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Emotional Expression Predicts Treatment Outcome in Focal Psychodynamic and Cognitive Behavioural Therapy for Anorexia Nervosa: Findings from the ANTOP Study

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Treatment outcomes for adult anorexia nervosa (AN) patients are generally poor [1]. Examining elements of the therapeutic process could provide helpful new insights into cognitive and behavioural factors associated with a favourable outcome. AN patients typically show strong emotional avoidance, emotion dysregulation, and reduced emotional expression [2, 3]. AN behaviours such as dietary restraint may serve as maladaptive mechanisms of emotion regulation by reducing aversive emotional experience [3]. High levels of emotional processing during psychotherapy are usually associated with symptom reduction [4]. This is most likely to occur during mid-treatment when patients rely on the established

therapeutic alliance and have learned to deal adaptively with distress. Previous psychotherapy research has demonstrated that emotional processing particularly during mid-treatment predicts favourable treatment outcomes [4]. Our main hypothesis was that greater expression of negative emotions, particularly during mid-treatment, is associated with favourable outcomes in AN treatment, independent of the psychotherapeutic approach.

Data were obtained from a multicentre randomised controlled trial comparing 40 sessions of manualised focal psychodynamic therapy (FPT) and enhanced cognitive behaviour therapy (CBT-E) against optimised treatment-as-usual in adult outpatients with AN (for more details of the ANTOP study see [5]). Participants were female, ≥ 18 years, and had a DSM-IV diagnosis of full-syndrome/subthreshold AN (BMI 15.0–18.5). Written informed consent was obtained from each participant. Independent research ethics committees approved the study. Participants were randomised to receive either FPT, CBT-E, or optimised treatment-as-usual. Sessions were recorded and stored as audio files only in the FPT and CBT-E condition. Recordings were not available in 21% of the cases because either the patient or the therapist refused to give informed consent to use the recordings, and in 23% of the cases recordings were either incomplete or of insufficient quality. The analysis is thus based on the data from 89 patients (FPT: 43; CBT-E: 46), i.e., 56% of the original samples, which corresponds to similar studies [6]. These patients did not differ from those excluded regarding BMI, illness duration, eating disorder psychopathology, proportion of restricting subtype, and comorbid disorders at baseline (all $p > 0.073$). Likewise, FPT and CBT-E participants in this sample did not differ in these variables at baseline, end of treatment, and follow-up (all $p > 0.129$), except for more common comorbid MDD among CBT-E patients at baseline, $\chi^2(1) = 5.169$, $p = 0.023$. However, patients with and without comorbid MDD did not differ regarding emotional expression in any treatment phase (all $p > 0.156$).

FPT comprised 3 treatment phases: sessions 1–15 focused on therapeutic alliance, pro-anorectic behaviour/beliefs, and self-esteem, sessions 16–32 emphasised emotional experiencing, interpersonal relationships, and their association with problematic eating behaviour, and sessions 33–40 focused on transfer to everyday life, anticipation of treatment termination, and parting. CBT-E comprised several modules: motivation, normalisation of nutrition, creating a formulation, and relapse prevention (mandatory), and cognitive restructuring, mood regulation, social skills, shape concern, and self-esteem (optional).

BMI (calculated as kilograms/metres squared) at end of treatment and at the 12-month follow-up served as the primary outcome. Secondary outcomes were self-reported (Eating Disorders

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Inventory-2, EDI-2 [7]) and observer-rated (Structured Interview for Anorexic and Bulimic Syndromes, SIAB-EX [8]) eating disorder psychopathology. Corresponding to previous research, session selection was based on patient ratings of session quality [4]. The highest-rated session according to the Short Inventory for Single Psychotherapy and Counseling [9] (covering motivational clarification/development, active help for problem solving, and therapeutic support) was chosen from the early, middle, and late treatment phase. Additionally, 1 of the initial 3 sessions was chosen alike. When patients rated 2 or more sessions equivalently, 1 of them was chosen randomly. If there were no complete/intact audio recordings available from this session, the session available with the next highest rating was chosen instead. Recordings were available from the initial, early, middle, and late phase from 76, 86, 81, and 63 patients, respectively. In line with previous studies, the middle 20 min of sessions (i.e., the “working segment”) were selected for analyses [4]. Audio recordings were transcribed and analysed with the Linguistic Inquiry and Word Count (LIWC) [10], a computerised text analysis software that allows for an unobtrusive, non-reactive assessment of naturally occurring verbal emotional expression. The LIWC calculates proportions of words that fall into specific categories (e.g., emotion words).

Sample characteristics, linguistic data, and outcome data are displayed in Table 1. FPT and CBT-E patients did not differ regarding negative emotion expression in any treatment phase (all $p > 0.140$). Across the course of psychotherapy, the amount of negative emotions expressed by patients showed a significant quadratic effect: $F(1, 56) = 6.10, p = 0.017$, indicating an inverted V-shape with greater emotional expression during mid-treatment compared to both the early and late phases (linguistic data from all 3 phases were available from 58 patients). This effect was not moderated by treatment condition: $F(1, 56) = 3.11, p = 0.083$.

A hierarchical multiple regression analysis was conducted with BMI at end of treatment as the dependent variable. In step 1, BMI at baseline was entered as the predictor into the equation to control for pre-treatment differences in BMI. In step 2, the proportion of negative emotion words expressed by the patient during mid-treatment was added to the model. Negative emotion expression predicted BMI at end of treatment: $B = 1.055, SE = 0.346, \beta = 0.307, p = 0.003$ ($R^2 = 0.197$ step 1, $p = 0.000$; $\Delta R^2 = 0.093$ step 2, $p = 0.003, n = 74$). This effect was not moderated by treatment condition, AN subtype, illness duration, or completer status (all $p > 0.131$). In an equivalent regression analysis, negative emotion expression predicted BMI at the 12-month follow-up. However, this effect fell just short of significance: $B = 0.880, SE = 0.454, \beta = 0.215, p = 0.057$ ($R^2 = 0.099$ step 1, $p = 0.007$; $\Delta R^2 = 0.046$ step 2, $p = 0.057, n = 73$). The hypothesised causal pathway (greater emotional expression leads to increases in BMI) was further underpinned by the fact that neither BMI after 4 months of treatment (approx. mid-treatment, $p = 0.095$) nor the change in BMI from baseline to mid-treatment ($p = 0.510$) predicted the magnitude of negative emotion expression at mid-treatment over and above initial negative emotion expression.

Greater negative emotion expression also predicted lower observer-rated eating disorder psychopathology (SIAB-EX) at end of treatment, over and above baseline SIAB-EX scores: $B = -0.199, SE = 0.076, \beta = -0.233, p = 0.011$ ($R^2 = 0.357$ step 1, $p < 0.000$; $\Delta R^2 = 0.054$ step 2, $p = 0.011, n = 78$). Similarly, it predicted SIAB-EX total scores at the 12-month follow-up: $B = -0.198, SE = 0.094, \beta = -0.226, p = 0.040$ ($R^2 = 0.245$ step 1, $p < 0.000$; $\Delta R^2 = 0.050$ step 2, $p = 0.040, n = 65$). It did not predict self-reported eating disorder

Table 1. Demographic and clinical characteristics, linguistic data, and treatment outcome of the sample ($n = 89$)

Demographic and clinical variables	
Age at baseline, years	27.53±7.80
Illness duration, % more than 6 years	32.6
Anorexia nervosa subtype, % restricting subtype	50.6
Comorbidities, %	
Any	34.8
Affective disorder	19.1
Anxiety disorder	20.2
Somatoform disorder	3.4
BMI	
Baseline	16.62±0.96
End of treatment ($n = 83$)	17.60±1.78
12-month follow-up ($n = 81$)	18.27±2.07
SIAB-EX total score	
Baseline	1.05±0.36
End of treatment ($n = 87$)	0.82±0.44
12-month follow-up ($n = 73$)	0.75±0.46
EDI-2 total score	
Baseline	265.58±50.60
End of treatment ($n = 84$)	246.80±56.24
12-month follow-up ($n = 71$)	237.23±58.65
Linguistic variables	
Total word count	
Initial treatment phase ($n = 76$)	1,936.22±769.89
Early treatment phase ($n = 85$)	1,765.92±744.16
Mid-treatment phase ($n = 80$)	1,756.75±761.16
Late treatment phase ($n = 62$)	1,699.50±678.51
Positive emotion words	
Initial treatment phase ($n = 76$), %	2.27±0.60
Early treatment phase ($n = 85$), %	2.32±0.77
Mid-treatment phase ($n = 80$), %	2.33±0.71
Late treatment phase ($n = 62$), %	2.47±0.65
Negative emotion words	
Initial treatment phase ($n = 76$), %	1.23±0.60
Early treatment phase ($n = 85$), %	1.15±0.49
Mid-treatment phase ($n = 80$), %	1.24±0.51
Late treatment phase ($n = 62$), %	1.05±0.54

Data are expressed as means ± SD unless otherwise indicated. SIAB-EX, Structured Inventory for Anorexic and Bulimic Symptoms; EDI-2, Eating Disorders Inventory-2.

symptoms (EDI-2) either at end of treatment ($p = 0.911$) or at the 12-month follow-up ($p = 0.315$).

The effects were specific for negative emotion expression, as positive emotion expression during mid-treatment did not predict BMI at end of treatment ($n = 74, p = 0.082$) and follow-up ($n = 73, p = 0.258$). Likewise, total word count during mid-treatment did not predict treatment outcome (all $p > 0.869$). Exploratory analysis

revealed that particularly expressions of sadness ($n = 74$, $B = 2.632$, $SE = 0.900$, $\beta = 0.295$, $p = 0.005$) and anger ($n = 74$, $B = 1.753$, $SE = 0.798$, $\beta = 0.227$, $p = 0.031$) predicted BMI at end of treatment, whereas anxiety expressions did not ($n = 74$, $p = 0.887$). Similarly, expressions of sadness ($n = 73$, $p = 0.059$) and anger ($n = 73$, $p = 0.050$) predicted BMI at follow-up (the effects, however, fell just short of significance), whereas anxiety expressions did not ($n = 73$, $p = 0.481$). The effects of negative emotion expression were specific for mid-treatment (neither negative nor positive emotion expression during the initial, early, or late phase predicted BMI at end of treatment or follow-up, all $p > 0.091$).

Consistent with our hypothesis, we found that greater expression of negative emotions by patients during mid-treatment predicted favourable treatment outcomes. This is in line with previous psychotherapy research showing strong relationships between emotional processing and treatment outcome [4]. Furthermore, this supports the idea that enhanced emotional processing during psychotherapy for AN may render maladaptive emotion regulation mechanisms (such as dietary restraint) unnecessary. Importantly, these effects were independent from treatment condition, AN subtype, and illness duration, suggesting negative emotion expression constitutes a robust universal action mechanism underlying effective AN treatment. The specific effects of sadness and anger dovetail with reports from AN patients that they perceive these feelings as particularly threatening as they might be rejected by others when expressing them [11].

The study has several limitations. Due to incomplete/noisy recordings and limited consent only half of the original sample could be analysed (note, however, that included and excluded participants did not differ in any sociodemographic or clinical variables). Due to the immense effort the transcription took (>1,000 h), we furthermore had to restrict our analyses to 4 sessions per patient (accumulating into 303 sessions) and to the middle 20 min of sessions. This may compromise the representativeness of the data. However, this approach is common in psychotherapy research and is assumed to sufficiently reflect typical aspects of the treatment [4, 6]. Quantitative text analysis per se is “blind” to the semantic context and temporal sequence of words and thus cannot provide any information regarding the depth of emotional processing. However, it bears advantages over self-ratings and observer ratings such as high objectivity. Moreover, it is considered a method that could significantly contribute to a better understanding of the active ingredients of psychotherapy [12]. Future studies may also apply more sophisticated text-mining approaches (e.g., n -grams, topic models) that include machine-learning procedures [12].

The findings suggest that, independent of treatment approach, therapists should strongly emphasise emotional expression in AN patients, particularly during mid-treatment. Future research should develop and refine treatment modules and techniques that foster emotional expression/processing in AN.

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