



# Personality predicts drop-out from therapist-guided internet-based cognitive behavioural therapy for eating disorders. Results from a randomized controlled trial



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## ABSTRACT

Internet-based guided self-help cognitive behavioural therapy (ICBT) seems a promising way of delivering eating disorder treatment. However, treatment drop-out is a common problem and little is known about the correlates, especially in clinical settings. The study aimed to explore prediction of drop-out in the context of a randomized controlled trial within specialized eating disorder care in terms of eating disorder symptomatology, personality traits, comorbidity, and demographic characteristics. 109 outpatients diagnosed with bulimia nervosa or similar eating disorder were randomized to two types of ICBT. Participants were assessed with several clinical- and self-ratings. The average drop-out rate was 36%. Drop-out was predicted by lower scores in the personality traits Dutifulness and Assertiveness as measured by the NEO Personality Inventory Revised, and by higher scores in Self-affirm as measured by the Structural Analysis of Social Behaviour. Drop-out was also predicted by therapist factors: one therapist had significantly more drop-outs (82%) than the other three ( $M = 30\%$ ). Theoretical and clinical implications of the impact of the predictors are discussed.

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## 1. Introduction

Internet-based interventions are becoming more and more popular as a way of providing self-help treatments (Dunn et al., 2012), and therapist-guided internet-based cognitive behavioural therapy (ICBT) seems a promising way of delivering eating disorder (ED) treatment (Aardoom et al., 2013). Evidence-based self-help programs and CBT (although not necessarily internet-based), are considered treatments of choice (NICE-guidelines, 2004) but when treatment drop-out is considered, the effectiveness of ICBT is less than assumed (Melville et al., 2010). We need to know more about relevant factors for drop-out. This study therefore aimed to investigate the predictive power of several factors for drop-out.

Two of the most common EDs; Bulimia nervosa (BN), and BN-like ED not otherwise specified (EDNOS) have an estimated lifetime prevalence of about 1% BN, and 2% EDNOS of bulimic type (Smink et al., 2012). Most commonly affected are young women (Fairburn and Harrison, 2003). BN is characterized by recurrent binge eating: episodes of eating considerably larger amounts than most people would eat within a limited time-period, and experiencing an inability to stop eating or a lack of control over how much or what one is eating. The binge eating is usually

followed by inappropriate compensatory behaviours such as self-induced vomiting, laxative or diuretics misuse, excessive exercise, or fasting. There is also a severe over-valuation of body shape and weight (APA, 2000).

The term drop-out refers to premature termination of treatment, but for both internet-based treatment and traditional treatment consensus on a more exact definition is lacking, making drop-out research difficult to interpret (Aardoom et al., 2013; Fassino et al., 2009b; Mahon, 2000). In traditional CBT drop-out has for instance been referred to as ending treatment before reaching therapeutic objectives, against the therapist's advice, without having discussed it with the therapist (Bados et al., 2007), or simply whether the participant terminated therapy prematurely or finished as planned (Schnicker et al., 2013). In internet-based treatment for psychological disorders in general it has been defined as ending without completing all treatment steps, or without completing enough treatment steps or percentage of treatment according to a predefined cut-off (Melville et al., 2010), thus in internet-based treatment drop-out definition usually concerns proportions rather than clinical relevance. However, due to the fact that there is no consensus on a drop-out definition we chose a definition resembling Bados et al., (2007); a pragmatic and clinically relevant definition. One review on internet-based ED treatment reported that some distinguish between study- and treatment drop-out (Dolemeyer et al., 2013). In studies on traditional ED treatment early and late drop-out has been examined (Fassino et al., 2009b), as well as whether failure to engage should be considered a drop-out category of its own (Bell, 2001; Waller, 1997; Watson et al., 2013).

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Treatment drop-out is common among psychiatric patients generally but especially so regarding ED (Swift and Greenberg, 2014; Zaitsoff et al., 2015). However, there is a large variation. One review found drop-out rates from internet-based ED treatment to be 9%–47.2% (Dolemeier et al., 2013) and another reported 5%–24% (Beintner et al., 2014). Two other studies on ICBT, specifically Salut BN (see below), showed drop-out rates to be 82% (Nevoenen et al., 2006) and 45% (Fernandez-Aranda et al., 2009), respectively. Taken together, rates roughly compare to drop-out rates from traditional ED outpatient treatment with rates ranging from 29%–73% (Fassino et al., 2009a,b). Although the problem has been long known, it has still not been solved; on the contrary some authors suggest that drop-out rates from ED treatment studies more than doubled during 1993–2009 (Campbell, 2009).

Drop-out may be problematic for a number of both clinical- and research reasons. It puts a strain on health care resources since administration and clinical assessments are both time-consuming and costly and efforts may be in vain should the patient choose to end prematurely. The administration around drop-out causes delay for other patients who wait for treatment (Watson et al., 2013). It is also possible that patients who drop out because they are somewhat improved would have reached an even better outcome had they remained in treatment, and that patients who drop out because they do not perceive the treatment to be effective would nonetheless have improved had they persisted. Also, high drop-out rates make it difficult to assess treatment effectiveness (Hoste et al., 2007).

As for treatment outcome however, drop-out from ED treatment is not necessarily negative for the patient (Schnicker et al., 2013). Regarding traditional ED-treatment, one review concluded that drop-outs often had better outcome at follow-up compared to completers (Fassino et al., 2009b). One study found that 71% of outpatient drop-outs were improved at a 2–5 year follow-up (Di Pietro et al., 2002), and another found outcome for drop-outs and completers not to be significantly different at follow-up, although completers had made a significantly greater clinical improvement (Bjork et al., 2009). On the other hand, others have found that patients with BN who dropped out from outpatient treatment continued to suffer from severe bulimic symptoms at 12 months follow-up (Fairburn et al., 1993). Outcome specifically for drop-outs from ICBT for EDs is yet unknown.

Results from previous research are mixed in terms of whether ED symptom severity, psychiatric comorbidity, or treatment factors predict drop-out from traditional ED treatment (Fassino et al., 2009a). For BN, longer duration of illness may be associated with drop-out (Hoste et al., 2007). There is however good evidence that personality traits such as impulsivity, low self-directedness, low cooperativeness, and borderline traits are associated with drop-out (Fassino et al., 2009b). Drop-out specifically from internet-based treatment is understudied, and previous research has emphasized the importance of more randomized controlled trials (RCT), direct comparisons of different internet-based treatments for ED (Wagner et al., 2015), and focus on personality variables such as conscientiousness and impulsivity since they may contribute to higher likelihood of drop-out due to lower tolerance for frustration, or less commitment to treatment (Melville et al., 2010).

Regarding drop-out prediction from ICBT for EDs, results have so far been inconsistent (Wagner et al., 2015). Two recent reviews showed that drop-out is associated with more pathology such as higher frequencies of binge eating and vomiting, higher drive for thinness, more shape concern, more severe comorbid symptoms of depression or anxiety (Aardoom et al., 2013), lower age, lower BMI, BN diagnosis, and higher restraint (Beintner et al., 2014). In one frequently used type of ICBT, Salut BN, predictors for drop-out have included therapist factors (Nevoenen et al., 2006), more depression symptoms, lower self-directedness (Wagner et al., 2015), more anxiety symptoms, lower hyperactivity, lower BMI, lower reward dependence (Fernandez-Aranda et al., 2009), and more binges and vomiting (Carrard et al., 2006), whereas in one study no predictors were found (Carrard et al., 2011).

While focus on patient characteristics are common in drop-out studies, some have examined therapist factors in ED treatment and found that drop-out is predicted by poor therapeutic alliance (Zaitsoff et al., 2015), and the therapist's inability to listen and be understanding (Bjork et al., 2009). Dissatisfaction with the therapist has been found to predict drop-out in traditional CBT for various psychiatric disorders (Bados et al., 2007). However, since such studies have not examined ICBT it is unclear whether results can be generalized to this population.

Since research on predictors for drop-out from ICBT for EDs is scarce and findings are inconsistent, and since drop-out from traditional ED treatment has been shown to be predicted by personality traits, we explored possible predictors in both personality traits, ED symptoms, psychiatric comorbidity, and demographic variables. Thus, the aim of the current study was to explore possible predictors for drop-out from ICBT within a randomized controlled trial (RCT), with two ICBT treatments (Salut BN and BIB-ICBT) for BN and similar EDs, within specialized out-patient ED care. Although not a strict replication, the study resembles a study on Salut BN and bibliotherapy by Wagner et al. (2015).

## 2. Method

### 2.1. Participants and design

The current study was conducted within the context of an RCT ([Controlled-trials.com/ISRCTN44999017](http://Controlled-trials.com/ISRCTN44999017)) and carried out at the specialized clinic Stockholm Centre for Eating Disorders within the Stockholm county council, Sweden. The clinic provides a variety of different treatments for patients of all ages and various types of ED, and during the inclusion period enrolled about 650 new patients a year via self-enrolment or referral. 150 outpatients were recruited October 2009 through February 2013. A pocket calculator was used to allocate participants randomly to one of two types of ICBT ( $N = 109$ ) or to a program oriented day patient program ( $N = 41$ ). The latter was beyond the scope of the present study and will therefore not be considered further here.

Inclusion criteria required a diagnosis of DSM-IV BN, EDNOS of bulimic type, or binge eating disorder with a history of inappropriate compensatory behaviour within the past year, age  $\geq 18$  years, body mass index (BMI) 17.5–34, fluent Swedish, and access to the internet. Exclusion criteria were severe symptoms of depression, anxiety, or obsession–compulsion (with a maximum score of 15, 15, and 14 respectively according to the CPRS-S-A described below), drug- or alcohol abuse, suicide attempt within the past year, current suicide plans, psychosis, or concurrent participation in other ED treatment, with the exception of psychopharmacological treatment.

Non-engagers ( $N = 11$ ) were defined as participants who failed to start treatment and were not included in the analyses. Drop-outs and completers were defined as in Bados et al. (2007): participants who terminated therapy prematurely versus finished as planned. For instance, participants who started but prematurely ended treatment either against the therapist recommendation, without informing the therapist, or without giving an explanation were defined as drop-outs. A total of 35 (36%) participants were considered drop-outs. Completers were defined as participants who completed at least the first treatment step and actively stayed in treatment either until a mutual agreement was reached to terminate treatment due to sufficient symptom reduction, until finishing all treatment steps, or until reaching the maximum allowed treatment time of 24 weeks. A total of 63 (64%) participants were considered completers.

### 2.2. Instruments

#### 2.2.1. Clinical ratings

The Structured Eating Disorder Interview (SEDI) is a structured clinical diagnostic interview covering a maximum of 30 questions to assess DSM-IV ED diagnosis. A preliminary validation showed acceptable

concordance with gold standard Eating Disorder Examination interview (Cooper et al., 1989) (Kendall's tau-b = 0.69,  $p \leq 0.0001$ ; De Man Lapidoth, and Birgegard, unpublished results).

The Structured Clinical Interview for DSM-IV Axis I Disorders; SCID-I (First et al., 1999) is considered gold standard for clinical disorders and was used for assessment of psychiatric comorbidity. Inter-rater reliability has been shown to be moderate to excellent (Lobbstaal et al., 2011).

The Global Assessment of Functioning (GAF) scale, DSM-IV axis V, measures severity of psychological, social, and occupational symptoms on a 0–100 scale. The reliability and validity of GAF has been shown to be modest (Goldman et al., 1992).

Information about previous ED treatment, housing, occupation, age at first ED symptoms etc. was registered in Riksät; a national quality register for ED treatment.

### 2.2.2. Self-ratings

The Eating Disorder Examination Questionnaire; EDE-Q, version 4.0 (Fairburn and Beglin, 1994) has 36 items and focuses on the past 28 days in four domains; dietary restraint, eating-, shape-, and weight concern, rated on a 7-step scale. The subscales are combined into a fifth, mean global scale. Disturbed eating- and compensatory behaviours are assessed, including frequency. The EDE-Q has shown good internal consistency, discriminative validity (Berg et al., 2012), satisfactory concurrent validity (Fairburn and Beglin, 1994) temporal stability (Mond et al., 2004) and test-retest reliability (Luca and Crowther, 1999). All subscales in the Swedish version have shown acceptable internal consistency (Mantilla and Birgegard, 2015).

The Structural Analysis of Social Behaviour; SASB introject (Benjamin, 2000) measures self-image in terms of self-directed behaviours in 36 statements on a 10 step Likert scale. SASB is a circumplex model with two dimensions; one horizontal affiliation axis with two variables that ranges from self-love to self-attack, and one vertical autonomy axis with variables ranging from self-empowerment to self-control. In combination, the two dimensions create four additional variables; self-affirm, -protect, -blame, and -neglect. SASB introject has strong content validity and several findings support its construct-, concurrent- and predictive validity (Benjamin et al., 2006).

The Comprehensive Psychopathology Rating Scale self-assessment for Affective syndromes; CPRS-S-A (Asberg et al., 1978) covers 19 items and measures symptoms of depression, anxiety, and obsessive-compulsiveness over the past 3 days on a 7-step scale. It is regarded as a useful and dependable instrument for measuring symptoms in outpatients (Mattila-Evenden et al., 1996).

Clinical Impairment Assessment; CIA has 16 items that are reported on a 4-point Likert scale measuring impairment secondary to ED in the past 28 days in three domains: cognitive, personal, and social. It has been shown to have high levels of internal consistency, test-retest reliability, discriminant- and construct validity, and sensitivity to change (Bohn et al., 2008).

Bulimia nervosa stages of change questionnaire; BNSOCQ has 20 items examining motivation to change in six stages: pre-contemplation, contemplation, preparation, action, maintenance and termination. It has good psychometric properties with excellent internal consistency and test-retest reliability (Martinez et al., 2007). Three items were removed since they were aimed at motivation for weight gain, which generally did not apply to the participants included in the current study who were of average weight.

The NEO Personality Inventory Revised; NEO PI-R (Costa and McCrae, 1992) is a 240 item self-report inventory designed to measure both the five dimensions and 30 facets of the five factor model (FFM) where the five dimensions are Neuroticism, Extraversion, Openness, Agreeableness, and Conscientiousness. Statements of behaviour, feelings and attitudes are rated on a five point Likert scale from strongly disagree to strongly agree. Replicability of the factor structure in a psychiatric sample has been demonstrated (Bagby et al., 1999). The Swedish version

shows satisfactory psychometric properties (Kallmen et al., 2011) with the exception of the facet Values, which showed low internal consistency.

### 2.3. Procedure

As a standard procedure, participants were initially assessed with the computerized "Stepwise" system (Birgegard et al., 2010) which includes several clinical and self-ratings (see above). If inclusion criteria were fulfilled, the patients were given oral and written information about the current study and were asked to participate. Those who declined received treatment as usual. Those who accepted were referred to one of four therapists whereof three were licensed psychologists and one was a social scientist. All had training in CBT and clinical experience prior to the study. Assessment of motivation to change (BNSOCQ) was administered in paper-form in connection with the meeting with the therapist, and assessment of personality traits (NEO PI-R) was sent by mail to the participant shortly after the meeting. Ethics approval was granted by the Stockholm Ethical Review Board (reg. no. 2008/669-31/4).

#### 2.3.1. Treatment conditions

The study examined two similar types of ICBT; BIB-ICBT and Salut BN. Both treatments had a maximum treatment length of 24 weeks, the participant had weekly internet-based support from a therapist, two face-to-face meetings (pre- and post-assessment), and the treatment content was comprised of a CBT-based program with a number of steps to be followed consecutively. The content may be categorized in three main areas: 1) stop the vicious cycle of bingeing-purging-dieting through behavioural modification and psychoeducation, 2) cognitive restructuring in terms of reassessing attitudes towards self-worth and appearance, and 3) relapse prevention. Participants paid a standard fee for the two face-to-face meetings otherwise treatment was free of charge. Each treatment also had its own unique features. In BIB-ICBT, the patient received a self-help paperback manual (Fairburn, 2003) with six treatment steps; 1) Getting started, 2) Regular eating, 3) Alternatives to binge eating, 4) Problem solving and taking stock, 5) Dieting and related forms of food avoidance, and 6) Relapse prevention. A secure communication platform was used for e-mail communication and the therapist followed guidelines from the therapist manual (Fairburn, 1995). In Salut BN (<http://www2.salut-ed.org/demo/>) the participant was given a user account to a pure online program covering seven steps: 1) Motivation, 2) Self-observation, 3) Behaviour modification, 4) Problem solving, 5) Cognitive restructuring, 6) Assertiveness, and 7) Relapse prevention. Communication with the therapist was managed within the system. The Salut BN was associated with a license fee and a fixed price per treatment and was thus more expensive for the clinic than BIB-ICBT.

### 3. Statistical analyses

Data were analysed using SPSS for Mac (v.22). Differences between drop-out and completers in continuous data were calculated by independent samples *t*-tests. Cohen's *d* effect sizes were defined as  $\geq 0.20$  small,  $\geq 0.50$  medium, and  $\geq 0.80$  large effect. Categorical data were analysed by  $\chi^2$  with effect sizes  $\phi \geq 0.10$  small,  $\geq 0.30$  medium, and  $\geq 0.50$  large. As for the predictor analyses, four categories of predictors were chosen: 1) personality traits, 2) ED symptoms, 3) psychiatric comorbidity, and 4) demographics (e.g. age, BMI, duration of illness). Due to insufficient power, the variables in the categories were analysed separately. For personality traits measured by NEO PI-R, links on the facet-level were studied to capture variance that can be masked on the dimensional level (Markon et al., 2005), and to maximize clinical utility (Samuel and Widiger, 2006). The personality based self-assessments SASB and NEO PI-R were analysed with logistic regression with two control variables: therapist and duration of illness. In analyses of psychiatric comorbidity in terms of CPRS-S-A scores, disturbed eating and compensatory behaviour in terms of EDE-Q frequencies, and demographic

**Table 1**

Descriptive statistics and comparisons between drop-outs and completers in participated weeks and completed treatment steps.

Variable	Drop-out (N = 35)	Completer (N = 63)	t	d	p
Weeks in treatment	13.8 (7.0)	24.9 (4.7)	−9.335	−1.90	<0.001
Steps BIB-CBT	0.8 (0.4) <sup>a</sup>	4.1 (1.3) <sup>b</sup>	−10.885	−3.88	<0.001
Steps Salut BN	1.4 (0.9) <sup>c</sup>	5.1 (1.9) <sup>d</sup>	−7.485	−2.64	<0.001

Note. Number of steps is shown separately for BIB-CBT and Salut BN since they contain a maximum of six and seven steps respectively. Weeks in treatment is the number of weeks from the date of treatment start to end, in many cases treatment was paused due to holidays, illness, or similar reasons, and thus the maximum number of active treatment weeks was always 24 despite that the reported average time for completers is 24.9 weeks.

<sup>a</sup> N = 19.

<sup>b</sup> N = 32.

<sup>c</sup> N = 16

<sup>d</sup> N = 31.

variables such as age, and BMI, the control variables were therapist and duration of illness. Goodness of fit for the models were analysed with Hosmer and Lemeshow Test. Nagelkerke's R<sup>2</sup> was chosen to show the proportion of explained variance, and Chi-square statistics showed the significance for each full model respectively. Univariate outliers were defined as observations  $\pm 2.5$  SD of the mean.

#### 4. Results

A total of 98 participants were analysed in ICBT whereof 50 (51%) in BIB-ICBT, and 48 (49%) in Salut BN. Assessment was on average carried out 34 days (*SD* = 23, range = 0–91) before treatment start. There was no significant difference between drop-out and completers in number of days between assessment and treatment start ( $p = 0.913$ ,  $t = -0.110$ ). The average drop-out rate was 36% and thus most participants (64%) were completers. However, few completed all treatment steps. In BIB-ICBT six (12%) participants completed all steps and in Salut BN 13 (27%) participants did. There were no significant differences between BIB-ICBT and Salut BN in drop-out rate ( $p = 0.834$ ,  $\chi^2 = 0.110$ ) or number of participated weeks ( $p = 0.339$ ,  $t = -0.961$ ). Time in treatment and number of completed steps and are shown in Table 1.

##### 4.1. Participant characteristics

All participants but one were female and 40 (41%) had undergone at least one treatment prior to ICBT. There were no significant differences between drop-outs and completers in history of previous treatment (data not shown). The majority (62%) of the participants were diagnosed with bulimia. Comorbid psychiatric diagnosis was common, especially anxiety disorder (50%), followed by depression (29%). ED-diagnosis and comorbidity for drop-outs and completers respectively is shown in Table 2.

**Table 2**

Prevalence and comparison between drop-outs and completers in ED- and comorbid diagnoses.

Variable	Drop-out (N = 35)	Completer (N = 63)	$\chi^2$	phi	p
ED diagnosis					
Bulimia	25 (71%)	36 (57%)	1.954	−0.141	0.162
EDNOS	10 (29%)	27 (43%)			
Comorbidity					
Depression	10 (29%)	18 (29%) <sup>a</sup>	0.002	0.005	0.962
Anxiety	20 (57%)	29 (47%) <sup>a</sup>	0.962	−0.100	0.327
Substance abuse	3 (9%)	2 (3%) <sup>a</sup>	1.308	−0.116	0.253

Note. Due to missing data <sup>a</sup>N = 62. Comorbidity refers to DSM-IV SCID-I diagnoses: Depression includes major depression and depression not otherwise specified (NOS); Anxiety includes agoraphobia with and without panic disorder, panic disorder without agoraphobia, obsessive-compulsive disorder, posttraumatic stress disorder, social phobia, specific phobia, generalized anxiety disorder, and anxiety NOS; Substance abuse includes both alcohol- and drug abuse. Only current diagnoses were included.

**Table 3**

Baseline descriptive statistics for drop-outs and completers in self-assessed personality traits, ED symptoms, psychiatric comorbidity, age, BMI, duration of illness, clinical impairment, motivation to change, and clinical assessment of global functioning.

Variable	Drop-out (N = 35)	Completer (N = 63)
Age	27.5 (7.2)	27.1 (7.4)
BMI	22.8 (2.8)	23.4 (3.4)
Duration, years	13.5 (9.5)	10.7 (7.9) <sup>c</sup>
EDE-Q global	3.7 (1.2)	3.8 (0.9) <sup>d</sup>
EDE-Q frequencies		
Over eating	10.2 (8.7)	8.4 (8.2)
Objective binge eating	8.3 (6.5) <sup>a</sup>	6.4 (6.1) <sup>e</sup>
Subjective binge eating	6.3 (6.5)	4.1 (4.3)
Vomiting	6.3 (6.5)	7.0 (8.9)
Exercise	9.11 (8.4)	6.5 (7.8)
CIA	25.8 (10.0)	25.6 (10.0)
BNSCOQ global	2.5 (0.4) <sup>b</sup>	2.6 (0.4) <sup>f</sup>
GAF	51.7 (5.8) <sup>a</sup>	51.5 (6.1) <sup>c</sup>
SASB self-		
-emancipate	34.3 (16.3)	25.3 (14.7) <sup>g</sup>
-affirm	34.0 (19.1) <sup>a</sup>	26.4 (17.1) <sup>e</sup>
-love	38.1 (20.8)	34.8 (19.3) <sup>c</sup>
-protect	48.7 (18.6)	43.2 (18.5) <sup>c</sup>
-control	58.5 (17.3)	55.2 (14.4) <sup>c</sup>
-blame	51.5 (19.9)	51.4 (22.7) <sup>c</sup>
-attack	37.3 (21.6)	35.8 (24.3) <sup>c</sup>
-ignore	36.0 (18.6)	33.6 (19.9) <sup>c</sup>
NEO PI-R domain		
Neuroticism	117.8 (22.6) <sup>i</sup>	117.1 (25.3) <sup>h</sup>
Extraversion	111.0 (20.6) <sup>j</sup>	113.3 (21.9) <sup>i</sup>
Openness	121.4 (20.2) <sup>k</sup>	113.0 (21.9) <sup>i</sup>
Agreeableness	117.5 (22.7) <sup>k</sup>	126.0 (16.5) <sup>h</sup>
Conscientiousness	105.0 (22.5) <sup>k</sup>	113.7 (22.6) <sup>h</sup>
CPRS-S-A comorbidity		
Depression	8.1 (4.0)	7.9 (3.5) <sup>c</sup>
Anxiety	7.3 (3.5)	7.2 (3.6) <sup>c</sup>
Obsession-compulsion	6.8 (3.4)	6.4 (3.0) <sup>c</sup>

Note. Due to missing data: <sup>a</sup>N = 34, <sup>b</sup>N = 28, <sup>c</sup>N = 62, <sup>d</sup>N = 59, <sup>e</sup>N = 60, <sup>f</sup>N = 55, <sup>g</sup>N = 61, <sup>h</sup>N = 45, <sup>i</sup>N = 24, <sup>j</sup>N = 26, <sup>k</sup>N = 25, <sup>l</sup>N = 44. Duration refers to a calculation based on the patient's own statement of age when first experiencing ED-symptoms.

We found a significant difference in drop-out based on therapist ( $\chi^2 = 11.485$ ,  $p = 0.009$ ). For three therapists a minority of the participants (29%, 30%, and 30% respectively) dropped out, whereas for the fourth therapist a large majority (82%) did so. Duration of illness was on average close to three years longer for drop-outs than for completers. This was not a significant difference, but there was a small effect ( $t = 1.528$ ,  $d = 0.32$ ,  $p = 0.130$ ). We found no other significant differences between drop-outs and completers in the descriptive variables shown in Table 3.

Logistic regressions were carried out to examine possible predictors of drop-out. Based on the previous research that found therapist (Nevoen et al., 2006) and duration of illness (Hoste et al., 2007) to be predictive of drop-out, and based on our finding that these variables were (trend-) significantly different between groups, therapist and duration of illness were chosen as control variables in the predictive models. Results showed that within the Conscientiousness domain, lower scores in the facet Dutifulness predicted drop-out. Drop-outs on average scored 19.4 (*SD* = 5.7), and completers 23.0 (*SD* = 3.6). Also, the facet Assertiveness in the Extraversion domain was significant. Drop-outs scored 13.9 (*SD* = 5.2) and completers 16.1 (*SD* = 4.3). In SASB, the cluster Self-affirm was found to predict drop-out (see Table 3 for descriptives). Results of the logistic regression analyses are shown in Tables 4 and 5. Predictive analyses were also conducted for EDE-Q psychological scales, frequencies of disturbed eating and compensatory behaviour, CPRS-S-A subscales depression, anxiety, and obsession-compulsion, respectively as well as clinical assessment of global functioning and demographic variables such as BMI, and age, controlling for therapist and duration of illness. None of these variables were found to predict drop-out (data not shown).

**Table 4**

Predictors of treatment drop-out. Logistic regression models, one model for each predictor, controlling for therapist and duration of illness.

Model	Predictor	B	Exp(B) (CI 95%)	p	$\chi^2$ (p)	R <sup>2</sup>	H-L
NEOPI R	Dutifulness (N = 73) <sup>a</sup>	0.210	1.23 (1.07;1.43)	0.004	30.68 (<0.001)	0.474	0.174
	Assertiveness (N = 73) <sup>a</sup>	0.135	1.14 (1.00;1.31)	0.044	25.05 (<0.001)	0.401	0.450
SASB	Self-affirm (N = 94) <sup>b</sup>	−0.029	0.97 (0.94;1.00)	0.041	19.50 (0.002)	0.257	0.389

Note. R<sup>2</sup> = Nagelkerke's R-square, H-L = Hosmer-Lemeshow test, Exp(B) = odds ratio.<sup>a</sup> N = 25 drop-out and 48 completer.<sup>b</sup> N = 34 drop-out and 60 completer.

## 5. Discussion

### 5.1. Main findings

The current study explored personality traits, ED-symptoms, psychiatric comorbidity, and demographic variables as possible predictors of drop-out in two types of ICBT for BN and similar EDs, within a randomized controlled trial in a clinical population. The results showed that lower scores in the personality traits Dutifulness and Assertiveness, and higher scores in Self-affirmation predicted drop-out. Drop-out was also found to be predicted by therapist factors.

Firstly, lower scores in Dutifulness describe someone who tends to be somewhat undependable and unreliable, as opposed to someone with a high score who would be described as adherent to ethical principles and eager to fulfil moral obligations. To put this in context, Dutifulness is a facet within the Conscientiousness dimension, which generally may be described as “will to achieve”. It concerns the ability to resist impulses in order to attain higher goals in terms of executive functioning such as planning, organizing, and carrying out tasks. Our finding is in line with previous research where lower scores in Self-directedness, as measured by the Temperament and Character Inventory TCI (Cloninger et al., 1994), have been found to predict drop-out. Self-directedness shows a strong positive association with Conscientiousness and measures “will-power” or the ability to regulate and adapt one's behaviour and resist urges for instant gratification in order to achieve higher goals and values. Compared to Swedish norms for women (Costa and McCrae, 2003) drop-out scores were in the low range and completer scores in the average range (data not shown). In previous research, as noted, impulsivity has been shown to predict drop-out, but we did not find any significant effect in that facet. However, a ceiling effect may have masked an association; completers were in the high range, and drop-outs in the extremely high range compared to norm data. Also, impulsiveness has been shown to correlate negatively with Conscientiousness (Costa and McCrae, 1992) within which we, as stated, did find a notable effect.

Secondly, a lower score in Assertiveness was found to predict drop-out. Low scores reflect a preference for staying in the background and let others do the talking, whereas high scores are associated with dominance, forcefulness, and social ascendancy. Assertiveness is a facet within the Extraversion domain which in general describes someone as being either people liking, sociable, active, talkative, and optimistic, or being introverted, reserved, independent, and even-paced. Although lower scores predicted drop-out, compared to Swedish norms for women (Costa and McCrae, 2003), both drop-outs and completers scored within the average range.

Thirdly, personality traits conceptualized as self-image showed that higher scores in Self-affirm predicted drop-out. High scores in Self-affirm indicate acceptance of one's feelings, a willingness to explore one's emotions, and to act on them. Tolerance, permissiveness, and a broad and open cognitive style accompany these traits. Although drop-outs scored higher than completers, both scored lower compared to previously published norm data for Swedish women (Bjorck et al., 2003).

One interpretation of the NEO PI-R and SASB results is that drop-outs appear to experience a lower sense of moral obligation to abide by rules and expectations compared to completers and ICBT requires that the participant assumes responsibility for progress and complies with the steps in the program. Low Assertiveness may be associated with independence that can lead to a sense of self-sufficiency, depending on concurrent traits for instance in the Neuroticism dimension. High SASB Self-affirm operationalizes a tendency to be interested in, accept, and explore one's emotions and to act on them. It is also associated with a tendency to feel comfortable and satisfied with oneself. In short, in deciding to continue or drop out, the predictive personality traits may indicate giving precedence to avoiding short-term emotional discomfort over achieving long-term goals. However, it is also possible that for some patients drop-out is a sound decision based on the conviction that one is capable of recovery on one's own, and/or that the treatment is not helpful, or even detrimental to ones symptoms. A qualitative study on ICBT for various psychiatric disorders showed that 9.3% of patients reported some type of negative effect of the treatment (Rozenal et al., 2015). Also, as previous research on treatment outcome for drop-outs has shown, it is not necessarily negative for the patient. The three predictors (Assertiveness, Dutifulness, and Self-affirm) might measure different aspects of similar traits. It is however likely that they explain unique variance since they all remained significant when entered together in the logistic regression analysis.

Given the heterogenous and often ad hoc nature of research on drop-out, a theoretical framework would be useful to guide future efforts, and one such might be found in the concept of ego depletion (Baumeister et al., 2006). This refers to a state where the finite resource of self-regulation, the ability to override and alter spontaneous responses to attain a goal, is exhausted, and counter-productive behaviour becomes more likely. Dropping out from treatment can be seen as an example of such behaviour, which has been associated with several traits from the domain of Negative emotionality (cf. Neuroticism) and Constraint (similar to Conscientiousness) of the Multidimensional Personality Questionnaire (Roberts et al., 2006). Those authors propose that certain personality characteristics lead people to have certain experiences, and then will in turn be shaped by those experiences, reinforcing personality traits. For instance, when faced with a challenge in the program, patients

**Table 5**

Predictors of treatment drop-out. Combined logistic regression model with all three predictors entered in the same model, controlling for therapist and duration of illness.

Model	Predictor	B	Exp(B) (CI 95%)	p	$\chi^2$ (p)	R <sup>2</sup>	H-L
NEOPI R	Dutifulness	0.251	1.29 (1.06;1.56)	0.012	42.67 (<0.001)	0.636	0.613
	Assertiveness	0.218	1.24 (1.03;1.51)	0.025			
SASB	Self-affirm	−0.060	0.941 (0.90;0.98)	0.007			

Note. N = 70, whereof 23 drop-outs and 47 completers. R<sup>2</sup> = Nagelkerke's R-square, H-L = Hosmer-Lemeshow test, Exp(B) = odds ratio.

low in Assertiveness might be less likely to ask for additional guidance (rather than unfortunate interfering factors, insufficient instructions, misunderstanding or some other reason), leading to increased difficulty following the program and an even higher threshold to asking for help.

We also found a therapist effect. The average drop-out rate among three therapists was 30%, while for the fourth therapist it was 82%. This result is similar to that of Nevenon et al. (2006) where the overall drop-out rate was 82%, but two therapists together had a drop-out rate of 86% and the third had a drop-out rate of 14%. Nevenon's definition of completer was stricter than ours: only those who completed all treatment steps were considered completers. Nonetheless, therapist was a significant factor for drop-out. Interviews with the therapists revealed that the therapist with least drop-out provided more support, and had a more therapeutic approach compared to the other two therapists (Nevenon et al., 2006). Nevenon's findings are in line with a review on internet-based interventions for mental health that found a relationship between the therapeutic alliance and internet-based treatment outcome (Sucala et al., 2012), and with a study on ICBT for various anxiety disorders that also found an association between alliance and treatment outcome (Nordgren et al., 2013). Thus, although the current study has not examined treatment outcome, it seems that alliance is of importance in ICBT, and that it may therefore possibly be associated with the therapist-related drop-out rate we found. However, we did not collect data on participants' experience of the treatment or therapist, nor did we conduct interviews with the therapists and could therefore not analyse this matter further.

### 5.1.1. Implications

The results of the present study are primarily to be interpreted theoretically in that they contribute to increased knowledge of predictors for drop-out from ICBT in a clinical setting. But the results are also of clinical importance since they underline the need for thorough baseline screening for personality traits, before deciding to provide ICBT. Also, present findings along with previous ones may guide the construction of a new instrument designed specifically for this purpose.

### 5.1.2. Strengths of the study

Assessments were carried out within a standardised procedure that included both clinical- and self-assessments that were well validated and overall had good psychometric properties. Another strength is that the participants were recruited from routine specialized care within a clinical setting, as opposed to university based studies which is relatively common in otherwise similar drop-out studies.

### 5.1.3. Limitations

The current study has several limitations. First and foremost it is underpowered. This is difficult to avoid since it is a part of a randomized controlled trial originally designed for other purposes than examining drop-out; indeed it is difficult to imagine a study of drop-out not being underpowered since such analyses are incidental to treatment studies where prior power analysis is aimed at efficacy/effectiveness, not drop-out. For this reason, we adopted an approach where Type I error, an obvious risk given the many analyses and no correction for *p*-value inflation, was judged as more acceptable in the service of contributing data that may help stabilize future meta-analytic estimates of contributing factors. Another limitation is that there were missing data and this may have affected results. The initial assessments were carried out on average 34 days before treatment start. It is possible that state factors such as symptom levels have a lower predictive ability than the trait personality factors over such a time period and should therefore be interpreted with caution. Since there is no consensus about what the definition of drop-out should be, another classification of drop-out might have given different result; our findings were however consistent with previous research. We mixed data from the two treatment conditions because we found no significant differences between

them. However, due to the relatively low power the treatments may have been different in some respects that remained undetected.

## 5.2. Conclusions and future research

The current study explored several variables as possible predictors of drop-out from ICBT for eating disorders in a specialized out-patient setting. Both therapist factors and personality factors such as being less dutiful and assertive, and more self-affirming were identified as predictors.

We did not find psychiatric comorbidity to predict drop-out. However, the RCT excluded patients with more severe psychiatric symptoms, and assessment did not cover all psychiatric disorders, for instance personality disorders were not assessed. Future research should broaden the inclusion criteria to explore this question further before firm conclusions are drawn. Our aim to include male participants resulted in only one male. Further attempts should preferably be made to include males to a greater extent than we managed to do.

The personality traits we found to predict drop-out are partly the same, or similar, to previous findings of drop-out from standard ED treatment. Therefore, an appropriate focus in future research is whether patients with certain personality traits are likely to drop out regardless of treatment type. Another question is how problematic drop-out really is; long-term follow-up of both completer and drop-out may help to clarify the picture. The fact that someone completes all treatment steps or stays in treatment for the full time-period does not necessarily mean that they are compliant with treatment, and the fact that someone drops out does not necessarily mean that they are not compliant while still in treatment. Personality variables may successfully predict compliance also. Future studies should preferably also examine therapist related factors such as alliance, allegiance, personality, and approach in association to drop-out.

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