceptance</i>							
	Lagged fear	-0.277	-1.25	0.210	-0.708	0.156	-0.44
	Lagged need	0.911	0.81	0.420	-1.302	3.124	0.29
	Lagged acceptance	-0.568	-2.26	0.024*	-1.061	-0.075	-0.80^^
	Recovered group	0.178	0.048	<0.001**	0.084	0.272	1.31^^
<i>Primary adaptive emotion</i>							

Lagged fear	-0.167	-0.64	0.521	-0.675	0.341	-0.23
Lagged need	-1.131	-0.79	0.432	-3.95	1.69	-0.28
Recovered group	0.199	3.32	0.001**	0.082	0.317	1.17^^

Note: p values marked with a ** reject the null hypothesis with the Bonferroni correction applied and are therefore highly statistically significant, * indicates significance of 0.05 without Bonferroni correction. Effect sizes (d) meeting criteria for a medium effect (>0.5) are signified with a ^, and those meeting criteria for a large effect (>0.8) are signified with ^^ (Cohen, 1988).

Analysis 3c: Secondary guilt/shame, rejecting anger, and negative self-evaluation will predict subsequent primary adaptive emotions

Table 6 displays linear mixed models with primary adaptive emotions as dependent variables predicted by lagged shame/guilt, rejecting anger, and negative self-evaluation, along with group. Again, lagged versions of each primary adaptive emotion controlled for earlier expression. Prior shame/guilt and being recovered significantly predicted greater hurt/grief. Greater primary adaptive emotions overall were significantly predicted by prior shame/guilt, rejecting anger, and being in the recovered group. Lagged negative self-evaluation significantly negatively predicted acceptance and primary adaptive emotion, indicating that a decrease in negative self-evaluations was associated with a subsequent increase in acceptance and primary adaptive emotion.

Table 6: Linear mixed model identifying whether secondary emotions and negative self-evaluation predicted subsequent primary adaptive emotions

Dependent variable	Predictors	Coefficient β	z	p	95% confidence intervals		d
<i>Self-soothing</i>	Lagged shame/guilt	0.081	1.15	0.250	-0.057	0.220	0.41
	Lagged rejecting anger	-0.014	-0.24	0.808	-0.124	0.097	-0.09

	Lagged negative evaluation	-0.030	-0.15	0.879	-0.415	0.355	-0.05
	Recovered group	-0.016	-1.92	0.055	-0.033	0.003	-0.68^
<i>Hurt/grief</i>	Lagged shame/guilt	0.339	2.20	0.028*	0.037	0.639	0.78^
	Lagged rejecting anger	0.272	1.42	0.155	-0.103	0.648	0.50^
	Lagged negative evaluation	-0.813	-1.54	0.124	-1.851	0.190	-0.54^
	Recovered group	0.098	2.93	0.003**	0.032	0.163	1.04^^
<i>Assertive anger</i>	Lagged shame/guilt	-0.150	-0.99	0.324	-0.449	0.148	-0.35
	Lagged rejecting anger	0.194	1.05	0.295	-0.169	0.558	0.37
	Lagged negative evaluation	-0.163	-0.28	0.777	-1.287	0.962	-0.10
	Recovered group	0.032	-1.31	0.192	-0.593	0.119	0.45
<i>Acceptance</i>	Lagged shame/guilt	0.354	1.19	0.234	-0.229	0.938	0.42
	Lagged rejecting anger	0.266	0.76	0.449	-0.423	0.954	0.27
	Lagged negative evaluation	-2.426	-2.33	0.020*	-4.464	-0.388	-0.82^^
	Recovered group	0.236	4.68	<0.001**	0.137	0.334	-1.04^^
<i>Primary adaptive emotion</i>	Lagged shame/guilt	0.708	2.32	0.020*	0.110	1.305	0.82^^
	Lagged rejecting anger	0.739	2.08	0.037*	0.043	1.434	0.74^
	Lagged negative evaluation	-2.929	-2.36	0.019**	-5.366	-0.492	-0.83^^
	Recovered group	0.308	4.62	<0.001**	0.177	0.439	1.63^^

Note: *p* values marked with a ** reject the null hypothesis with the Bonferroni correction applied and are therefore highly statistically significant, * indicates significance of 0.05 without Bonferroni correction. Effect sizes (*d*) meeting criteria for a medium effect (>0.5) are signified with a ^, and those meeting criteria for a large effect (>0.8) are signified with ^^ (Cohen, 1988).

Analysis 3d: Need expressions will predict the primary adaptive emotions

Table 7 displays linear mixed models with primary adaptive emotions as the dependent variables, with lagged need and outcome group included as predictors (along with lagged versions of each respective primary adaptive emotion controlling for earlier expression of that emotion). Table 8 indicates that need expression did not predict the primary adaptive emotions, however being recovered significantly predicted acceptance and primary adaptive emotion overall, and significantly negatively predicted self-soothing, all with large effects.

Table 7: Linear mixed model identifying whether need expression predicted subsequent primary adaptive emotions

Dependent variable	Predictors	Coefficient β	z	p	95% confidence intervals		d
<i>Self-soothing</i>	Lagged need	-0.018	-0.12	0.093	-0.299	0.264	-0.04
	Recovered group	-0.022	-3.09	0.003**	-0.356	-0.007	-1.09^^
<i>Hurt/grief</i>	Lagged need	-0.036	-0.07	0.944	-1.033	0.963	-0.02
	Recovered group	0.050	1.48	0.139	-0.016	0.116	0.52^
<i>Assertive anger</i>	Lagged need	0.198	0.40	0.689	-0.771	1.169	0.14
	Recovered group	0.042	1.85	0.064	-0.002	0.087	0.66^
<i>Acceptance</i>	Lagged need	0.364	0.33	0.738	-1.775	2.504	0.12
	Recovered group	0.173	3.45	0.001**	0.075	0.271	1.22^^
<i>Primary adaptive emotion</i>	Lagged need	-1.638	-1.34	0.179	-4.028	0.752	-0.47
	Recovered group	0.187	3.24	0.001**	0.074	0.301	1.15^^

Note: p values marked with a ** reject the null hypothesis with the Bonferroni correction applied and are therefore highly statistically significant, * indicates significance of 0.05 without Bonferroni correction. Effect sizes (d) meeting criteria for a medium effect (>0.5) are signified with a ^, and those meeting criteria for a large effect (>0.8) are signified with ^^ (Cohen, 1988).

Discussion

Across numerous therapies and mental health difficulties, sequential emotional processing (transitioning from expressing maladaptive emotions to access more adaptive emotions) appears to be an important mechanism of therapeutic change. This study aimed to explore a hypothesised sequence of emotional change in a sample of adults undergoing an AN-specific EFT, using complementary statistical analyses.

Secondary emotion

There was no group difference in the expression of overall secondary emotion (global distress, guilt/shame, and rejecting anger combined), which may suggest that SPEAKS enabled those who did and did not fully recover to express secondary emotions somewhat equally. The hypothesis that guilt/shame and rejecting anger would decrease over time was supported graphically but was not statistically significant. Potentially, these tests were insufficiently powerful to detect differences (Button et al., 2013). When data was pooled into one model controlling for group, the SPEAKS sequential model (Figure 1, page 77) was supported in that guilt/shame and rejecting anger predicted greater subsequent expression of primary adaptive emotions. Guilt/shame was also the only emotion predictor of subsequent hurt/grief. Therefore, facilitating expression of guilt/shame and rejecting anger appear to be important to the change process.

In sessions, rejecting anger tended to be expressed in chair work where the participant was encouraged to speak from her critical or anorexic part. Rejecting anger may have therefore originated from the critic and be a process they subjected themselves to as opposed to instigated by themselves. Typically, the participant was encouraged to then sit in the opposing chair to respond to this rejecting anger, which sometimes resulted in participants expressing shame and/or negative self-evaluations. These findings support using EFT

techniques to elicit rejecting anger and shame early in therapy, such as emphasising the critic's voice to deepen emotion in the experiencing self (Elliot & Greenberg, 2016). Given that shame predicted higher personal inadequacy for individuals with social anxiety (Haberman et al., 2019), it is possible that accessing shame within the context of a validating therapeutic relationship within SPEAKS enabled the emotion, associated beliefs, and critical voice to be challenged, and to expose its developmental origins leading to an important change process for people with AN. Changing shame with (adaptive) emotion (Greenberg, 2021) may therefore reduce reliance on AN to protect against feeling shameful feelings associated with an inadequate sense of self.

Primary maladaptive emotion

Overall, there was no significant difference in overall expression of primary maladaptive emotion (fear of abandonment/attachment fear) between those who recovered and did not fully recover. Over time, those who recovered had highest expression of fear of abandonment in phase one which reduced significantly over time. However, no sets of phases were statistically different. The importance of fear of abandonment within a sequential SPEAKS model was only partially corroborated. Lower rejecting anger predicted greater subsequent fear of abandonment, and contrary to hypotheses, fear of abandonment did not predict subsequent primary adaptive emotion. Rather than facilitating increased expression of fear of abandonment to access primary adaptive emotion, in line with Harrington's (2016) finding that *early* emotion expression was important, perhaps early expressions of fear of abandonment need to reduce across the therapeutic phases to associate with recovery.

Although not significant, fear of abandonment slightly increased over time for the not fully recovered group. In this study, 'fear' included expressions of terror and anxiety *as well as* fear of abandonment. Anxiety may maintain AN, with peaks in ED severity associated

with similar peaks in anxiety (Lavender et al., 2013). Furthermore, greater anxiety has been associated with lower recovery rates from EDs (Murray et al., 2018). Perhaps different aspects of fear held different functions within the change process and grouping them may have impacted findings.

Negative self-evaluation and need expression

Lower negative self-evaluations, which like need were coded separately to emotion, predicted greater subsequent primary adaptive emotions and specifically acceptance. Perhaps experiencing high self-criticism and the absence of secondary emotional experiences (rejecting anger or shame) kept people stuck in a in a more cognitive, unemotional place preventing subsequent transformation of these emotions to access primary adaptive emotion. This may relate to prior qualitative evidence, where people with AN reported that direct dialogue with their ED ‘critical voice’ helped established a positive relationship (Ling et al., 2022). Furthermore, lack of recovery has been associated with higher self-blame and self-criticism whereas those who had progressed to recovery recognised that self-criticism was problematic and had moved towards acceptance (Hannon et al., 2017).

Interestingly, the not fully recovered group expressed significantly different levels of needs across the phases, with needs increasing, although no sets of phases were statistically different. This may suggest that greater need expression without parallel significant reductions in fear of abandonment is not associated with better outcomes. Expressions of true needs are thought to be associated with primary adaptive emotions, enabling the person to connect with their adaptive, healthy adult to reach their goals (Damasio, 2004; Shahar, 2014). Other expressions of need may be expressed in a less healthy, blaming or complaining manner, originating from a maladaptive way of coping. Secondary emotion and primary maladaptive emotion provide inaccurate information about needs and may direct the person

towards unhelpful action to meet those needs given their poor fit for the situation (Oldershaw et al., 2019). AN itself gives false sense of needs, and so expressing needs without accessing adaptive emotion may perhaps even perpetuate stuck patterns (Oldershaw et al., 2019). In this study, need was coded to include both distinctions. Given that need was not found to predict any of the primary adaptive emotions, one explanation is that needs were confounded by those expressed from the false sense of self, potentially driven by fear of abandonment or secondary emotions.

Primary adaptive emotion

Complementary analyses found that the recovered group expressed significantly more primary adaptive emotion overall than the not fully recovered group, and that being recovered predicted greater expression of primary adaptive emotion. Supporting the SPEAKS model, this suggests that only those who recovered sufficiently accessed core, primary adaptive emotions. Given there were no significant differences in expression of overall secondary and primary maladaptive emotion, this suggests that the recovered group were uniquely able to move beyond these emotions, corroborating evidence that transformation of ‘stuck’ emotions with primary adaptive emotion is crucial to recovery (Greenberg, 2021).

For specific adaptive emotions, a trend was observed whereby assertive anger increased over time, particularly for the recovered group. Whilst effects were moderate this was not significant. In prior research, assertiveness was associated with fewer subsequent ED behaviours (Cockell et al., 2004), which this trend tentatively supports. Similar trends were observed for hurt/grief and acceptance, however, change in each emotion for each outcome group were not significant. One explanation for the lack of significance is issues with power (Button et al., 2013). When data was combined in a model accounting for non-independence of observations, being in the recovered group was found to predict greater expression of

hurt/grief (when controlling for secondary emotions) and acceptance. It may be that SPEAKS facilitated greater expression of hurt/grief and acceptance as opposed to assertive anger, at least for this small sample. These findings corroborate qualitative evidence that developing acceptance can sustain therapeutic change and that experiencing positive emotions can help to forge an identity other than the ED (Cockell et al., 2004). Lower acceptance also predicted greater subsequent acceptance. Given that greater acceptance was predicted by recovery, one explanation of this is that it is important not to attempt to arrive at expressing acceptance too early within therapy.

Furthermore, not fully recovering was associated with greater self-soothing compared to the fully recovered group. Whilst self-soothing is adaptive, it may hold a different function to other primary adaptive emotions, as within sessions self-soothing tended to be expressed in response to emotional overwhelm and distress. Often, the therapist responded to the client's distress through facilitating soothing exercises. As such, self-soothing may have been required by the not fully recovered group more so than the recovered group who were able to access the other primary adaptive emotions. Graphs indicate that proportions of self-soothing were low compared to other adaptive emotions, suggesting self-soothing was not accessed extensively for either group.

Models of change elicited by findings in the current study

In keeping with other emotional process studies (Choi et al., 2016; Lifshitz et al., 2020), this study found that individuals did shift from expressing secondary emotions to subsequent expression of primary adaptive emotion. Significant positive and negative predictors of subsequent emotion are compiled in Figure 4a, with Figure 4b displaying the variables that were positively or negatively predicted by outcome group. Regarding the models of emotional change, these findings suggest the importance of accessing secondary

emotions prior to primary adaptive: with acceptance as highlighted above, but also as prior rejecting anger and guilt/shame predicted primary adaptive emotion and shame/guilt was the only emotion predictor of subsequent hurt and grief. This suggests that expression of secondary emotion is particularly important to facilitate within early phases to enable sufficient time for emotional transformation to primary adaptive emotions.

Figure 4a: Diagram displaying significant predictors of subsequent emotion variables based on empirical findings from linear mixed models, represented by a solid black arrow. Dotted black arrows represent a negative prediction.

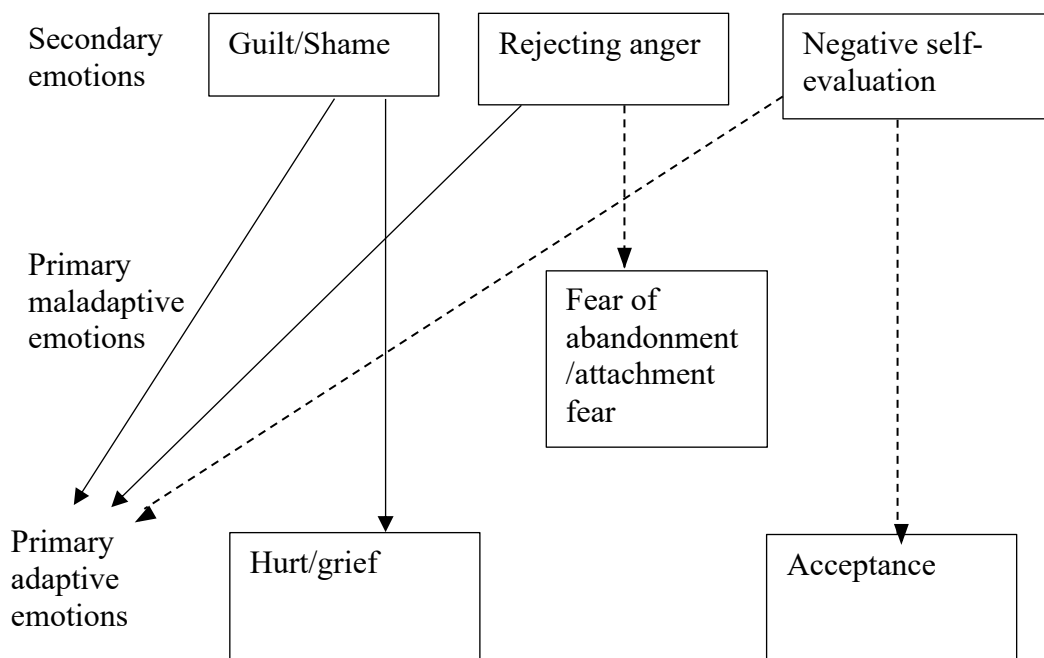
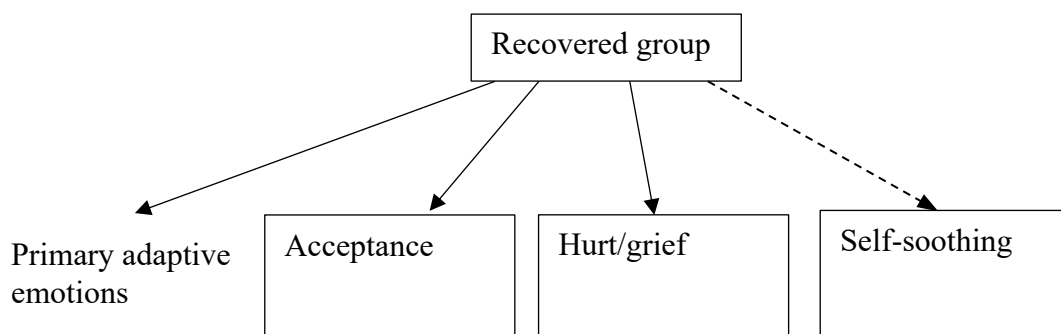


Figure 4b: Diagram displaying which emotion variables were significantly predicted by being in the recovered group in contrast to the not fully recovered group. Positive predictions represented by a solid black arrow; negative predictions represented by a dotted black arrow.



Strengths and limitations

Strengths include inclusion of hierarchical linear mixed models which are more robust than traditional associative methods due to addressing potential relatedness of individuals within samples (Joo et al., 2016). Factoring these relationships within the model reduces the risk of a Type I error (Joo et al., 2016). Furthermore, the study obtained good (close to excellent) inter-rater reliability on double coded sessions, increasing reliability in the findings. This low measurement error improves statistical power and decreases the likelihood of a Type II error in which additional “noise” can lead researchers to fail to detect relationships in data (Hallgren, 2012, p.5). Clear protocols for sample and session selection improve the study’s potential replicability.

A limitation is this study’s small sample size, which although acceptable (Professor Emsley, 2022) may have introduced problems with power leading to a Type I or Type II error (Button et al., 2013). Interaction terms were not included in this study due to its low sample size, given that multiple sources suggest that sample sizes should be increased to enable inclusion of interactions (Leon & Heo; 2009; Kutner et al., 2005). A larger sample size may have warranted the use of interaction terms within models to determine whether there were specific interactions between being recovered or not fully recovered and other predictors of emotional expression. This would further clarify whether the recovered versus not fully recovered participants moved through different specific sequential patterns of emotional expression and whether not fully recovered participants had different patterns or became stuck at points in similar patterns. Furthermore, the study utilises multiple statistical tests, increasing the likelihood of family-wise error and therefore a Type I error. The number of tests was deemed justified given that all were driven by pre-determined hypotheses. Bonferroni-corrected results were also highlighted, and results are strengthened given the multiple significant Bonferroni-corrected findings with large effect sizes.

The recovered and not fully recovered groups were selected from participants available at the time of data collection. Group differences and processes of emotional change may have been different if this study could have confirmed selection of the most extreme cases. Despite this, post-intervention comparisons indicated the groups were significantly different suggesting that comparisons are meaningful.

The sample primarily consisted of white British females in their twenties and thirties. Only one participant was mixed-race (white and Jamaican British). This limits generalisability to the wider population of individuals with AN. The EDE-Q was used to determine outcome groups, but research has found racial/ethnic discrepancies in scores across ethnically diverse groups (Kelly et al., 2017). Given the primarily white British sample this may not limit results extensively, however with the small sample this participant represents an eighth of the study and does not therefore account for potential variability in their EDE-Q scores. Furthermore, defining recovery through ED characteristics and weight may not match with subjective experiences of recovery for participants, with some survivor-led ED campaigns advocating for ‘dumping the scales’ (Virgo, 2017). Defining recovery more widely might have altered outcome groups and comparisons.

Clinical and research implications

The updated models of emotional process for SPEAKS (Figures 4a and 4b) helps refine the therapeutic process and emphasis for clinicians. This study suggests the importance of facilitating early expression of shame and rejecting anger, with sufficient time for transformation of emotion to access primary adaptive emotions, and to be mindful of situations where a client expresses negative self-evaluations but without connecting these with maladaptive emotional experience such as shame or rejecting anger. Recovery was associated with fear reducing over time and expressing primary adaptive emotion, which were predicted by prior secondary emotions. Therefore, aiming to facilitate these sequences

within therapy seems an important target for clinicians. Therapists may need to attend to the emotional tone of needs expressed, to facilitate their expression in the context of primary adaptive emotions.

Future research should identify whether additional sessions would support those with poorer outcomes to access primary adaptive emotions, as there were trends indicating increases even for the not fully recovered group. 'Fear' and 'needs' included multiple definitions (i.e., anxiety and threat but also expressions of loneliness/fear of abandonment; healthy and unhealthy need expressions). Future studies may benefit from separating these to further understand whether either distinction has particular predictive power within a sequential model.

Further research would benefit from larger sample sizes and a less homogenous demographic group. Given that individuals from different cultures may express emotion in idiosyncratic ways (Hareli et al., 2015), further research is needed to ensure reliability and validity of measures for wider demographic groups. Further research should also look at the association between emotional change over time in relation to different definitions of recovery, including survivor-led definitions and subjective ratings.

Conclusion

This study evaluated emotional change processes for people with AN undergoing adapted EFT. Through coding emotional process within sessions across three phases of therapy, this study sought to identify whether recovering from AN would be associated with greater overall expression of emotion, decreases in secondary and primary maladaptive emotion and increases to primary adaptive emotions, and sequences of emotional change. Those who had recovered expressed significantly more primary adaptive emotions, with recovery predicting greater expression of hurt/grief and acceptance, as well as primary

adaptive emotions overall. Not fully recovering was associated with greater expression of needs over time, however not necessarily associated with adaptive emotions and therefore may not have been helpful. Not fully recovering also predicted greater self-soothing, which may have served a different function to other primary adaptive emotions; utilised to manage distress. However, generalisability was limited due to the small sample size and limited demographic variability. Further large-scale studies identifying emotion process are required to corroborate these findings, which are the first to measure moment-by-moment emotion process for people with AN undergoing EFT. In conclusion, it is important that clinicians using SPEAKS attend to emotional expression of individuals with AN to best support recovery.

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<http://www.jstor.org/stable/43826004>

Section C: Appendices of supporting material**Appendix A: Classification of Affective Meaning States decision coding 'tree'**

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Appendix B: Eating Disorder Examination Questionnaire (EDE-Q)

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Appendix C: Health Research Authority

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Appendix D: Participant information sheet updated for this study



Specialist Psychotherapy with Emotion for Anorexia



Feasibility Trial Participant

Participant Information Sheet

You are being invited to take part in a feasibility study of a new psychological intervention for adults with anorexia. It is important for you to understand why the research is being done and what it will involve. Please take time to read and listen to the following information carefully and discuss it with others if you wish. Ask us if there is anything that is not clear or if you would like more information.

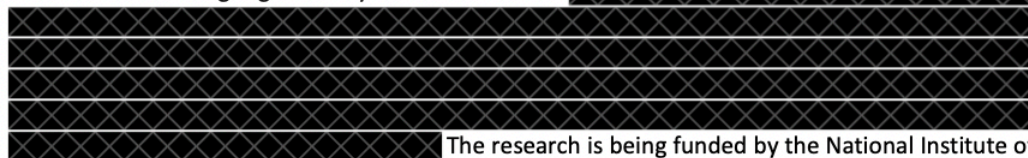
Why is this research being done?

This research forms part of a research programme called SPEAKS (Specialist Psychotherapy with Emotion for Anorexia in [REDACTED]). The programme has involved developing a new emotion focussed therapy for adults with anorexia. This therapy is an individual treatment delivered by a psychologist on a weekly basis for around one year. The aim of the therapy is to look at the difficulties you may have underlying the problems you have around eating, in particular difficulties with emotions, and to focus on these in therapy.

We are now going to test the intervention in a 'feasibility study'. The goal of the feasibility study is to test whether the therapy seems helpful for adults with anorexia and whether it can be delivered within an NHS eating disorder service.

Who is organising the research?

The research is being organised by researchers at the [REDACTED]



[REDACTED] The research is being funded by the National Institute of Health Research.

Why have I been asked to take part?

You have been invited to take part in this study as you are somebody aged over 18 who has been referred to the [REDACTED] who currently meets the study inclusion criteria. This includes having a diagnosis of anorexia.

What will happen to me if I take part?

If you are interested in participating in the research you will be contacted by a research worker who works for the [REDACTED]. The research worker will answer any questions you may have about the research and your potential involvement in it. If you are interested in taking part, the research worker will arrange to meet with you to discuss further, and if you'd like to continue then they will ask you to sign the attached consent form and complete some questionnaires. After this you will be allocated a [REDACTED] therapist who will contact you to arrange your first appointment to begin the new [REDACTED] therapy.

The Therapy

As described above, the [REDACTED] therapy will involve meeting with a psychologist weekly for around a year to focus on difficulties with emotion.

With your permission, we would like to record your therapy sessions (either audio or video) and to keep a picture and written record of your therapy formulation (a hypothesis completed with your therapist of current difficulties and what is getting in the way of change). There are two purposes for this:

- Firstly, we would like to monitor what your therapist is doing and check that they are following the study guidelines. The video recordings and formulation details will be reviewed during routine supervision by a senior member of the care team with your therapist.
- Secondly, we would like to apply a coding system to themes arising within your therapy sessions and in your formulation to help us better understand the process of change in therapy in order to adapt and improve [REDACTED]. This work would be completed by three trainee clinical psychologists as part of their doctoral theses, with additional coding completed as required by research assistants employed within [REDACTED] trusts.

You can consent to us using taped therapy sessions and formulations for both, either or neither of the above reasons by indicating your preference on your consent form. Therefore, you can participate in the study without agreeing to have your therapy sessions recorded at all. Even if you do consent to these recordings, your therapist will always ask again at the start of each session and you are free to say no without it affecting your session that week or any of your care in the future.

Whether or not you consent to video recordings and sharing of formulation, your identity will be known by the supervisor as part of the care team responsible for your treatment. The trainee psychologists will not know your identity beyond what they see in recorded therapy sessions.

Research Followup Questionnaires

After 3 months, 6 months and 9 months you will be given some more questionnaires to complete. None of the questionnaires you complete at any point during the study will have your name or any other identifying information on them; they will all be anonymous.

At the end of the 12 months, there will be further questionnaires and also a qualitative interview so we can gain more detailed feedback about your experience of the [REDACTED] therapy. The interview will be recorded by audio-tape using a Dictaphone and this will be transcribed (typed up) word for word. This is to help us better remember everything that has been talked about. During the transcription process any identifying information will be removed and the audiotapes will be destroyed after transcription.

If the COVID-19 pandemic has significantly disrupted your therapy, your therapist may suggest an extension to the work, up to a maximum of three months of additional therapy. If you agree to this additional therapy, then a further research followup at 15 months will be completed.

You do not have to take part.

It is up to you to decide whether or not to take part. If you do decide to take part, you will get this information sheet to keep and you will be asked to sign a consent form which you will also keep a copy of.

If you decide to take part, you can still withdraw at any time without giving a reason. If you decide to not take part, or to withdraw at any stage, it will not affect your current or future care in any way. Although you can stop being part of a research study at any time, without giving a reason, the research team will keep the research data about you that they already have. Researchers need to manage your records in specific ways for the research to be reliable. This means that they won't be able to let you see or change the data they hold about you. Research could go wrong if data is removed or changed.

What are the possible benefits from taking part?

You may find that you benefit from the new [REDACTED] intervention. It is very different from other currently available treatments in the field of eating disorders and therefore will be a new treatment approach you have not tried before in tackling the anorexia. Your participation will also contribute to the further development and refinement of the [REDACTED] therapy which may mean that we can better help those with anorexia in the future.

What are the possible disadvantages and risks of taking part?

Therapy is a difficult process that can involve discussion of some upsetting topics. In this respect the disadvantages and risks of taking part are no different from you completing any psychological therapy. As psychological therapy is in the NICE guidelines as front line treatment for adults with anorexia then talking therapy is what you should be offered at your eating disorder service. As the [REDACTED] therapy is a new intervention, however, it is unclear how much or how quickly it will help to you to make changes. Yet, as with the provision of all psychological therapies in eating disorder services, attention will continue to be paid to any physical and psychological risk throughout your therapy. If at any point it is considered that a change to your treatment plan is required, then this and your welfare will always be prioritised above the research.

Will my taking part in the study be kept confidential?

- Any information you have provided about yourself will be anonymised and will be stored in a locked cabinet on [REDACTED] property.

- Your consent form (which you sign) will be kept in a locked cabinet on [REDACTED] [REDACTED] (i.e. whichever site you attend therapy at). This will be kept separate from your questionnaires and interview transcripts, which will have no identifying information on them.
- Your identity will not be recorded within data or written transcripts of the interviews, and will not be revealed in any publication that may result from this study. Data will be collected with only a participant number and pseudonym to identify it.
- In line with usual clinical practice, all information you provide will be kept confidential, except as governed by law (i.e. if there is a legal obligation on the researcher to disclose this information to authorities due to a concern about risk to you or others). If the researcher needs to contact a third party due to concerns about risk, they would always try to speak with you about this first.
- The data collected in this study will be used only for the purpose described in this form, and will be available only to the research team. Therefore, your identity and the fact that you have participated will be known only to staff members from [REDACTED] (i.e. whichever site you attend therapy at). Any video recordings of therapy sessions and formulation descriptions will be stored on a secure [REDACTED].
- Qualitative interview recordings may be transcribed by a third party agency approved for this purpose. Your name and personal details will not be disclosed and full confidentiality agreements will be in place in keeping with all confidentiality protocols as set out in this information sheet.
- Data gathered from this study will be retained as long as required by regulations, which is up to ten years following the publication of empirical articles or communications describing the results of the study.

What if I have a concern about the research?

If you wish to complain, or have any concerns about any aspect of the way you have been approached or treated during the course of this study, please contact in writing, providing a detailed description of your concerns:

- The [REDACTED] Research and Development Manager [REDACTED] if you are participating in [REDACTED]
- The Patient Advice and Liaison Team at [REDACTED] you are participating in [REDACTED]

[REDACTED]. The Sponsor is responsible for the design, management and conduct of this study. [REDACTED] provides cover for negligent harm arising from the design, conduct and management of the research. If you have concerns regarding negligent harm arising from this study please contact the Chief Investigator.

What will happen to the results of the research study?

It is intended that we will use the information collected from the questionnaires and interviews to inform the development of the [REDACTED] therapy. If the data from this study suggest that [REDACTED] helpful then we will apply to arrange a randomised controlled trial to further study the benefits when directly compared with an existing therapy. Short extracts from interviews may appear in

reports or publications. This may include publication in a scientific journal, presentations at professional conferences, research reports to the ethics committee/NIHR or other [REDACTED] documents (e.g. in a description of the [REDACTED] therapy intervention for therapists using the approach). However, these extracts will always be anonymised and will not be linked to any identifying information. It will not be possible for anyone to tell that you took part in this study or to know which views were yours.

What if I want to have some further information?

If you have any specific questions regarding this research study or would like further information about the focus groups or the [REDACTED] (Lead Researcher/Principle Investigator) who will be happy to answer any questions (contact details below).

You will be asked if you would like to receive further information about the outcomes of the study and of the wider [REDACTED] project. If you would like to be kept updated, your name will be added to our list of contacts and we will share regular updates and newsletters with you. Your details will only be kept until the end of the study in 2022 and you can choose to be removed from this list at any time by contacting the study team.

If you would like any further information about participating in research, or to hear about other projects which are currently running in your area, you can visit the [REDACTED] webpages: [REDACTED]

Who has reviewed the study?

All research in the NHS is looked at by independent group of people, known as the Research Ethics Committee. This study has been reviewed in accordance with the guidelines for Canterbury Christ Church University research and has been approved by the [REDACTED]

Thank you for taking the time to hear about our research. We hope that you will consider taking part in it.

[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]

[REDACTED]
[REDACTED]

Appendix E: updated consent form



Specialist Psychotherapy with Emotion for Anorexia



Feasibility Trial Participant Participant Consent Form

Location: [Redacted]

Participant Identification Number:

One copy of this Consent Form and the Information sheet to be provided to the participant ;
One copy to be filed in the investigator file.

Please initial the relevant boxes

- 1) I confirm that I have read/had read to me and understood the information sheet for the above study (dated 30/08/2020; version 2.0). I have also been given the opportunity to consider the information, ask questions and have had these answered satisfactorily.
- 2) I understand that my participation is voluntary and that I am free to withdraw at any time, without giving a reason, and that my current and future care will be unaffected.
- 3) I understand that any information collected about me will not have my name on it.
- 4) I agree to have my sessions audio/video recorded:
 - (a) For the purposes of monitoring therapist adherence to the treatment model *(you may still proceed with participation even if you decline this)*
 - (b) For the purposes of analysing therapeutic change to examine [Redacted] hypotheses *(you may still proceed with participation even if you decline this)*
- 5) I agree that my 'formulation' picture and description can be accessed by a researcher to explore themes *(you may still proceed with participation even if you decline this)*
- 6) I agree to participate in the above study

Name of Participant

Date

Signature

Name of Person
Taking Consent

Date

Signature

Appendix F: CAMS coding plan

CAMS coding plan – November 2021 version

Coding rules

1. Code one minute of data at a time, with 0:00-0:59 coded as minute 0, 1:00-1:59 as minute 1, and so on, up to the end of the video.
2. Use the updated CAMS coding worksheet – August 2021 version. Code minutes horizontally so each person has 2 rows: 1 row for variable 1 (emotion code) and 1 row for variable 2 (need or neg-eval).
3. Code using the CAMS coding tree first, this coding plan, and also consulting the CAMS (Greenberg & Pascual-Leone, 2005) manual
4. When using the coding tree start at the top and move down from there – i.e. firstly, check - is the aroused emotion positive (smiles, happy, laughing) or negative (distress or something painful) – then go to the next boxes (more angry or sad? etc). Hopefully this will help us to increase consistency when comparing hurt/grief with shame, for example, as shame would imply an unhealthy direction whereas hurt/grief is healthy. If you're not sure then consult the CAMS manual (2005) for more info as well as descriptions below.
5. Code each minute using the following codes:
 1. Global distress – GD
 2. Rejecting anger – RA
 3. Shame – S
 4. Fear - F
 5. Hurt / Grief – HG
 6. Self-soothing - SS
 7. Assertive Anger – AA [focus on assertiveness]
 8. Acceptance – Acc [focus on sense of acceptance]
 9. Uncodable – Unc
6. Code the following as a separate variable:
 1. Negative self-evaluation – NSE
 2. Existential need – N
7. Once an emotion begins, continue coding that emotion until there is an identifiable change in expression, either the emotion ending or changing to another.
8. Code uncodable in the following situations:
 - When there is no/insufficient emotional expression observed
 - If two or more emotions are present within a minute with no dominant emotion
 - If the client is talking about experiencing an emotion in the past, but with no observable emotion expressed live (however if client says 'I am feeling scared' referring to the present time but appearing quite flat emotionally this can likely be coded as Fear as we are taking the client at face value).

- However, in relation to the above, talking about an emotional experience in the past may well elicit an emotion in the therapy room and the therapist may try and bring this out, so pay attention to any non-verbal cues e.g. glassy eyes, pauses in speech, changes in eye contact or posture, etc, which might indicate an emotion is being experienced live
- Code uncodable when criteria are not met: i.e. 1. emotional tone (emotion/action tendency), 2. Involvement (expression i.e. nonverbal behavioural, emotional arousal; and vocal quality changes), and 3. Meaning (Stance/adaptivity and/or specificity).
- Don't read into or guess an emotion – some markers need to be present – pay attention to nonverbal cues, changes to voice, body language, posture, facial expression as well as what the person says

Common disagreements between lead author and second coder during practice coding:

Antonio spoke about how reliability emerges between the two coders - each person becomes a part of the process in that we will each be interpreting what we observe for each participant. Where there is disagreement we can discuss this and make effectively a rule between us that clarifies that we will be coding in a particular way.

In SPEAKS there is a lot of chair work in which the therapist aims to bring forward certain parts of the self or others, connecting with the felt emotion and needs of the self. Sometimes during these tasks although the therapist may be attempting to enable the participant to connect with something, e.g. shame, the participant might stay expressing something else, e.g. rejecting anger directed towards the self. In these circumstances we will code the emotion we perceive the person is actually experiencing in the moment (i.e. if there has been no noticeable shift into another emotion despite the chair work).

1. Fear and shame (and distinguishing from hurt/grief)

We have separated out fear and shame in line with Lifshitz et al (2021), who also did this using the CAMS. These are distinguished as follows:

- Using the coding tree, both fear and shame are: more sad, about something specific and experienced in the moment, Unhealthy, implying a negative self-evaluation. Narrative reflects deep and enduring suffering; an old familiar and feeling? (i.e. Same old story?). Once these have been established, separate shame and fear as follows:
- Shame can be categorised as an expression of an emotion that includes negative statements or implications about the self, feeling humiliated, or personally inadequate.

- Fear is defined as expression of emotion that includes implying or indicating a threat to the self from an external source, feeling unsafe, defenceless, and also expressions of being lonely or alone, fearing abandonment, afraid that attachments with others are or might be threatened, or an expression of dread.
- Note: Shame is categorised differently to hurt/grief, as HG implies a positive self-evaluation rather than negative, that recognises hurt, is not desperate, and is grounded.

2. Distinguishing Assertive anger from Acceptance

In our practice coding we have had some disagreements about assertive anger versus acceptance and agency. For the purposes of our coding, let's agree that assertive anger is when we interpret the emotional expression comes from a place of pain/distress/something difficult (rather than joy, happiness, contentedness etc), where the person uses "I" language, suggests their needs and rights, indicates anger at ethical violation, is holding others or themselves accountable.

In contrast, acceptance is when we interpret the emotional expression as being positive (smiling, laughing, humour etc) AND when someone experiences an increase in new meaning, the presence of new episodic memory (almost like a moment or sense of realisation and resolution about something specific). Without the sense of contentedness/happiness/positive affect then just speaking clearly about new meaning made in relation to something distressing might be more likely coded as assertive anger.

3. Anger directed at the self, e.g. in chair work

If anger is directed at the self, e.g. through chair work or self-talk, let's agree to code it as rejecting anger (or assertive anger if that feels more relevant) as then we can continue to use the coding tree if the person seems more angry. However I imagine this could easily tip over into shame (which would appear more sad than angry). In SPEAKS, anger directed at the self is referred to as the critical voice, which following discussion with Anna is best coded as Rejecting Anger.

This may occur in chair work as SPEAKS aims to bring forward the critical voice and have participants speak as this voice. When the person moves to the other position (i.e. another part of the self) in chair work this RA may then be followed by another emotion (e.g. shame, fear, or assertive anger or something else), and so it is important to capture the critical voice as separate to this rather than collapsing it with shame.

4. Rejecting anger vs assertive anger

When someone seems more angry than sad, we are distinguishing whether the anger is: blaming/attacking, distances themselves from others, expressed in response to having been injured, and is *general* in content (rejecting anger) from anger that is:

asserting their rights/needs, in response to an ethical violation and holding others to account, and is expressed in relation to *specific* examples. As above, we are coding the critical voice of anorexia directed towards the self as rejecting anger. So we can also think of rejecting anger as being cruel in tone, or anger that is controlling. When the person speaks critically/angrily from their anorexic voice/part we would code this as rejecting anger, even if this is attempting to meet the person's needs around weight and shape, because in these examples this defensive strategy is likely disconnecting them from their primary needs so would not be coded as assertive anger. There may be specific exceptions to this (e.g. if you really feel all the criteria for assertive anger are clearly met) but this is the general rule to follow!

Appendix G:**Verbal examples of emotion states coded for this study****1. Global distress**

Why wont it just go away? Why I can't I be happy? But then there's a part of me that doesn't want it to go.

I have this conversation all the time, I don't feel like it gets anywhere. It used to be frustrating but now I feel beaten down. Like any fight or strength I don't have it anymore. I feel like a shell.

2. Rejecting anger

You've done this to yourself, you're to blame. You're the only one who can get yourself out of this and you're not trying hard enough. You're pretty useless and pathetic.

What do you know? You have no idea about how this feels and how hard it is. You're an idiot, its not an easy fix, you're stupid for thinking there is.

Just get over it [your emotions]. If you talk to anyone about it they will think you're absolutely pathetic and ridiculous so don't even bother.

3. Guilt/Shame

If they knew some of the things they'd be so disappointed. They might be disgusted with me. The things I did was disgusting. I just feel so ashamed of myself. Deep down I knew it wasn't right. I still went along with it..

I always feel guilty but I feel so much worse this week as its all come out. I feel really ashamed of myself. Makes me feel pretty useless and pathetic.

I tell myself at least I'm eating, at least I'm not exercising and not eating. But I know it's not... I do it all in secret so no one knows.

4. Negative self-evaluation

I don't see my strengths or things that I have achieved as being achievements, I see them as not being enough. I see them as being a given, yeah I'm good at that, that's fine but what have I done with it?

I clearly don't deserve it which is why people are treating me that way, because I'm not good enough.

I was sitting on the floor and I wanted to rip my skin off. So much disgust and hatred for myself.

5. Need

I needed him to listen to me and not expect me to be the grown up

I need to acknowledge and accept that I'm in a bad way and that I do need help.

I just find it hard to open up. I'm just frustrated because I know what I need to do, I need to open up stuff that's difficult.

6. Fear

Thinking about scared I am of everything. I'm frightened of letting it all out. Frightened of losing control.

I've kept everything in all week and tried to put a brave face on things, I'm a bit scared myself. What if I can't do it? I don't want to be like this for the rest of my life.

It's very lonely. Even with family around me I feel so lonely. I keep them all out and I'm dealing with it by myself and I'm really lonely.

It's a sinking feeling, of dread, and it's being scared that at some point I'm going to make a decision I can't come back from. Most of the time it's dying, putting myself out of my misery. Other times it's ending a relationship, with family, or my parents. cutting my nose off to spite my face, because I'm so desperate and feel so alone that I push everyone away.

7. Self-soothing

[Imagery exercise] I feel it in the middle of my chest. I think it's kind of warm and glowy. Like I can just imagine it singing happy opera tunes. I kind of get this image of you know in beauty and beast when all the objects turn back into humans, that kind of feeling.

I just want to give her [vulnerable child] a hug and say everything will be ok. And even if not it will pass.

8. Hurt/grief

I don't want to start crying or something. The thing that mattered most to me, all the time, I feel like I lost it. I lost him.

I think because everyone should be able to express how they feel and be seen, then be seen as having emotions rather than just what they look like. Everyone else has that, but I don't.

I wish I could go back and say, there should have been someone in between all of that, an adult somewhere that said hang on a minute, enough is enough, there should have been that person there.

9. Assertive anger

You shouldn't have kept blaming me for everything. I didn't understand how I felt or how to deal with that, you should have helped me deal with it instead of getting angry.

I think I'd tell her not to change. I think she felt like the whole time that there was something wrong with her, or she wasn't good enough, or aspects of her that shouldn't be heard or thought... She constantly kept thinking there was something wrong with her and she needed to change something or rework it. Other people took it in the wrong way and that was their problem not hers, she wasn't a horrible person.

I'm not the little kid anymore and that I have more power than I realise.

10. Acceptance

I need to connect with the smaller me, and I always feel resistant like I don't see the point to it but I can see now that I keep falling into her, she's there anyway so that's why it's better to connect with her rather than switch between the two.

I think it will be easier to feel I can stay as me if I can picture her there with me rather than just becoming her. To be more protective than defensive.

It does makes me realise how much I want to hear that vulnerability though because I know how important it is to recognise how I am feeling.

Appendix H: T Tests output

Total secondary emotion

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
totsec	Equal variances assumed	.161	.702	.836	6	.435	.061666667	.073795890	-.11890537	.242238704
	Equal variances not assumed			.836	5.360	.439	.061666667	.073795890	-.12426101	.247594344

		group - 0 poor 1 good	N	Mean	Std. Deviation	Std. Error Mean
totsec	Poor		4	.287500000	.121056308	.060528154
	Good		4	.225833333	.084431651	.042215826

Total primary maladaptive emotion

		group - 0 poor 1 good	N	Mean	Std. Deviation	Std. Error Mean
totpmal	Poor		4	.172500000	.034142946	.017071473
	Good		4	.165833333	.105703113	.052851557

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
totpmal	Equal variances assumed	1.619	.250	.120	6	.908	.006666667	.055540276	-.12923549	.142568825
	Equal variances not assumed			.120	3.619	.911	.006666667	.055540276	-.15415105	.167484380

Total primary adaptive emotion

		group - 0 poor 1 good	N	Mean	Std. Deviation	Std. Error Mean
totpad	Poor		4	.176666667	.056240225	.028120113
	Good		4	.350833333	.071614968	.035807484

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
totpad	Equal variances assumed	.184	.683	-3.825	6	.009	-.17416667	.045529295	-.28557284	-.06276050
	Equal variances not assumed			-3.825	5.681	.010	-.17416667	.045529295	-.28710839	-.06122494

Appendix I: Between-within ANOVA output

Guilt/Shame

Within-Subjects Factors

Measure: Shameguilt

Dependent Variable

Time	Dependent Variable
1	p1sg
2	p2sg
3	p3sg

Between-Subjects Factors

	Value Label	N	
group - 0 poor 1 good	0	Poor	4
	1	Good	4

Descriptive Statistics

	group - 0 poor 1 good	Mean	Std. Deviation	N
p1-sg	Poor	.1750	.06807	4
	Good	.1450	.08347	4
	Total	.1600	.07231	8
p2-sg	Poor	.215000000	.166833250	4
	Good	.077500000	.041129876	4
	Total	.146250000	.134370224	8
p3-sg	Poor	.125000000	.117898261	4
	Good	.082500000	.076321688	4
	Total	.103750000	.094708198	8

Multivariate Tests^a

Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Time	Pillai's Trace	.428	1.869 ^b	2.000	5.000	.248	.428
	Wilks' Lambda	.572	1.869 ^b	2.000	5.000	.248	.428
	Hotelling's Trace	.748	1.869 ^b	2.000	5.000	.248	.428
	Roy's Largest Root	.748	1.869 ^b	2.000	5.000	.248	.428
Time * group0poor1good	Pillai's Trace	.282	.982 ^b	2.000	5.000	.437	.282
	Wilks' Lambda	.718	.982 ^b	2.000	5.000	.437	.282
	Hotelling's Trace	.393	.982 ^b	2.000	5.000	.437	.282
	Roy's Largest Root	.393	.982 ^b	2.000	5.000	.437	.282

a. Design: Intercept + group0poor1good
Within Subjects Design: Time

b. Exact statistic

Tests of Within-Subjects Effects

Measure: Shameguilt

Source		Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Time	Sphericity Assumed	.014	2	.007	1.526	.257	.203
	Greenhouse-Geisser	.014	1.753	.008	1.526	.260	.203
	Huynh-Feldt	.014	2.000	.007	1.526	.257	.203
	Lower-bound	.014	1.000	.014	1.526	.263	.203
Time * group0poor1good	Sphericity Assumed	.014	2	.007	1.534	.255	.204
	Greenhouse-Geisser	.014	1.753	.008	1.534	.258	.204
	Huynh-Feldt	.014	2.000	.007	1.534	.255	.204
	Lower-bound	.014	1.000	.014	1.534	.262	.204
Error(Time)	Sphericity Assumed	.054	12	.005			
	Greenhouse-Geisser	.054	10.516	.005			
	Huynh-Feldt	.054	12.000	.005			
	Lower-bound	.054	6.000	.009			

Tests of Within-Subjects Contrasts

Measure: Shameguilt

Source	Time	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Time	Linear	.013	1	.013	4.431	.080	.425
	Quadratic	.001	1	.001	.179	.687	.029
Time * group0poor1good	Linear	.000	1	.000	.055	.823	.009
	Quadratic	.014	1	.014	2.220	.187	.270
Error(Time)	Linear	.017	6	.003			
	Quadratic	.037	6	.006			

Tests of Between-Subjects Effects

Measure: Shameguilt

Transformed Variable: Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Intercept	.448	1	.448	20.936	.004	.777
group0poor1good	.029	1	.029	1.373	.286	.186
Error	.128	6	.021			

Pairwise Comparisons

Measure: Shameguilt

(I) Time	(J) Time	Mean Difference (I-J)	Std. Error	Sig. ^a	95% Confidence Interval for Difference ^a	
					Lower Bound	Upper Bound
1	2	.014	.035	.711	-.073	.100
	3	.056	.027	.080	-.009	.122
2	1	-.014	.035	.711	-.100	.073
	3	.043	.038	.302	-.050	.135
3	1	-.056	.027	.080	-.122	.009
	2	-.043	.038	.302	-.135	.050

Based on estimated marginal means

a. Adjustment for multiple comparisons: Least Significant Difference (equivalent to no adjustments).

Appendix J: Friedman's Tests output

Fear – not recovered group:

	N	25th	Percentiles 50th (Median)	75th
p1-sg	4	.1200	.1600	.2450
p2-sg	4	.105000000	.150000000	.390000000
p3-sg	4	.012500000	.130000000	.232500000

a. group - 0 poor 1 good = 0

	Mean Rank
p1-f	2.00
p2-f	2.25
p3-f	1.75

a. group - 0
poor 1
good = 0

N	4
Chi-Square	.500
df	2
Asymp. Sig.	.779

a. group - 0 poor
1 good = 0
b. Friedman Test

Fear – recovered group:

	N	25th	Percentiles 50th (Median)	75th
p1-f	4	.087500000	.235000000	.390000000
p2-f	4	.0525	.1650	.2550
p3-f	4	.042500000	.120000000	.145000000

a. group - 0 poor 1 good = 1

	Mean Rank
p1-f	3.00
p2-f	1.75
p3-f	1.25

a. group - 0
poor 1
good = 1

N	4
Chi-Square	6.500
df	2
Asymp. Sig.	.039

a. group - 0 poor
1 good = 1
b. Friedman Test

Follow up wilcoxon signed rank test for recovered group:

	p2-f - p1-f	p3-f - p2-f	p1-f - p3-f
Z	-1.826 ^c	-1.289 ^c	-1.826 ^d
Asymp. Sig. (2-tailed)	.068	.197	.068

a. group - 0 poor 1 good = 1
b. Wilcoxon Signed Ranks Test
c. Based on positive ranks.
d. Based on negative ranks.

Negative self-evaluation not recovered group:

	N	25th	Percentiles 50th (Median)	75th
p1-ne	4	.010000000	.055000000	.092500000
p2-ne	4	.0125	.0250	.0525
p3-ne	4	.0075	.0300	.0300

a. group - 0 poor 1 good = 0

	Mean Rank
p1-ne	2.63
p2-ne	1.88
p3-ne	1.50

a. group - 0
poor 1 good
= 0

N	4
Chi-Square	3.000
df	2
Asymp. Sig.	.223

a. group - 0 poor
1 good = 0
b. Friedman Test

Negative self-evaluation recovered group:

Descriptive Statistics^a

	N	25th	Percentiles 50th (Median)	75th
p1-ne	4	.040000000	.055000000	.107500000
p2-ne	4	.0025	.0100	.0325
p3-ne	4	.0000	.0050	.0400

a. group - 0 poor 1 good = 1

Ranks^a

	Mean Rank
p1-ne	2.75
p2-ne	1.63
p3-ne	1.63

a. group - 0 poor 1 good = 1

Test Statistics^{a,b}

N	4
Chi-Square	3.600
df	2
Asymp. Sig.	.165

a. group - 0 poor 1 good = 1
b. Friedman Test

Need – not recovered group:

Descriptive Statistics^a

	N	25th	Percentiles 50th (Median)	75th
p1-n	4	.015000000	.040000000	.050000000
p2-n	4	.035000000	.050000000	.065000000
p3-n	4	.047500000	.075000000	.102500000

a. group - 0 poor 1 good = 0

Ranks^a

	Mean Rank
p1-n	1.25
p2-n	1.75
p3-n	3.00

a. group - 0 poor 1 good = 0

Test Statistics^{a,b}

N	4
Chi-Square	7.429
df	2
Asymp. Sig.	.024

a. group - 0 poor 1 good = 0
b. Friedman Test

Follow up Wilcoxon Signed Rank Tests:

Test Statistics^{a,b}

	p2-n - p1-n	p3-n - p2-n	p1-n - p3-n
Z	-1.342 ^c	-1.826 ^c	-1.841 ^d
Asymp. Sig. (2-tailed)	.180	.068	.066

a. group - 0 poor 1 good = 0
b. Wilcoxon Signed Ranks Test
c. Based on negative ranks.
d. Based on positive ranks.

Need – recovered group:

Descriptive Statistics^a

	N	25th	Percentiles 50th (Median)	75th
p1-n	4	.040000000	.040000000	.062500000
p2-n	4	.032500000	.070000000	.107500000
p3-n	4	.060000000	.105000000	.150000000

a. group - 0 poor 1 good = 1

Ranks^a

	Mean Rank
p1-n	1.63
p2-n	1.88
p3-n	2.50

a. group - 0 poor 1 good = 1

Test Statistics^{a,b}

N	4
Chi-Square	1.733
df	2
Asymp. Sig.	.420

a. group - 0 poor 1 good = 1
b. Friedman Test

Hurt grief – not recovered group:

Descriptive Statistics^a

	N	25th	Percentiles 50th (Median)	75th
p1-hg	4	.0000	.0100	.0275
p2-hg	4	.007500000	.040000000	.080000000
p3-hg	4	.0150	.0900	.1200

a. group - 0 poor 1 good = 0

Ranks^a

	Mean Rank
p1-hg	1.50
p2-hg	2.00
p3-hg	2.50

a. group - 0 poor 1 good = 0

Test Statistics^{a,b}

N	4
Chi-Square	2.286
df	2
Asymp. Sig.	.319

a. group - 0 poor 1 good = 0
b. Friedman Test

Hurt/grief – recovered group:

	N	25th	Percentiles 50th (Median)	75th
p1-hg	4	.0350	.0550	.1950
p2-hg	4	.052500000	.100000000	.147500000
p3-hg	4	.0425	.1000	.1800

a. group - 0 poor 1 good = 1

	Mean Rank
p1-hg	2.00
p2-hg	2.00
p3-hg	2.00

a. group - 0 poor 1 good = 1

	N	4
Chi-Square		.000
df		2
Asymp. Sig.		1.000

a. group - 0 poor 1 good = 1
b. Friedman Test

Self soothing – not recovered group:

	N	25th	Percentiles 50th (Median)	75th
p1-ss	4	.0000	.0000	.0150
p2-ss	4	.0025	.0150	.0350
p3-ss	4	.0225	.0400	.0575

a. group - 0 poor 1 good = 0

	Mean Rank
p1-ss	1.38
p2-ss	1.88
p3-ss	2.75

a. group - 0 poor 1 good = 0

	N	4
Chi-Square		5.636
df		2
Asymp. Sig.		.060

a. group - 0 poor 1 good = 0
b. Friedman Test

Self-soothing – recovered group:

	N	25th	Percentiles 50th (Median)	75th
p1-ss	4	.0000	.0050	.0250
p2-ss	4	.0000	.0050	.0100
p3-ss	4	.0000	.0000	.0150

a. group - 0 poor 1 good = 1

	Mean Rank
p1-ss	2.38
p2-ss	1.88
p3-ss	1.75

a. group - 0 poor 1 good = 1

	N	4
Chi-Square		1.400
df		2
Asymp. Sig.		.497

a. group - 0 poor 1 good = 1
b. Friedman Test

Assertive anger – not recovered group :

	N	25th	Percentiles 50th (Median)	75th
p1-aa	4	.0000	.0200	.1825
p2-aa	4	.070000000	.110000000	.135000000
p3-aa	4	.0575	.1050	.1300

a. group - 0 poor 1 good = 0

	Mean Rank
p1-aa	1.50
p2-aa	2.00
p3-aa	2.50

a. group - 0 poor 1 good = 0

	N	4
Chi-Square		2.000
df		2
Asymp. Sig.		.368

a. group - 0 poor 1 good = 0
b. Friedman Test

Assertive anger – recovered group:

	N	25th	Percentiles 50th (Median)	75th
p1-aa	4	.0525	.0950	.1150
p2-aa	4	.067500000	.145000000	.207500000
p3-aa	4	.1000	.1400	.1875

a. group - 0 poor 1 good = 1

	Mean Rank
p1-aa	1.75
p2-aa	2.00
p3-aa	2.25

a. group - 0 poor 1 good = 1

	N	4
Chi-Square		.500
df		2
Asymp. Sig.		.779

a. group - 0 poor 1 good = 1
b. Friedman Test

Acceptance – not recovered group:

Descriptive Statistics^a

	N	25th	Percentiles 50th (Median)	75th
p1-acc	4	.000000000	.000000000	.015000000
p2-acc	4	.007500000	.035000000	.062500000
p3-acc	4	.0000	.0250	.0575

a. group - 0 poor 1 good = 0

Ranks^a

	Mean Rank
p1-acc	1.50
p2-acc	2.25
p3-acc	2.25

a. group - 0
poor 1 good
= 0**Test Statistics^{a,b}**

N	4
Chi-Square	2.000
df	2
Asymp. Sig.	.368

a. group - 0 poor
1 good = 0
b. Friedman Test**Acceptance – recovered group:****Descriptive Statistics^a**

	N	25th	Percentiles 50th (Median)	75th
p1-acc	4	.002500000	.010000000	.055000000
p2-acc	4	.080000000	.095000000	.372500000
p3-acc	4	.0325	.1400	.2925

a. group - 0 poor 1 good = 1

Ranks^a

	Mean Rank
p1-acc	1.13
p2-acc	2.25
p3-acc	2.63

a. group - 0
poor 1 good
= 1**Test Statistics^{a,b}**

N	4
Chi-Square	5.200
df	2
Asymp. Sig.	.074

a. group - 0 poor
1 good = 1
b. Friedman Test

Appendix K: Linear mixed models output

```

7 . mixed f sg_lag ra_lag ne_lag f_lag i.group || id:

Performing EM optimization ...

Performing gradient-based optimization:
Iteration 0:  log likelihood = 18.123041
Iteration 1:  log likelihood = 18.354115
Iteration 2:  log likelihood = 18.434876
Iteration 3:  log likelihood = 18.435482
Iteration 4:  log likelihood = 18.435482

Computing standard errors ...

Mixed-effects ML regression              Number of obs   =       15
Group variable: id                      Number of groups =        8
                                         Obs per group:
                                         min =          1
                                         avg =          1.9
                                         max =          2
                                         Wald chi2(5)    =       8.06
Log likelihood = 18.435482                Prob > chi2     =       0.1530

```

f	Coefficient	Std. err.	z	P> z	[95% conf. interval]	
sg_lag	-.5168945	.3915081	-1.32	0.187	-1.284236	.2504473
ra_lag	-1.052434	.5363254	-1.96	0.050	-2.103613	-.0012559
ne_lag	1.975033	1.413477	1.40	0.162	-.7953321	4.745397
f_lag	-.2271008	.2933997	-0.77	0.439	-.8021537	.3479522
group						
Recovered	-.0857774	.0465143	-1.84	0.065	-.1769438	.005389
_cons	.3266023	.110881	2.95	0.003	.1092796	.543925

Random-effects parameters	Estimate	Std. err.	[95% conf. interval]	
id: Identity				
var(_cons)	7.46e-14	4.61e-10	0	.
var(Residual)	.0050119	.0018301	.0024501	.0102522

LR test vs. linear model: chibar2(01) = 0.00 Prob >= chibar2 = 1.0000


```
10 . mixed n f_lag n_lag i.group || id:
```

```
Performing EM optimization ...
```

```
Performing gradient-based optimization:
```

```
Iteration 0: log likelihood = 32.793871
```

```
Iteration 1: log likelihood = 32.986309
```

```
Iteration 2: log likelihood = 32.987706
```

```
Iteration 3: log likelihood = 32.987706
```

```
Computing standard errors ...
```

```
Mixed-effects ML regression
```

```
Group variable: id
```

```
Number of obs = 16
```

```
Number of groups = 8
```

```
Obs per group:
```

```
min = 2
```

```
avg = 2.0
```

```
max = 2
```

```
Wald chi2(3) = 7.84
```

```
Prob > chi2 = 0.0493
```

```
Log likelihood = 32.987706
```

n	Coefficient	Std. err.	z	P> z	[95% conf. interval]
f_lag	.0799261	.0759249	1.05	0.292	-.068884 .2287362
n_lag	.5357678	.3432715	1.56	0.119	-.137032 1.208568

group						
Recovered	.0137961	.0162765	0.85	0.397	-.0181052	.0456974
_cons	.0264422	.0191966	1.38	0.168	-.0111826	.0640669

Random-effects parameters	Estimate	Std. err.	[95% conf. interval]
id: Identity			
var(_cons)	2.17e-14	1.10e-10	0 .
var(Residual)	.0009478	.0003351	.000474 .0018953

```
LR test vs. linear model: chibar2(01) = 0.00
```

```
Prob >= chibar2 = 1.0000
```

```
13 . mixed ss f_lag n_lag ss_lag i.group || id:
```

```
Performing EM optimization ...
```

```
Performing gradient-based optimization:
```

```
Iteration 0: log likelihood = 46.579099
Iteration 1: log likelihood = 46.733744
Iteration 2: log likelihood = 46.849258
Iteration 3: log likelihood = 46.85566
Iteration 4: log likelihood = 46.855661
```

```
Computing standard errors ...
```

```
Mixed-effects ML regression      Number of obs      =      16
Group variable: id              Number of groups   =       8
                                Obs per group:
                                min =       2
                                avg =      2.0
                                max =       2
                                Wald chi2(4)    =     17.11
                                Prob > chi2    =     0.0018
Log likelihood = 46.855661
```

ss	Coefficient	Std. err.	z	P> z	[95% conf. interval]	
f_lag	.0312102	.0332509	0.94	0.348	-.0339605	.0963808
n_lag	-.0553534	.1456699	-0.38	0.704	-.3408612	.2301545
ss_lag	.5215635	.2931409	1.78	0.075	-.052982	1.096109
group						
Recovered	-.02187	.0068582	-3.19	0.001	-.0353118	-.0084281
_cons	.0200462	.0098806	2.03	0.042	.0006807	.0394118

Random-effects parameters	Estimate	Std. err.	[95% conf. interval]	
id: Identity				
var(_cons)	9.97e-12	7.73e-07	0	.
var(Residual)	.0001674	.0000592	.0000837	.0003348

```
LR test vs. linear model: chibar2(01) = 0.00      Prob >= chibar2 = 1.0000
```

```
16 . mixed hg f_lag n_lag hg_lag i.group || id:
```

```
Performing EM optimization ...
```

```
Performing gradient-based optimization:
```

```
Iteration 0: log likelihood = 26.171122
```

```
Iteration 1: log likelihood = 26.171834
```

```
Iteration 2: log likelihood = 26.171834
```

```
Computing standard errors ...
```

```
Mixed-effects ML regression
```

```
Group variable: id
```

```
Number of obs = 16
```

```
Number of groups = 8
```

```
Obs per group:
```

```
min = 2
```

```
avg = 2.0
```

```
max = 2
```

```
Wald chi2(4) = 3.70
```

```
Prob > chi2 = 0.4476
```

```
Log likelihood = 26.171834
```

hg	Coefficient	Std. err.	z	P> z	[95% conf. interval]	
f_lag	-.1186875	.1158243	-1.02	0.305	-.345699	.108324
n_lag	.0715428	.5020725	0.14	0.887	-.9125012	1.055587
hg_lag	-.0724877	.2043431	-0.35	0.723	-.4729928	.3280174
group						
Recovered	.0526206	.0329393	1.60	0.110	-.0119392	.1171803
_cons	.0774346	.0334708	2.31	0.021	.0118331	.1430361

Random-effects parameters		Estimate	Std. err.	[95% conf. interval]	
id: Identity					
	var(_cons)	.0008075	.0009359	.0000833	.007829
	var(Residual)	.0015566	.0008046	.0005653	.0042868

```
19 . mixed aa f_lag n_lag i.group || id:
```

```
Performing EM optimization ...
```

```
Performing gradient-based optimization:
```

```
Iteration 0: log likelihood = 26.894409
```

```
Iteration 1: log likelihood = 27.083934
```

```
Iteration 2: log likelihood = 27.085535
```

```
Iteration 3: log likelihood = 27.085535
```

```
Computing standard errors ...
```

```
Mixed-effects ML regression          Number of obs    =      16
Group variable: id                   Number of groups =       8
                                      Obs per group:
                                      min =          2
                                      avg =          2.0
                                      max =          2
                                      Wald chi2(3)      =      3.36
Log likelihood = 27.085535            Prob > chi2      =      0.3394
```

aa	Coefficient	Std. err.	z	P> z	[95% conf. interval]	
f_lag	.0394175	.1097967	0.36	0.720	-.1757801	.2546151
n_lag	-.0826121	.4964125	-0.17	0.868	-1.055563	.8903386
group						
Recovered	.0401107	.0235378	1.70	0.088	-.0060225	.0862439
_cons	.0982079	.0277607	3.54	0.000	.0437979	.1526178

Random-effects parameters		Estimate	Std. err.	[95% conf. interval]	
id: Identity					
	var(_cons)	7.18e-14	3.47e-10	0	.
	var(Residual)	.0019822	.0007008	.0009913	.0039635

```
LR test vs. linear model: chibar2(01) = 0.00          Prob >= chibar2 = 1.0000
```



```
22 . mixed acc f_lag n_lag acc_lag i.group || id:
```

```
Mixed-effects ML regression      Number of obs   =      16
Group variable: id              Number of groups =       8
                                Obs per group:
                                min =       2
                                avg =      2.0
                                max =       2
                                Wald chi2(4)   =      16.12
                                Prob > chi2    =      0.0029

Log likelihood = 16.303675
```

acc	Coefficient	Std. err.	z	P> z	[95% conf. interval]	
f_lag	-.2762665	.2203548	-1.25	0.210	-.7081539	.1556209
n_lag	.9112933	1.129077	0.81	0.420	-1.301658	3.124244
acc_lag	-.5675397	.2515203	-2.26	0.024	-1.06051	-.074569
group						
Recovered	.1781468	.0479496	3.72	0.000	.0841673	.2721264
_cons	.0498001	.0556674	0.89	0.371	-.0593059	.1589062

Random-effects parameters	Estimate	Std. err.	[95% conf. interval]	
id: Identity				
var(_cons)	7.96e-10	9.71e-07	0	.
var(Residual)	.0076287	.0026972	.0038151	.0152544

```
LR test vs. linear model: chibar2(01) = 0.00          Prob >= chibar2 = 1.0000
```

```
25 . mixed pad f_lag n_lag pad_lag i.group || id:
```

```
Performing EM optimization ...
```

```
Performing gradient-based optimization:
```

```
Iteration 0: log likelihood = 15.293138
```

```
Iteration 1: log likelihood = 15.489449
```

```
Iteration 2: log likelihood = 15.493625
```

```
Iteration 3: log likelihood = 15.493625
```

```
Computing standard errors ...
```

```
Mixed-effects ML regression
```

```
Group variable: id
```

```
Number of obs = 16
```

```
Number of groups = 8
```

```
Obs per group:
```

```
min = 2
```

```
avg = 2.0
```

```
max = 2
```

```
Wald chi2(4) = 20.99
```

```
Prob > chi2 = 0.0003
```

```
Log likelihood = 15.493625
```

pad	Coefficient	Std. err.	z	P> z	[95% conf. interval]
f_lag	-.1666274	.2594358	-0.64	0.521	-.6751122 .3418574
n_lag	-1.130816	1.4399	-0.79	0.432	-3.952969 1.691336
pad_lag	.1300521	.2711338	0.48	0.631	-.4013603 .6614646
group					
Recovered	.1994112	.0600426	3.32	0.001	.0817298 .3170926
_cons	.2769039	.0598496	4.63	0.000	.159601 .3942069

Random-effects parameters	Estimate	Std. err.	[95% conf. interval]
id: Identity			
var(_cons)	1.28e-11	1.13e-10	4.23e-19 .0003892
var(Residual)	.0084416	.0029848	.0042215 .0168807

```
LR test vs. linear model: chibar2(01) = 0.00
```

```
Prob >= chibar2 = 1.0000
```

```
28 . mixed ss sg_lag ra_lag ne_lag ss_lag i.group || id:
```

```
Performing EM optimization ...
```

```
Performing gradient-based optimization:
```

```
Iteration 0: log likelihood = 44.137077
```

```
Iteration 1: log likelihood = 44.336397
```

```
Iteration 2: log likelihood = 44.341105
```

```
Iteration 3: log likelihood = 44.341105
```

```
Computing standard errors ...
```

```
Mixed-effects ML regression      Number of obs      =      15
Group variable: id              Number of groups   =       8
```

```
Obs per group:
```

```
min = 1
```

```
avg = 1.9
```

```
max = 2
```

```
Wald chi2(5) = 18.07
```

```
Prob > chi2 = 0.0029
```

```
Log likelihood = 44.341105
```

ss	Coefficient	Std. err.	z	P> z	[95% conf. interval]	
sg_lag	.081232	.0706404	1.15	0.250	-.0572206	.2196847
ra_lag	-.0137175	.0565028	-0.24	0.808	-.1244609	.0970258
ne_lag	-.0298632	.1965893	-0.15	0.879	-.4151712	.3554448
ss_lag	.0430511	.4321842	0.10	0.921	-.8040144	.8901167
group						
Recovered	-.0162509	.008458	-1.92	0.055	-.0328283	.0003265
_cons	.0148404	.0093084	1.59	0.111	-.0034037	.0330846

Random-effects parameters		Estimate	Std. err.	[95% conf. interval]	
id: Identity					
	var(_cons)	4.44e-13	3.71e-12	3.35e-20	5.88e-06
	var(Residual)	.0001585	.0000579	.0000775	.0003241

```
LR test vs. linear model: chibar2(01) = 0.00 Prob >= chibar2 = 1.0000
```



```
31 . mixed hg sg_lag ra_lag ne_lag hg_lag i.group || id:
```

```
Performing EM optimization ...
```

```
Performing gradient-based optimization:
```

```
Iteration 0: log likelihood = 26.658742
```

```
Iteration 1: log likelihood = 26.661528
```

```
Iteration 2: log likelihood = 26.661528
```

```
Computing standard errors ...
```

```
Mixed-effects ML regression
Group variable: id
Number of obs      =      15
Number of groups   =       8
Obs per group:
    min =          1
    avg =          1.9
    max =           2
Wald chi2(5)       =      10.32
Prob > chi2        =      0.0666
Log likelihood = 26.661528
```

hg	Coefficient	Std. err.	z	P> z	[95% conf. interval]	
sg_lag	.3386319	.1537077	2.20	0.028	.0373704	.6398935
ra_lag	.2723942	.1914717	1.42	0.155	-.1028834	.6476718
ne_lag	-.8132183	.5292607	-1.54	0.124	-1.85055	.2241135
hg_lag	-.201204	.1994545	-1.01	0.313	-.5921277	.1897197
group						
Recovered	.0977691	.0333757	2.93	0.003	.0323539	.1631842
_cons	.0083011	.0318505	0.26	0.794	-.0541246	.0707269

Random-effects parameters	Estimate	Std. err.	[95% conf. interval]	
id: Identity				
var(_cons)	.0004673	.0006783	.0000272	.0080377
var(Residual)	.0012663	.0006741	.0004461	.0035947

```
LR test vs. linear model: chibar2(01) = 0.51 Prob >= chibar2 = 0.2366
```



```
34 . mixed aa sg_lag ra_lag ne_lag aa_lag i.group || id:
```

```
Performing EM optimization ...
```

```
Performing gradient-based optimization:
```

```
Iteration 0: log likelihood = 27.047442
```

```
Iteration 1: log likelihood = 27.251578
```

```
Iteration 2: log likelihood = 27.257546
```

```
Iteration 3: log likelihood = 27.257546
```

```
Computing standard errors ...
```

```
Mixed-effects ML regression
Group variable: id
Number of obs      =      15
Number of groups   =       8
Obs per group:
    min =          1
    avg =          1.9
    max =           2
Wald chi2(5)       =       9.77
Prob > chi2        =      0.0819
Log likelihood = 27.257546
```

aa	Coefficient	Std. err.	z	P> z	[95% conf. interval]	
sg_lag	-.1504251	.1524455	-0.99	0.324	-.4492128	.1483626
ra_lag	.1942598	.1853843	1.05	0.295	-.1690868	.5576064
ne_lag	-.1626741	.5738073	-0.28	0.777	-1.287316	.9619676

aa_lag	-.2370645	.1815093	-1.31	0.192	-.5928162	.1186873
group						
Recovered	.0317202	.0247284	1.28	0.200	-.0167465	.0801869
_cons	.1409851	.032302	4.36	0.000	.0776743	.2042959

Random-effects parameters	Estimate	Std. err.	[95% conf. interval]	
id: Identity				
var(_cons)	7.03e-12	3.53e-11	3.77e-16	1.31e-07
var(Residual)	.0015458	.0005646	.0007556	.0031625

```
LR test vs. linear model: chibar2(01) = 0.00 Prob >= chibar2 = 1.0000
```

```
37 . mixed acc sg_lag ra_lag ne_lag acc_lag i.group || id:
```

```
Performing EM optimization ...
```

```
Performing gradient-based optimization:
```

```
Iteration 0: log likelihood = 16.369641 (not concave)
Iteration 1: log likelihood = 16.96481
Iteration 2: log likelihood = 17.002829
Iteration 3: log likelihood = 17.003986
Iteration 4: log likelihood = 17.003986
```

```
Computing standard errors ...
```

```
Mixed-effects ML regression      Number of obs      =      15
Group variable: id              Number of groups   =       8
                                Obs per group:
                                min =      1
                                avg =     1.9
                                max =      2
                                Wald chi2(5)    =     25.23
                                Prob > chi2    =     0.0001

Log likelihood = 17.003986
```

acc	Coefficient	Std. err.	z	P> z	[95% conf. interval]	
sg_lag	.3544647	.2978684	1.19	0.234	-.2293465	.938276
ra_lag	.2659154	.3513526	0.76	0.449	-.422723	.9545538
ne_lag	-2.425945	1.039661	-2.33	0.020	-4.463643	-.388246
acc_lag	-.6305511	.2143513	-2.94	0.003	-1.050672	-.2104302
group						
Recovered	.2356999	.0504084	4.68	0.000	.1369013	.3344985
_cons	.0518754	.0612278	0.85	0.397	-.0681289	.1718797

Random-effects parameters	Estimate	Std. err.	[95% conf. interval]	
id: Identity				
var(_cons)	2.45e-11	9.11e-08	0	.
var(Residual)	.0060659	.0022149	.0029654	.0124082

```
LR test vs. linear model: chibar2(01) = 0.00 Prob >= chibar2 = 1.0000
```

```
40 . mixed pad sg_lag ra_lag ne_lag pad_lag i.group || id:
```

```
Performing EM optimization ...
```

```
Performing gradient-based optimization:
```

```
Iteration 0: log likelihood = 16.671116
```

```
Iteration 1: log likelihood = 16.875564
```

```
Iteration 2: log likelihood = 16.884443
```

```
Iteration 3: log likelihood = 16.884443
```

```
Computing standard errors ...
```

```
Mixed-effects ML regression
```

```
Group variable: id
```

```
Number of obs = 15
```

```
Number of groups = 8
```

```
Obs per group:
```

```
min = 1
```

```
avg = 1.9
```

```
max = 2
```

```
Wald chi2(5) = 35.52
```

```
Prob > chi2 = 0.0000
```

```
Log likelihood = 16.884443
```

pad	Coefficient	Std. err.	z	P> z	[95% conf. interval]	
sg_lag	.7075821	.3049316	2.32	0.020	.1099272	1.305237
ra_lag	.7386208	.3548601	2.08	0.037	.0431077	1.434134
ne_lag	-2.928699	1.243402	-2.36	0.019	-5.365722	-.4916771
pad_lag	-.1608832	.2166379	-0.74	0.458	-.5854857	.2637192
group						
Recovered	.3083155	.0667612	4.62	0.000	.1774659	.439165
_cons	.1624524	.0718675	2.26	0.024	.0215946	.3033101

Random-effects parameters	Estimate	Std. err.	[95% conf. interval]
id: Identity			

```
43 . mixed ss n_lag ss_lag i.group || id:
```

```
Performing EM optimization ...
```

```
Performing gradient-based optimization:
```

```
Iteration 0: log likelihood = 46.212086
```

```
Iteration 1: log likelihood = 46.414405
```

```
Iteration 2: log likelihood = 46.426851
```

```
Iteration 3: log likelihood = 46.426852
```

```
Computing standard errors ...
```

```
Mixed-effects ML regression
```

```
Group variable: id
```

```
Number of obs = 16
```

```
Number of groups = 8
```

```
Obs per group:
```

```
min = 2
```

```
avg = 2.0
```

```
max = 2
```

```
Wald chi2(3) = 15.38
```

```
Prob > chi2 = 0.0015
```

```
Log likelihood = 46.426852
```

ss	Coefficient	Std. err.	z	P> z	[95% conf. interval]	
n_lag	-.0175382	.1437904	-0.12	0.903	-.2993623	.2642858
ss_lag	.4442837	.2889832	1.54	0.124	-.122113	1.01068
group						
Recovered	-.0217989	.0070441	-3.09	0.002	-.035605	-.0079928
_cons	.0244972	.0089037	2.75	0.006	.0070462	.0419482

Random-effects parameters		Estimate	Std. err.	[95% conf. interval]	
id: Identity					
	var(_cons)	2.86e-11	4.24e-08	0	.
	var(Residual)	.0001767	.0000625	.0000884	.0003533

```
LR test vs. linear model: chibar2(01) = 0.00
```

```
Prob >= chibar2 = 1.0000
```



```
46 . mixed hg n_lag hg_lag i.group || id:
```

```
Performing EM optimization ...
```

```
Performing gradient-based optimization:
```

```
Iteration 0: log likelihood = 25.662321
```

```
Iteration 1: log likelihood = 25.663891
```

```
Iteration 2: log likelihood = 25.663891
```

```
Computing standard errors ...
```

```
Mixed-effects ML regression
```

```
Group variable: id
```

```
Number of obs = 16
```

```
Number of groups = 8
```

```
Obs per group:
```

```
min = 2
```

```
avg = 2.0
```

```
max = 2
```

```
Wald chi2(3) = 2.52
```

```
Prob > chi2 = 0.4720
```

```
Log likelihood = 25.663891
```

hg	Coefficient	Std. err.	z	P> z	[95% conf. interval]	
n_lag	-.0355383	.5092476	-0.07	0.944	-1.033645	.9625686
hg_lag	-.0620925	.2117152	-0.29	0.769	-.4770466	.3528616
group						
Recovered	.049924	.0337443	1.48	0.139	-.0162136	.1160616
_cons	.0619679	.030605	2.02	0.043	.0019831	.1219527

Random-effects parameters	Estimate	Std. err.	[95% conf. interval]	
id: Identity				
var(_cons)	.0008259	.0010607	.0000666	.0102351
var(Residual)	.0016816	.0009062	.0005849	.0048351

```
LR test vs. linear model: chibar2(01) = 0.66
```

```
Prob >= chibar2 = 0.2090
```

```
49 . mixed aa n_lag aa_lag i.group || id:
```

```
Performing EM optimization ...
```

```
Performing gradient-based optimization:
```

```
Iteration 0: log likelihood = 27.414941
```

```
Iteration 1: log likelihood = 27.612215
```

```
Iteration 2: log likelihood = 27.621485
```

```
Iteration 3: log likelihood = 27.621486
```

```
Computing standard errors ...
```

```
Mixed-effects ML regression
```

```
Group variable: id
```

```
Number of obs = 16
```

```
Number of groups = 8
```

```
Obs per group:
```

```
min = 2
```

```
avg = 2.0
```

```
max = 2
```

```
Wald chi2(3) = 4.70
```

```
Prob > chi2 = 0.1950
```

```
Log likelihood = 27.621486
```

aa	Coefficient	Std. err.	z	P> z	[95% conf. interval]	
n_lag	.1978361	.4943908	0.40	0.689	-.7711521	1.166824
aa_lag	-.1997946	.178957	-1.12	0.264	-.5505439	.1509546
group						
Recovered	.0422795	.022814	1.85	0.064	-.0024352	.0869942
_cons	.1100743	.0255211	4.31	0.000	.0600539	.1600946

Random-effects parameters		Estimate	Std. err.	[95% conf. interval]	
id: Identity					
	var(_cons)	1.23e-10	2.66e-07	0	.
	var(Residual)	.0018537	.0006554	.000927	.0037067

```
LR test vs. linear model: chibar2(01) = 0.00
```

```
Prob >= chibar2 = 1.0000
```

```
52 . mixed acc n_lag acc_lag i.group || id:
```

```
Performing EM optimization ...
```

```
Performing gradient-based optimization:
```

```
Iteration 0: log likelihood = 15.374605
```

```
Iteration 1: log likelihood = 15.553402
```

```
Iteration 2: log likelihood = 15.553998
```

```
Iteration 3: log likelihood = 15.553998
```

```
Computing standard errors ...
```

```
Mixed-effects ML regression
```

```
Group variable: id
```

```
Number of obs = 16
```

```
Number of groups = 8
```

```
Obs per group:
```

```
min = 2
```

```
avg = 2.0
```

```
max = 2
```

```
Wald chi2(3) = 13.24
```

```
Prob > chi2 = 0.0041
```

```
Log likelihood = 15.553998
```

acc	Coefficient	Std. err.	z	P> z	[95% conf. interval]	
n_lag	.3644632	1.091389	0.33	0.738	-1.774619	2.503546
acc_lag	-.501045	.2576589	-1.94	0.052	-1.006047	.0039571
group						
Recovered	.1729137	.050059	3.45	0.001	.0747998	.2710276
_cons	.0257812	.0547742	0.47	0.638	-.0815742	.1331366

Random-effects parameters	Estimate	Std. err.	[95% conf. interval]	
id: Identity				
var(_cons)	7.26e-14	5.91e-10	0	.
var(Residual)	.0083782	.0029621	.0041899	.0167531

```
LR test vs. linear model: chibar2(01) = 0.00
```

```
Prob >= chibar2 = 1.0000
```


55 . mixed pad n_lag pad_lag i.group || id:

Performing EM optimization ...

Performing gradient-based optimization:

Iteration 0: log likelihood = **15.08889**

Iteration 1: log likelihood = **15.285585**

Iteration 2: log likelihood = **15.289985**

Iteration 3: log likelihood = **15.289985**

Computing standard errors ...

Mixed-effects ML regression	Number of obs	=	16
Group variable: id	Number of groups	=	8
	Obs per group:		
	min	=	2
	avg	=	2.0
	max	=	2
Log likelihood = 15.289985	Wald chi2(3)	=	20.06
	Prob > chi2	=	0.0002

pad	Coefficient	Std. err.	z	P> z	[95% conf. interval]	
n_lag	-1.637897	1.219574	-1.34	0.179	-4.028218	.7524237
pad_lag	.2148654	.2398361	0.90	0.370	-.2552047	.6849355
group						
Recovered	.1874958	.0578361	3.24	0.001	.0741391	.3008525
_cons	.2584552	.0531785	4.86	0.000	.1542272	.3626831

Random-effects parameters	Estimate	Std. err.	[95% conf. interval]	
id: Identity				
var(_cons)	1.22e-11	4.72e-08	0	.
var(Residual)	.0086593	.0030615	.0043305	.0173152

LR test vs. linear model: chibar2(01) = 0.00 Prob >= chibar2 = 1.0000

56 .

end of do-file

Appendix L: End of Study Letter for NHS Ethics

Name of Trust/location: [REDACTED]

Type of project: Major Research Project

Year completed: 2022

Title: How is emotional processing across an emotion-focused therapy for adults with anorexia nervosa associated with outcome?

Trainee: [REDACTED]

Supervisors: [REDACTED]

Section B Abstract:

Objective: This study explored the mechanism of emotional change for an emotion-focused therapy for adults with anorexia nervosa. **Methods:** This was a mixed methods design with a sample of eight participants (n = 4 recovered, n = 4 not fully recovered) who underwent a specialist emotion-focused therapy (SPEAKS) for anorexia nervosa. Emotional expression was sampled for six entire therapy sessions across three phases (early, middle, late) for each participant using the Classification of Affective Meaning States process measure, enabling minute-by-minute observation of expressed emotional states. Complementary data analyses were used: graphical and descriptive to identify group differences, analysis of variance to examine emotional change across therapy, and linear mixed models to identify sequential patterns. **Results:** Sequential patterns were observed, from secondary to primary adaptive emotions. Recovery was associated with fear expression being highest in early therapy and gradually reducing, and with greater expression of primary adaptive emotions (hurt/grief, acceptance, and total primary adaptive emotion). Not fully recovering was associated with greater needs expressed over time and greater self-soothing. **Conclusions:** This study found that sequential emotional processing occurred for those undertaking SPEAKS, with different patterns of change observed for those who recovered versus those who had not fully recovered. However, there were various methodological limitations. Implications for future research and clinical practice are discussed. **Keywords:** anorexia nervosa; emotion-focused therapy; emotional processing; process research; change mechanism research

For submission to Psychotherapy Research Journal.

Awards available for MRPs: please complete boxes below

The following awards are available to MRPs receiving a Pass or Pass with Minor Corrections on first submission within this academic year (01 August to 31 July). MRPs can be considered for more than one award, but will not receive more than one award. Please indicate below which awards your MRP can be considered for.

Eligible?	Award details
No	My MRP focuses on tackling inequality, increasing diversity, or focuses on needs of marginalised groups to increase inclusion and can be considered for the <i>Louise Goodbody Award for Equality, Diversity and Inclusion</i>
No	My MRP is in the area of Children, Young People or Families* and can be considered for the <i>Lucy Fildes Award for best research relating to Children, Young People or Families</i> (NB this award is available to all doctoral projects within the Salomons Institute, including PhDs) <i>*MRPs on Families do not need to be Child or YP-based</i>
Yes	My MRP employs qualitative methods in a significant element of the work and can be considered for the <i>Paul Camic Award for Best Qualitative Research</i>
Yes	Available to all MRPS: <i>Lavender Award for Research that Makes a Difference</i>