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# Take Charge: Personality as Predictor of Recovery from Eating Disorder

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## Abstract

Many treatments for eating disorders (ED) have demonstrated success. However, not all patients respond the same to interventions nor achieve full recovery, and obvious candidates like ED diagnosis and symptoms have generally failed to explain this variability. The current study investigated the predictive utility of personality for outcome in ED treatment. One hundred and thirty adult patients with bulimia nervosa or eating disorder not otherwise specified enrolled in an intensive multimodal treatment for 16 weeks. Personality was assessed with the NEO Personality Inventory Revised (NEO PI-R). Outcome was defined as recovered versus still ill and also as symptom score at termination with the Eating Disorder Inventory-2 (EDI-2). Personality significantly predicted both recovery (70% of patients) and symptom improvement. Patients who recovered reported significantly higher levels of Extraversion at baseline than the still ill, and Assertiveness emerged as the personality trait best predicting variance in outcome. This study indicates that personality might hold promise as predictor of recovery after treatment for ED. Future research might investigate if adding interventions to address personality features improves outcome for ED patients.

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**Keywords**

Five-Factor Model, Prediction, Outcome, Psychotherapy, Group Therapy

## 1. Introduction

Several psychotherapeutic treatments for eating disorders (ED) have demonstrated success in achieving recovery in patients. However, not all patients respond the same to intervention nor achieve full recovery. ED specific characteristics have so far generally failed to make sense of this variability (Steinhausen and Weber, 2009) warranting a wider perspective on relevant patient factors for prognosis. Personality traits have emerged as an underlying structure for mental disorders (Wright and Simms, 2015), and hence have the potential to explain variance in outcome and predict prognosis. The current study was conducted to investigate personality dimensions as predictors of recovery from non-underweight eating disorder, both at end of intervention and follow-up.

The bulk of treatment research for mental disorders has focused on which treatment is best or is the most effective for a particular disorder. Yet in addition to the intervention of choice, diverse factors influence the effectiveness of any given treatment for psychopathology (Bensing, 2000). Patients diagnosis and treatment factors are most commonly the focus of attention, but therapist factors, individual patient factors beyond symptomatology and the working alliance between patients and therapist has received attention as well; in the striving to answer not only the standard question: which treatment works for which ailment, but to answer: which factors are important for recovery?

The failure of the current diagnostic system for mental disorders to explain underlying mechanisms and to predict treatment response has lead the American National Institute for Mental health (NIMH) to adopt a transdiagnostic perspective in aiming to identify common underlying mechanisms of dysfunction, regardless of particular diagnosis (Insel et al., 2010).

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One promising transdiagnostic perspective for mental illness is personality. The five major domains of personality: Neuroticism, Extraversion, Openness, Agreeableness and Conscientiousness, have proven to provide a robust meta-structure of psychopathology across common clinical syndromes such as major depression, anxiety disorders, substance use disorders, post-traumatic stress disorder, personality disorders and psychosis (Andersen and Bienvenu, 2011; Wright and Simms, 2015). The five personality domains mentioned above, along with 25 subsumed personality traits, are based on the Five Factor Model of personality (FFM) and now construe the alternative model in DSM-5 section III.

The investigation of personality in relation to outcome has yielded evidence for its' added value. Personality can predict present and future psychosocial functioning in patients with various mental disorders (Chow and Roberts, 2014; Hopwood et al., 2007; Wright et al., 2015), and has for example been shown to predict treatment response for depression (Du et al., 2002; Klein et al., 2011; Quilty et al., 2008; Wardenaar et al., 2014), addiction (Betkowska-Korpala, 2012), borderline personality disorder (Zanarini et al., 2014) eating disorder (Fairburn et al., 2009) and pathological gambling (Ramos-Grille et al., 2013).

In eating disorders research, an array of patient factors has been investigated for their prognostic capacity. Steinhausen and Weber (2009) conclude in an ambitious review of 72 studies on patient factors in Bulimia Nervosa (BN), that existing evidence is weak at best or even contradictory. This conclusion pertained for example to specific characteristics of ED, age, education, having children, coexisting axis I or II disorders, self-esteem, various personality traits and time. More recent studies have likewise found few significant pre-treatment predictors (Brewerton and Costin, 2011; Ciao et al., 2015; Rowe et al., 2010). Two robust predictors that have emerged are duration to follow-up (Steinhausen and Weber, 2009) and early change in treatment (Vall and Wade, 2015); neither of which can be ascertained pre-treatment. A recent review by Martinez and Craighead (2015), suggests that the high attrition,

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low compliance, chronicity of symptoms and suboptimal efficacy of ED interventions may be attributable to an inadequate consideration of individual personality and cognitive differences. Despite evidence for the relevance of normal personality traits for psychopathology, research investigating the predictive value of the FFM for outcome in EDs is scarce. We succeeded in locating one study of reasonable size, where Deumens and colleagues (2012) investigated 182 binge eating disordered patients, and found Openness and Extraversion to predict outcome following a 20-week cognitive behavioral day-treatment program.

In summary, there is strong evidence for personality as a relevant patient factor in predicting outcome for several mental disorders. There is also a lack of established predictors for outcome in ED treatment and a scant exploration of FFM in regards to ED outcome. This study therefore aimed to investigate personality as predictor of recovery in patients with non-underweight eating disorder, undergoing a 16-week multimodal day-patient treatment program.

## 2. Methods

### *2.1. Participants and procedure*

Participants were adult female patients fulfilling diagnostic criteria for a DSM-IV diagnosis of BN or EDNOS (Eating Disorder Not Otherwise Specified) at an ED treatment center serving the greater metropolitan area of Stockholm, Sweden. During the time of the study (January 2010 thru April 2013) 161 were eligible for participation, 146 gave written consent and 130 (81%) returned baseline self-report data. Participants had a mean age of 28.3 (*SD* = 8.1) and 70 had BN and 60 EDNOS. Ninety-one percent provided self-report at end of treatment and 73% at 6 months post-treatment ($n$ = 118 and 95). Patients failing to provide follow-up data were significantly lower on personality facets Altruism ($t$ = 3.03, $p$ = .003) and Dutifulness ($t$ = 2.53, $p$ = .013) pre-treatment.

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Assessment of background, psychopathology, associated features and motivation for treatment was performed by experienced clinicians in the treatment team during three 45-min sessions. If deciding to participate, patients at the final session signed a contract stating intention to fulfill treatment and to abide by code of conduct (for example*: if I have suicidal thoughts I will speak to a member of the treatment team about them*). They were then informed of the personality study. Of patients agreeing to participate, one patient failed to initiate treatment and one patient manifested psychotic symptoms in treatment and was therefore prematurely terminated and referred for more suitable care. The week following termination, team members jointly diagnosed patients (based on self-report EDI-2, food diary and interview by individual therapist) and decided on further intervention/referral of patients, if required. Recovery was defined as not fulfilling any DSM-IV ED diagnosis over the last 90 days. At the end of the study, all patients were reimbursed with a gift-certificate (value approx. $15) and offered personal 45-min feedback on their personality profile.

*2.2. Treatment*

The treatment was a sixteen week multimodal, day-patient treatment; with eight patients/group. Patients spent approximately three and a half hours at the clinic Monday thru Friday. The core features were a 90-minute treatment module, a 60-minute lunch at a local restaurant, a 30-min supportive intervention following lunch and a 15-30min snack-time. Depending on weekday, the 90-min module consisted of physiotherapy, art therapy, psychoeducation, or group-therapy (this module twice a week). Group therapy was conducted in line with principles outlined in mentalization-based psychotherapy for patients with ED (Skårderud and Fonagy, 2011). Lunch and snack-time was supervised by a member of the treatment team for the first eight weeks, and from day one they were obliged to eat a full meal. In addition, they had individual treatment sessions 45min/week focusing on food-diary

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and devising/following through on an individualized treatment plan. Partners and close relatives could be invited by patients for three 90-minute psychoeducation and Q/A sessions at beginning, middle and end of treatment. The treatment team consisted of one psychiatrist, two psychologists, two psychiatric nurses, one physiotherapist, one nutritionist, one psychoeducation specialist/sexologist and one art therapist. The first author (JL) performed assessments and was one of the two group-therapists for the majority of patients in the study. Intermittently, JL was also engaged in supervising lunch-time, in supportive intervention following lunch and for psychoeducation to partners/close relatives. For the duration of the treatment patients were on sick-leave full-time. The treatment was substantially subsidized in accordance with health care policy in Sweden, permitting patients from all SES-levels. The maximum total cost of treatment/patient was estimated at $300.

*2.3. Measures*

*The Structured Eating Disorder Interview* (SEDI), a semi-structured interview with 20-30 questions was used to assess fulfillment of diagnostic criteria according to DSM-IV (de Man Lapidoth and Birgegård, 2009).

*NEO Personality Inventory Revised* (NEO PI-R): The NEO PI-R is a 240-item self-report measure assessing the five dimensions (Neuroticism, Extraversion, Openness to Experience, Agreeableness and Conscientiousness) and 30 subsumed facets of the Five Factor Model (Costa and McCrae, 1992). Participants rate statements of behaviour, feelings and attitudes on a five point Likert scale from strongly agree to strongly disagree. The Swedish version shows satisfactory psychometric properties, with the exception of facet Openness to Values (Källmen et al., 2011). Average Cronbach's alpha per facet was 0.73, range 0.43-0.87.

*Eating Disorder Inventory-2* (EDI-2): ED symptomatology was assessed using the EDI-2 (Garner and Olmsted, 1986), which is a 91-item questionnaire consisting of eleven

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subscales that assess specific cognitive and behavioral ED dimensions and associated features. The Swedish version has satisfactory psychometric properties and discriminates well between eating disorder patients and both psychiatric and normal controls (Nevonen et al., 2006). The three subscales included in the present study, dubbed EDI-2 symptom score, were the bulimia, drive for thinness and body dissatisfaction subscales as they are directly related to symptomatology. Cronbach's alpha per time point was 0.76, 0.93 and 0.93.

*Clinical Impairment Assessment* (CIA). The extent to which the ED disorder affected daily life was assessed by CIA, a 16 item questionnaire covering the last 28 days, with a clinical cut-off of 16. It covers aspects such as mood, self-perception, cognitive functioning, interpersonal functioning, and work performance (Bohn et al., 2008). The CIA has good psychometric properties in clinical samples (Bohn et al., 2008; Welch et al., 2011).

*The Comprehensive Psychopathological Rating Scale* (CPRS). Common co-occuring psychiatric symptoms were assessed with CPRS. 19 items capture symptoms of depression, anxiety and obsessive-compulsiveness and the clinical cut-offs are 9, 9 and 8 respectively (Svanborg and Åsberg, 1994).

### *2.4. Statistical Analyses*

Analyses were conducted using IBM SPSS Statistics 22. The first outcome measure was self-reported EDI-2 symptom score at termination. First, univariate correlations between manifest dimensions and facets of the FFM on the one hand, with symptom score on the other, were explored. Secondly, the predictive power of significant dimensions and facets was explored through multiple regression, controlling for baseline EDI-2 symptom score. The second outcome was a dichotomous measure: remission versus still ill. Biserial correlations between personality and the dichotomous outcome was explored. To test if personality could

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predict recovery, logistic regression was used, entering personality domains and facets showing significant correlation to outcome, after controlling for baseline symptom-score.

Building the model as described above has been the standard procedure in psychiatry when investigating personality but might be misleading, as it neither adjusts for multicollinearity between personality traits, nor adequately discerns contribution from general (dimensional) versus specific (facet) personality traits. Therefore, the relationship between personality and eating disorder was also tested according to the bi-factor model (Chen et al., 2006). This entails that for every facet, e.g. Gregariousness, there is a general variance from the latent 'Extraversion' domain it is subsumed beneath, and a specific variance, not accounted for by the domain. In this study for instance, Extraversion explained 53% of the variance in Gregariousness, leaving 47% as unique variance of the facet. We approximated a bi-factor model using principal axis factoring with varimax rotation, which was used to extract the five latent general personality factors. To estimate specific variance of the facets, not captured by the latent factors, the relevant latent factor was by linear regression entered as predictor of each facet belonging to the same dimension, saving the standardized residuals as a measure of specific variance. In instances of one or two missing values on items, facets were calculated from mean of facet items.

## 3. Results

At baseline, patients rated a mean clinical impairment of 30.8 ($SD$ = 8.7) and rated levels above clinical cut-off for depression, anxiety and obsessive/compulsive symptoms on CPRS ($M$ = 10.9, 9.6 and 9.5 respectively). Patients' symptom score on EDI-2 was in the clinical range at baseline and symptom severity diminished significantly in the group as a whole after treatment ($r$ = 0.34, $t$ = 16.3, $p < 0.001$). The symptom reduction was stable through the 6-month follow-up period ($r$ = 0.77, $p < 0.001$). Improvement was significantly

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greater for recovered than for still ill patients ($t$ = 5.38, $p$ < 0.001), corresponding to a Cohen's $d$ effect size of 1.06 (Table 1).

### *3.1. Personality as predictor of improvement*

BN and EDNOS patients showed no significant group differences on facets ($p$ = 0.08-0.99) and were therefore jointly analyzed. Zero-order correlations between symptom score at termination and personality showed that Neuroticism and Extraversion, along with seven facets from all five dimensions, were significantly correlated to symptom score at termination (Table 2). To investigate if personality could predict symptom score at termination, multiple regression using the enter method was performed, entering higher-order dimensions followed by facets, while controlling for baseline symptom score. Baseline symptom severity and Extraversion was significantly related to improvement ($F$(2,115) = 11.77, $p$ = 0.013), and adding any of the seven facets did not improve the model, though Assertiveness was slightly better than Extraversion as predictor ($\beta$ = -0.261 and $R^2_{Adj}$ = 0.170 versus $\beta$ = -0.233 and $R^2_{Adj}$ = 0.156).

As a next step, the scores for the overall domains and facets derived from the bi-factor model were used, the advantage being that the bi-factor model derived scales can distinguish latent (e.g. dimensional) from specific (e.g. facet) variance in personality. The latent personality factors were extracted by factor analysis and the specified five factor solution accounted for 51% of variance in personality. Correlations between symptom score at termination with latent factors and specific facets are shown in Table 2. Multiple regression was repeated again, as above. Now, the Neuroticism factor was the only global Big Five factor correlated to improvement, but when controlling for baseline EDI in regression analysis this was not significant ($F$ = 10.97, $p$ = 0.15). However, two specific facets were still

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predictive of improvement after controlling for EDI, namely Assertiveness ($\beta$ = -0.224) and Order ($\beta$ = 0.114).

### *3.2. Personality as predictor of recovery*

For clinicians, the goal of treatment is primarily recovery, not just relative improvement. Therefore, the second outcome was a dichotomous measure: recovery vs still ill. 70% of patients recovered following treatment. Biserial correlations found that Extraversion along with three of its' facets, namely Gregariousness, Assertiveness and Positive Emotions were positively correlated to recovery ($r$ = 0.27, 0.19, 0.28 and 0.19, $p$ < 0.05), as was Openness to Fantasy ($r$ = 0.21, $p$ < 0.05). Logistic regression was then used to explore if personality could predict likelihood of recovery. Symptom-severity at baseline failed to predict recovery ($p$ = 0.51) and was therefore omitted in following analyses. Extraversion was again significant ($\chi^2$ = 10.02, $p$ < 0.01), and correctly classified 72% of cases. Adding any of the seven correlated facets did not improve the model, though Assertiveness alone also predicted 72% of cases correctly ($\chi^2$ = 10.89, $p$ < 0.01).

The bi-factor model-based scores were thereafter tested, yielding slightly different findings. The Extraversion factor ($r$ = 0.19) and three specific facets, Assertiveness ($r$ = 0.19), Openness to Fantasy ($r$ = 0.20) and Order ($r$ = -0.19, $p$ > 0.05), correlated significantly to recovery. Logistic regression showed that Extraversion alone could classify 71% of cases ($\chi^2$ = 4.60, $p$ = 0.03). Extraversion in combination with Assertiveness could correctly classify 73% of cases ($\chi^2$ = 12.57, $p$ < 0.01), as could Assertiveness alone ($\chi^2$ = 7.35, $p$ < 0.01). Extraversion along with Openness to Fantasy predicted 75% correctly ($\chi^2$ = 8.11, $p$ = 0.02). In sum, across methods and outcome measures, Assertiveness consistently appeared as a personality trait influencing the likelihood of improvement and recovery from eating disorder.

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Among patients still ill at termination, 68% had below average on Assertiveness at baseline (by the norm average); in comparison to 48% among those who recovered.

## 4. Discussion

The aim of the study was to investigate whether personality could predict improvement in ED patients receiving therapy. Adult non-underweight eating disordered patients underwent a four-month intensive day-patient treatment. Beyond baseline symptoms, personality could significantly contribute in predicting improvement, both defined as relative improvement and recovery. At first glance, when observing group differences between recovered and still ill on the higher domain level of personality, Extraversion appeared to play the major role. After discriminating between general and specific personality variance, Assertiveness surfaced as the main factor.

The full FFM profile has rarely been studied in ED patients, making comparisons with previous findings a challenge. A Belgian study on the full FFM was found (De Bolle et al., 2011), and the general profile in our sample was highly similar to their BN inpatient sample, except for higher Neuroticism here, nevertheless lending support for cross-cultural generalizability. Results are also corroborated by a longitudinal study on ED patients studying personality by another model. Thompson-Brenner and colleagues (2008) categorized 213 patients into five subtypes based on personality; namely high functioning, emotionally dysregulated, impulsive, obsessive-sensitive and avoidant-insecure. They found that the avoidant-insecure (i.e. less assertive) subtype had a worse outcome than the other four and were more likely to have increased treatment utilization up to eight years after baseline assessment.

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Findings that personality seems to have prognostic value should by no means be interpreted deterministically for the individual patient. Many patients with a less favourable profile recover, and the opposite also occurs. In addition, it has by now become quite clear that personality is not fixed, it is in fact pliable, susceptible to change (Roberts & Mroczek, 2008). Assertiveness captures a particular aspect of extraversion not related so much to positivity and sociability which the term usually alludes to, but to leadership: *Dare I, can I, make myself heard among others?* Perhaps it would be beneficial to add interventions aiming at helping the less assertive ED patient to better navigate social situations, take a more active part and grow to feel less inferior. Several treatments have in recent years in fact been developed to address problematic personality features in ED patients; such as obsessionality, impulsivity and perfectionism (Martinez and Craighead, 2015), where preliminary evaluations are optimistic. However, the ED treatment was chosen based on ED diagnosis rather than patients' trait levels and evaluations did not adjust for individual trait variability. We therefore recommend further development of treatments including interventions for personality features, and for research studies to include pre- and post- assessment of these personality features.

A recent meta-analysis on social processes according to the NIMH Research and Domain Criteria for ED (Caglar-Nazali et al., 2014), found that ED patients often compare and evaluate themselves negatively, have difficulty understanding mental states and have a sense of social inferiority, so it's little wonder if they behave less assertively. Assertiveness might be related to or overlap with other phenomena known to be prevalent among ED patients; such as depression (Ulfvebrand et al., 2015) and low self-esteem (La Mela et al., 2013), perhaps explaining why prognosis was worse for the less assertive. Self-esteem was not measured in this study but depression was, and self-reported depressive symptoms were

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not predictive of outcome (data not shown), supporting the finding that assertiveness is important in its' own right.

A first strength of the study was an effort to discriminate between general and specific personality traits, as the vast majority of prediction studies have been on the dimensional level, thus potentially obscuring associations. Studying facet-level relationships however demands a relatively large sample size, so results here should be interpreted with caution. Another limitation is that personality and ED symptoms were based on self-report only. The study however had another advantage in an unusual degree of homogeneity and intensity of intervention, including a very low drop-out rate. All women were enlisted at the same specific unit, treated by the same team of professionals, and were in close interaction with each other on a daily basis, generating a uniquely high degree of shared environment, ideal for investigating the impact of individual factors. At the same time this is a limitation, generalizability might be limited to the same type of intervention, and to ED patients with BMI above 17.5. Indeed, Assertiveness might be a trait of particular importance in a group-based treatment with the low degree of structure and high degree of free association characteristic of psychodynamic psychotherapy. Further research is needed on the predictive value of personality for other types of treatment.

In conclusion, personality holds promise as a predictor of prognosis for patients in treatment for ED. Particularly low assertiveness was associated with negative outcome. A continued investigation of the role of personality in ED, at both the dimensional and facet-level is necessary. A challenge for outcome studies is to try to bridge the gap between evidence-based medicine and patient-centered medicine, by systematically investigating individual traits in adjunct to diagnosis and symptoms.

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Table 1. Baseline characteristics and outcome in recovered versus still ill patients.

| | Recovered ($n$ = 90) | | Still ill ($n$ = 38) | |
|---|---|---|---|---|
| | *M* | *SD* | *M* | *SD* |
| Pre-treatment | | | | |
| EDI-2 score | 44.2 | 9.8 | 45.5 | 11.7 |
| Age | 28.0 | 7.4 | 29.2 | 9.9 |
| BMI | 25.0 | 5.4 | 23.8 | 6.8 |
| Personality dimensions | | | | |
| Neuroticism | 133.5 | 19.5 | 130.4 | 21.1 |
| Extraversion | 106.9 | 22.2 | 93.4 | 21.3 |
| Openness | 110.2 | 22.5 | 106.2 | 22.0 |
| Agreeableness | 123.3 | 16.6 | 126.3 | 21.4 |
| Conscientiousness | 103.0 | 26.1 | 106.6 | 27.1 |
| Post-treatment | | | | |
| EDI-2 score at T2 | 16.7 | 12.4 | 32.9 | 15.4 |
| EDI-2 score at T3 | 19.1 | 15.7 | 29.3 | 15.3 |

EDI-2 = Eating Disorder Inventory-2 symptom score, BMI = Body Mass Index, T2 = termination, T3 = 6-month follow-up.

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Table 2. Correlation between symptom-score at termination and baseline personality before and after extraction of domain versus facet variance.

| Personality variable | Raw correlations | CI (95%) | Bi-factor correlations | CI (95%) |
|---|---|---|---|---|
| Neuroticism | **0.21*** | (0.03,0.37) | **0.23*** | (0.05,0.39) |
| N1 Anxiety | **0.21*** | (0.03,0.37) | 0.01 | (-0.17,0.19) |
| N2 Angry Hostility | 0.06 | (-0.12,0.24) | -0.04 | (-0.22,0.17) |
| N3 Depression | 0.17 | (-0.01,0.34) | -0.05 | (-0.22,0.14) |
| N4 Self-Consciousness | **0.23*** | (0.05,0.39) | 0.11 | (-0.08,0.28) |
| N5 Impulsiveness | 0.11 | (-0.08,0.28) | 0.04 | (-0.14,0.22) |
| N6 Vulnerability | 0.12 | (-0.07,0.29) | -0.09 | (-0.09,0.27) |
| Extraversion | **-0.24**** | (-0.41, -0.07) | -0.16 | (-0.33,0.02) |
| E1 Warmth | -0.12 | (-0.30, 0.06) | 0.06 | (-0.13,0.23) |
| E2 Gregariousness | -0.12 | (-0.29,0.07) | -0.00 | (-0.18,0.18) |
| E3 Assertiveness | **-0.27**** | (-0.43, -0.09) | **-0.22*** | (-0.39,-0.05) |
| E4 Activity | -0.18 | (-0.34, 0.01) | -0.13 | (-0.30,0.05) |
| E5 Excitement-Seeking | -0.09 | (-0.26, 0.10) | -0.02 | (-0.20,0.16) |
| E6 Positive Emotions | **-0.19*** | (-0.35, -0.01) | -0.12 | (-0.30,0.06) |
| Openness | -0.10 | (-0.27,0.08) | -0.07 | (-0.25,0.11) |
| O1 Fantasy | -0.08 | (-0.26,0.10) | -0.05 | (-0.22,0.14) |
| O2 Aesthetics | 0.05 | (-0.14,0.22) | 0.17 | (-0.01,0.34) |
| O3 Feelings | 0.09 | (-0.09,0.27) | 0.15 | (-0.03,0.32) |
| O4 Actions | **-0.20*** | (-0.37,-0.02) | **-0.19*** | (-0.36,-0.01) |
| O5 Ideas | -0.15 | (-0.32,0.03) | -0.15 | (-0.32,0.03) |
| O6 Values | -0.10 | (-0.27,0.08) | -0.07 | (-0.25,0.11) |
| Agreeableness | 0.00 | (-0.18,0.18) | 0.06 | (-0.12,0.24) |
| A1 Trust | **-0.22*** | (-0.38,-0.04) | **-0.22*** | (-0.39,-0.05) |
| A2 Straightforwardness | -0.07 | (-0.24,0.12) | -0.12 | (-0.29,0.07) |
| A3 Altruism | 0.03 | (-0.15,0.21) | 0.01 | (-0.17,0.19) |
| A4 Compliance | 0.10 | (-0.08,0.27) | 0.08 | (-0.10,0.26) |
| A5 Modesty | 0.18 | (-0.00,0.35) | 0.17 | (-0.01,0.34) |
| A6 Tender-Mindedness | 0.02 | (-0.16,0.20) | -0.00 | (-0.18,0.18) |
| Conscientiousness | -0.07 | (-0.25,0.11) | -0.08 | (-0.25,0.11) |
| C1 Competence | **-0.20*** | (-0.37,-0.02) | **-0.22*** | (-0.39,-0.04) |
| C2 Order | 0.10 | (-0.08,0.27) | **0.20*** | (0.02,0.36) |
| C3 Dutifulness | -0.06 | (-0.24,0.12) | 0.00 | (-0.18,0.18) |
| C4 Achievement Striving | -0.07 | (-0.24,0.12) | -0.01 | (-0.19,0.18) |
| C5 Self-Discipline | -0.13 | (-0.30,0.06) | -0.12 | (-0.29,0.06) |
| C6 Deliberation | 0.04 | (-0.14,0.22) | 0.09 | (-0.09,0.27) |

Note: Negative score indicates that high trait-score is correlated to low symptom score.
* $p < 0.05$, ** $p < 0.01$.

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Highlights

- There are few known predictors of outcome in the treatment of eating disorder.
- The five-factor model was investigated for its' prognostic capacity.
- Extraversion and Assertiveness predicted both improvement and recovery.
- Targeting personality may be important in the treatment of eating disorder.

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