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Personality dimensions and treatment drop-outs among eating disorder patients treated with cognitive behavior therapy

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Abstract

Premature, unilateral interruption of inpatient treatment of eating disorders (ED) is a key factor limiting success. We evaluated the role of personality dimensions (temperament and character) in predicting drop-out in 145 consecutive ED inpatients (133 females) who entered cognitive behavior therapy. Baseline assessment included anthropometry, the Eating Disorder Examination, the Beck Depression Inventory, the State-Trait Anxiety Inventory, and the Temperament and Character Inventory (TCI). Treatment was based on the new transdiagnostic cognitive behavior theory of ED, adapted for an inpatient setting; it was manual-based and lasted 20 weeks (13, inpatients; 7, residential day hospital). Thirty-four patients (23.4%) discontinued treatment. Drop-outs had a lower level of education, a higher prevalence of separation or divorce in the family, and lower scores on the TCI Persistence scale. After correction for age, gender and body-mass index, scores on the Persistence scale continued to be significantly related to drop-out, and the association was confirmed by Kaplan-Meier analysis. Eating disorder patients with low Persistence scores are significantly less likely to complete inpatient treatment.

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1. Introduction

Inpatient treatment is often indicated for the management of anorexia nervosa. Indications include medical instability, risk of suicide, severe interpersonal problems at home, and failure of less intensive methods (Fairburn et al., 2003; Vandereycken, 2003; Yager and Andersen, 2005). For bulimia nervosa in the US and UK, the ma-

jority of treatment takes place in outpatient settings. Commonly, in European countries, such as Italy, Germany and Switzerland, and with varying frequency in the US, inpatient treatment is offered to patients who fail to respond to outpatient treatment (Mahon, 2000; Dalle Grave, 2005a). No indications have been published for the inpatient treatment of eating disorders not otherwise specified (NOS), although a recent survey found that approximately 40% of the patients admitted to a specialist inpatient unit for eating disorders meet the diagnostic criteria for this category (Dalle Grave and Calugi, 2007).

The clinical approach to eating disorder treatment in inpatient settings gradually shifted from a restrictive

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behavioral approach, involving compulsory hospitalization, toward a more lenient approach with fewer behavioral constraints (Touyz et al., 1984; Dalle Grave et al., 1993). Many current inpatient therapeutic efforts are dedicated to engaging patients in the treatment protocol and allowing them to retain a larger degree of control over the treatment process. Despite these changes, most subjects with eating disorders often terminate inpatient treatment prematurely (Woodside et al., 2004). Longitudinal data indicate that dropping out is predictive of a poorer post-treatment outcome (Baran et al., 1995; Carter et al., 2004). These observations underline the importance of studying factors involved in the drop-out process. A better knowledge of these factors could help develop strategies to reduce attrition and thus improve the final outcome (Woodside et al., 2004).

The drop-out rate in outpatient controlled trials of psychotherapy for anorexia nervosa is extremely variable, averaging nearly 40% in adults (Agras et al., 2004; Halmi et al., 2005), and varying from 10% to 20% in adolescents (Szmukler et al., 1985; Lock et al., 2006). In adult bulimia nervosa patients, the drop-out from outpatient controlled trials is on average 20%, with a range from 0% to 35% (Mitchell, 1991). No data are available in adolescents with bulimia nervosa and in patients with eating disorder NOS.

All the empirical investigations on drop-out in inpatient eating disorder units were carried out on anorexia nervosa. Five studies focused on adults (Vandereycken and Pierloot, 1983; Kahn and Pike, 2001; Surgenor et al., 2004; Woodside et al., 2004; Zeeck et al., 2005) and one on adolescent patients (Godart et al., 2005). The drop-out rate ranged from 20.2 to 51% with a median around 32.4%. A small number of baseline characteristics were found to predict drop-out in two or more independent studies. Predictors included the binge eating/purging type of anorexia nervosa (Kahn and Pike, 2001; Surgenor et al., 2004; Woodside et al., 2004), higher levels of maturity fears (Woodside et al., 2004; Zeeck et al., 2005), older age at onset of anorexia nervosa (Vandereycken and Pierloot, 1983; Godart et al., 2005), and older age at admission (Vandereycken and Pierloot, 1983; Godart et al., 2005). Additional predictors of premature termination of inpatient treatment were identified in a single study. These included longer duration of illness, lower educational or socioeconomic status, different treatment method (Vandereycken and Pierloot, 1983), lower restraint scores, more intense concerns about weight (Woodside et al., 2004) and active fluid restriction (Surgenor et al., 2004). Finally, in two unrelated studies treatment discontinuation was associated with lower body mass index (BMI) at ad-

mission (on average, 13.9 kg/m² vs. 14.8 in continuers; $P < 0.007$) (Surgenor et al., 2004) or higher BMI ($P < 0.03$) (Godart et al., 2005).

The role of personality, assessed by the seven-factor model of the Temperament and Character Inventory (TCI) (Cloninger, 1994), in the decision of eating disorder patients to discontinue treatment has been little investigated (Fassino et al., 2004). One study found that patients with anorexia nervosa who dropped out of treatment with brief outpatient individual psychodynamic psychotherapy had lower scores than completers on Harm Avoidance, Self-Directedness and Cooperativeness (Fassino et al., 2002b). In a similar setting, the same investigators found that drop-outs with bulimia nervosa had lower scores than completers on Self-Directedness and Cooperativeness (Fassino et al., 2003). No data are available on hospitalized patients with anorexia nervosa, bulimia nervosa and eating disorder NOS.

In the present study we tested the role of personality dimensions in predicting drop-out in a large sample of eating disorder patients representing the three DSM-IV (American Psychiatric Association, 2000) diagnostic subtypes (anorexia nervosa, bulimia nervosa, and eating disorder NOS) who had been consecutively hospitalized in a specialist eating disorder inpatient unit. Our hypothesis was that personality dimensions different from those identified in outpatient studies might predict drop-out in an inpatient setting.

2. Methods

2.1. Subjects

Participants comprised 145 Caucasian patients (133 females and 12 males; age range, 13–50) with an eating disorder diagnosed according to DSM-IV criteria. All patients were consecutively and voluntarily admitted to the eating disorder inpatient unit of Villa Garda Hospital between November 2003 and November 2005. All these patients had failed less intensive treatments (e.g. outpatient treatment) or had an eating disorder of clinical severity not manageable in an outpatient setting. Patients with active substance abuse, schizophrenia and other psychotic disorders were not included. The indications and contraindications for the inpatient treatment were evaluated during an eligibility interview completed by a senior specialist in the field (RDG). The Eating Disorder Examination interview (EDE) 12.0D (Fairburn and Cooper, 1993) was used to generate operational definitions of the DSM-IV diagnoses of anorexia nervosa and bulimia nervosa. Those eating disorders that did not meet the operational definitions of

anorexia nervosa or bulimia nervosa were classified as eating disorders NOS. All these patients had an eating disorder of clinical severity, as defined by Fairburn and Walsh (Fairburn and Walsh, 2002), not conforming to the diagnostic criteria for anorexia nervosa or bulimia nervosa.

Before participation, written informed consent was obtained from all subjects (or by the legal guardian for those less than 18 years old, in accordance with our institution's requirements). The protocol was approved by the Institutional Review Board of Villa Garda Hospital, Verona.

2.2. Inpatient treatment protocol

The program has been described in detail elsewhere (Dalle Grave, 2005b). The treatment is derived from the new transdiagnostic cognitive behavior theory and treatment of eating disorders (Fairburn and Harrison, 2003), but has been adapted to make it suitable for an inpatient setting. The treatment is manual-based (Dalle Grave, 2005a), lasts 20 weeks (13 in an inpatient setting, followed by 7 weeks of treatment in a residential day hospital), and is divided into three stages. The goals of these treatments are dependent on the presenting clinical eating behaviors of the patient (e.g. weight restoration in underweight patients, cessation of binge eating and purging in bulimic patients). In stage 1 (from week 1 to 4) the focus is on engaging and educating the patient, obtaining maximal early behavior change, and creating a personalized formulation of the disorder. In stage 2 (from week 5 to 17) the content is dictated by the extended formulation developed in stage 1. It always addresses the patient's psychopathology (the overvaluation of eating, shape and weight and their control, and its various expressions), but in specific patients it also addresses, in additional 'modules', one or more of the following maintaining mechanisms: clinical perfectionism, low self-esteem, mood intolerance, interpersonal difficulties. In stage 3 (from week 18 to 20) the focus is on maintaining progress after treatment ends and on organizing the outpatient follow-up.

The treatment is provided by a multidisciplinary, non-eclectic team composed of physicians, psychologists, dieticians and nurses. A unique aspect of treatment is that the team therapists are trained in transdiagnostic cognitive behavior theory and therapy for eating disorders.

2.3. Classification of treatment drop-out

All patients who unilaterally decided to interrupt the voluntary treatment were considered as drop-outs. No

patients decided to discontinue treatment because they were doing well, or were discharged prematurely by unilateral decision of the team, but in a few cases the day-hospital stay was reduced or prolonged according to a priori decision (Section 3.2).

2.4. Measures

Data collection included weight and height measurement, a detailed Medical Record, a face-to-face structured eating disorder diagnostic interview, and a package of questionnaires to evaluate specific eating disorder psychopathology, general psychopathology, and personality. All measurements were made on the first day of admission.

2.4.1. Weight and height

Weight was measured on a medical balance and height by a stadiometer by a medical doctor involved in the study. Patients were weighed wearing only underwear and without shoes.

2.4.2. Medical record

The medical record was completed by a physician by directly interviewing patients. It included demographic and family data and a detailed medical and eating disorder history.

2.4.3. Eating disorder psychopathology

The EDE 12.0D (Fairburn and Cooper, 1993) was used to evaluate the specific psychopathology of eating disorders and to elicit a correct diagnosis. The EDE is an investigator-based interview that assesses the frequency of key behavioral and attitudinal aspects of eating disorders during the preceding 4 weeks (28 days). The EDE evaluates the major areas of eating disorder psychopathology on four subscales: Restraint, Eating Concern, Shape Concern, and Weight Concern. Inter-rater reliability has been estimated to be 0.97–0.99 (Wilson and Smith, 1989). The four subscales have good discriminant validity in distinguishing between individuals with eating disorders and controls (Cooper et al., 1989; Fairburn and Cooper, 1993), and the Weight Concern and Shape Concern subscales have good discriminant validity in distinguishing between women with eating disorders and restrained eaters (Wilson and Smith, 1989). In addition to providing severity ratings of eating disorder pathology, the EDE diagnostic version can be used to generate operational definitions of the DSM-IV diagnoses anorexia nervosa and bulimia nervosa. When the interview is used to elicit diagnoses, relevant events in the preceding 2 months (months 2 and 3, respectively) should also be

noted. In the present study we used a validated Italian translation of the EDE (Mannucci et al., 1996).

2.4.4. General psychopathology

The Beck Depression Inventory (BDI) (Beck et al., 1961) was used to assess the presence and severity of depression and personal distress. This measure has excellent internal reliability, reasonably good test–retest reliability, and good criterion validity (Beck et al., 1961). The State-Trait Anxiety Inventory (STAI Form Y-1) (Spielberger et al., 1970) was used to measure trait levels of anxiety. This measure has good internal consistency (Ramanaiah et al., 1983) and good concurrent validity (Spielberger and Vagg, 1984). The Italian versions of the BDI and the STAI have both been validated (Lazzari and Pancheri, 1980; Baggio et al., 1997).

2.4.5. Personality

The Temperament and Character Inventory (TCI) (Cloninger, 1994) was used to evaluate personality characteristics. The TCI is based on a psychobiological model of personality. This model includes four temperament and three character dimensions (Cloninger et al., 1993; Cloninger, 1994). The temperamental dimensions are Novelty Seeking, Harm Avoidance, Reward Dependence and Persistence. The character dimensions are Self-Directedness, Cooperativeness, and Self-Transcendence. The TCI has good internal consistency (Cloninger, 1994; Sato et al., 1999), inter-tester reliability and test-retest reliability (Cloninger, 1994), and has been validated in its Italian version (Fassino et al., 2002a).

2.5. Statistical analyses

The study was exploratory, based on a sample of convenience, and there was no a priori calculation of power and sample size. Statistical analyses were

conducted by SPSS Version 11.0 (SPSS Inc., Chicago) and StatView 5.0 (SAS Institute, Inc., Cary, NC.). Continuous variables were categorized as mean±S.D. and categorical variables as frequency and percentage. Weight (in kg) and height (in m) data were transformed into BMI units (kg/m²) to allow comparison between genders. Analysis of variance (ANOVA) and chi-square tests were used to test the significance of differences between continuers and drop-outs.

A logistic regression model was pre-planned to identify the determinants of drop-out, followed by a Cox regression model to identify the risk of drop-out as function of time and category of TCI scores. For this purpose, considering the limited sample size and the narrow range of TCI scores, patients were categorized according to tertiles of individual temperament and character scores.

In the final model, the dependent variable was unilateral treatment discontinuation, and the independent variables, selected as candidate risk factors, were all the demographic and clinical characteristics, anthropometric measures and psychological variables (scores of the interviews and the questionnaires), which were significantly different between groups. Finally, the significance of TCI scores for drop-out was tested in a Cox regression model, after categorization into tertiles.

The significance limit was set at *P* values <0.05.

3. Results

3.1. Participant characteristics

Sixty-six participants (45.5%) met diagnostic criteria for anorexia nervosa, 17 (11.7%) for bulimia nervosa, and 62 (42.8%) were classified as eating disorder NOS. The three groups of patients did not differ significantly regarding age, age of eating disorder onset, and pre-morbid BMI. The patients with anorexia nervosa had a

Table 1
Clinical data in relation to the type of eating disorder (mean±S.D.)

	Anorexia nervosa (<i>n</i> =66)	Bulimia nervosa (<i>n</i> =17)	ED-NOS (<i>n</i> =62)	<i>P</i>
Age (years)	25.5±9.5	25.6±5.4	25.7±6.5	0.988
Current BMI (kg/m ²)	14.5±2.0 ^a	19.7±2.0 ^b	17.4±3.9 ^c	<0.001
Maximum BMI (kg/m ²) [#]	21.4±3.9 ^a	26.1±7.7 ^b	22.1±3.9 ^a	0.001
Minimum BMI (kg/m ²) [#]	13.4±1.7 ^a	16.9±2.1 ^b	14.7±2.4 ^c	<0.001
Premorbid BMI (kg/m ²)	20.6±3.3	22.6±3.6	20.8±3.5	0.110
Age of eating disorder onset (years)	16.8±5.3	18.2±4.0	17.7±6.2	0.537
Previous inpatient treatments ^o	2 [4] ^a	1 [1] ^b	1 [2] ^b	0.005

Note: ED-NOS=eating disorder not otherwise specified.

[#] Since menarche occurred. Superscripts represent significant differences (*P*<0.05 among groups).

^o Median [interquartile range] (Kruskall–Wallis test).

Table 2
Demographic and clinical characteristics of completers and drop-outs (mean±S.D. or number of cases and prevalence)

	Continuers (N=111)	Drop-outs (N=34)	P ^a
Demographic variables			
Age (years)	25.6±8.2	25.5±6.6	0.408
BMI (kg/m ²)	16.3±3.4	16.5±3.7	0.716
Female gender	102 (92%)	31 (91%)	0.895
Education			0.074
Elementary school	1 (1%)	1 (3%)	
Junior high school	30 (27%)	11 (32%)	
Senior high school	64 (58%)	17 (50%)	
Degree	15 (14%)	2 (6%)	
Other	1 (1%)	3 (8%)	
Parent status			0.020
Married	92 (83%)	21 (62%)	
Separated/divorced	7 (6%)	7 (21%)	
Widowed	12 (11%)	6 (18%)	
Historical variables			
Age of eating disorder onset (years)	17.5±5.7	16.7±5.0	0.513
Duration of eating disorder (months)	93.9±91.3	95.2±66.1	0.948
Previous eating disorder inpatient treatments ^b	1 [2]	2 [3]	0.227
Maximum BMI (kg/m ²)	22.2±4.7	22.3±4.6	0.949
Minimum BMI (kg/m ²)	14.3±2.3	14.4±2.4	0.915
Premorbid BMI (kg/m ²)	20.8±3.1	21.2±4.6	0.640
Eating disorder diagnosis			0.209
Anorexia nervosa	54 (48%)	12 (35%)	
Bulimia nervosa	14 (13%)	3 (9%)	
Eating disorder NOS	43 (39%)	19 (56%)	

^a Unpaired *t* test, chi-square or Fisher's exact test, or Mann–Whitney *U* test.

^b Median [interquartile range].

significantly lower BMI and lower minimum BMI than those with bulimia nervosa and those with eating disorder NOS. Patients with bulimia nervosa had a significantly higher BMI and a higher maximum BMI than those with eating disorder NOS. Patients with anorexia nervosa also had a higher number of previous inpatient treatments than the other groups (Table 1).

3.2. Drop-out rate

Of the 145 patients, 111 patients (76.6%) completed treatment (continuers), whereas 34 (23.4%) dropped out before concluding the planned weeks of treatment (drop-outs). All the continuers completed the 13 weeks of inpatient treatment, but in several cases, the 7 weeks of residential day-hospital treatment were either reduced or extended. The two principal reasons responsible for reduced residential day-hospital stay were the necessity to return to school or to work. These patients were not

considered drop-outs as the decision to reduce the length of treatment was made in conjunction with their treatment team at the beginning of their treatment. Only in a few very underweight patients was the residential day-hospital stay extended beyond 7 weeks to allow them to reach the minimum BMI threshold of 18.5 kg/m². The mean hospital stay was 123 days (S.D.=25) in program completers, compared with 38 (S.D.=25) in drop-outs ($P<0.0001$). The mean BMI at the end of the hospital stay was 20.1 kg/m² (S.D.=1.6) in completers and 17.6 kg/m² (S.D.=3.0) in drop-outs ($P<0.001$).

3.3. Drop-outs vs. completers

There were no significant differences between completers and drop-outs in the demographic and clinical characteristics (Table 2). Only family status was significantly different, with drop-outs having a higher prevalence of parental separation and divorce than the completers.

The comparison of the two groups across baseline measures of dysfunctional eating disorder behaviors and psychopathology (EDE) and associated general psychopathology (BDI, STAI) also failed to show significant differences. Only the TCI Persistence scale was different, with higher values in continuers (5.2 ± 1.8 vs. 4.4 ± 1.5 in drop-outs; $P=0.031$, data available as supplementary file on request). This difference was confirmed by logistic regression analysis; the risk of drop-out decreased by over 20% for each additional point on the Persistence scale (odds ratio=0.77; 95% confidence interval=0.61–0.98; $P=0.033$).

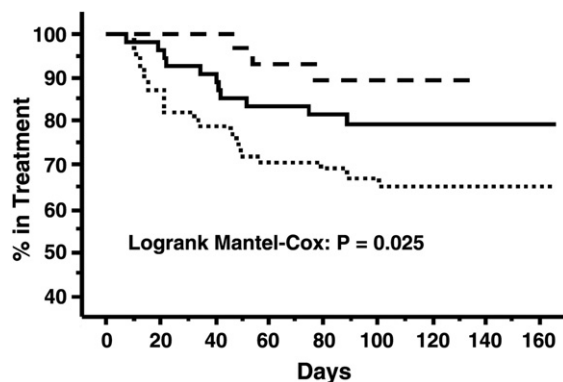


Fig. 1. Time course of treatment discontinuation in subjects with eating disorders as function of the baseline score on TCI Persistence. The dashed line identifies subjects with a high score on Persistence (>6; $n=29$); the continuous line represents subjects with moderate Persistence (5–6; $n=55$); the dotted line refers to subjects with low Persistence (<5; $n=61$).

When the two variables that were significant in univariate analysis (TCI Persistence and parents' status) were included in a multivariate logistic Cox's regression model, Persistence maintained a significant effect on drop-out (Hazard Ratio (HR), 0.78; 95% CI, 0.62–0.97; $P=0.027$). The correction for age, gender and BMI (HR=0.78, 95% CI=0.63–0.98; and a further correction for the diagnosis of eating disorder did not systematically change the results (HR=0.76, 95% CI=0.61–0.95; $P=0.016$). Kaplan–Meier analysis confirmed the association of drop-out with the Persistence score, as a function of time in subjects divided according to tertiles of the temperament scale (high: >6; $n=42$, medium: 5–6; $n=50$ and low: <5; $n=53$) (Log-rank Mantel–Cox, $P=0.025$; Fig. 1).

4. Discussion

The principal finding of the study is that lower levels of Persistence at baseline are positively associated with drop-out in a cognitive behavior inpatient treatment for eating disorders. The study has several strengths. First, it evaluated the role of personality dimensions on drop-out in a specialized inpatient unit for eating disorders, variables that had not been evaluated in previous studies. Secondly, it evaluated the prediction of drop-out independently of eating disorder diagnosis, in a group also including subjects with bulimia nervosa and eating disorder NOS. These patients are often hospitalized in Europe, but had not received attention in previous research. Thirdly, it evaluated the predictors of drop-out in a very specific setting: a non-eclectic and manual-based cognitive behavior inpatient treatment derived from the new transdiagnostic cognitive behavior theory of eating disorders (Fairburn et al., 2003). Therefore, the study on outcome predictors is likely to be valid in similar settings that adopt the same treatment. This contrasts with previous studies, where the predictors of drop-out were tested in inpatient treatments applying an eclectic and integrated approach including medical, psychological, nursing, and social interventions stemming from different and sometimes conflicting theories (Dalle Grave, 2005a), which cannot be reproduced in different units.

Our drop-out rate of 22.3% is lower than the median rate of 32.4% reported in previous studies (Vandereycken and Pierloot, 1983; Kahn and Pike, 2001; Surgenor et al., 2004; Woodside et al., 2004; Zeeck et al., 2005). This lower drop-out rate could be partly attributed to our cognitive behavioral approach, giving strong emphasis to patients' empowerment (Wilson and Schlam, 2004), and partly to the voluntary admission of the patients in the treatment. However, the drop-out rate of 22.3% remains

higher than the 8.7% observed in the psychiatric units of a general hospital (Pages et al., 1998). These data confirm that eating disorder patients are a population particularly resistant to treatment.

In our study, drop-out was related to baseline scores on TCI Persistence, but not by eating disorder diagnosis, baseline measures of dysfunctional eating disorder behaviors (e.g. binge eating, purging and driven exercise), eating disorder psychopathology and associated general psychopathology. Persistence maintained a significant effect on drop-out, after correction for age, gender and BMI, also in a multivariate logistic regression model. In addition, we could identify arbitrary cutoffs that significantly predicted the rate of drop-out and its temporal occurrence. Due to the narrow range of the Persistence score and its skewed distribution, we could not divide our population according to exact tertiles of Persistence, but the risk of drop-out progressively increased with lower scores of Persistence.

Perseverance despite frustration and fatigue, the core characteristics of Persistence (Cloninger et al., 1993), may in part explain why patients with this temperament are more likely to carry out a cognitive behavior inpatient treatment promoting changes (e.g., a normalization of body weight in underweight patients and the interruption of dysfunctional behaviors in bulimic patients), which usually generate anxiety and frustration in the majority of patients with eating disorders. By contrast, the low tolerance of frustration, typical of subjects with low Persistence, leads to premature treatment discontinuation.

The differences on personality dimensions associated with attrition between the two previous outpatient studies (Fassino et al., 2002b, 2003) and the present inpatient study could be partly ascribed to the different levels of clinical severity of the patients studied and to the different types of psychotherapy applied. Apparently, our treatment could be particularly appealing for patients with high levels of perseverance despite frustration and fatigue. Subjects are voluntarily admitted; from the very beginning they are repeatedly and explicitly told that achieving treatment goals and concluding the program requires a maximum commitment. We try to convince patients that the treatment for their eating disorder is much more difficult to carry out than maintaining their disease. The basic idea is to use the perfectionist and persistent personality common in eating disorder patients to increase their adherence to treatment. In cognitive behavioral terms, the aim is to shift the patients' self-evaluation dominion from the over-evaluation of shape, weight and eating control to a commitment to achieving the goals of treatment.

In a recent study carried out in most of the patients in the present series, we described that treatment also determined a significant reduction of Persistence, in strict association with changes in depression and eating disorder psychopathology (Dalle Grave et al., 2007). The combined results of these studies suggest the hypothesis that adapting treatment to individual personality dimensions might be useful for engaging patients. Once the patients are engaged, treatment itself might mitigate some dysfunctional personality traits, reducing the level of depression and eating-disorder-related psychopathology. Future studies in different settings are necessary to confirm this hypothesis.

The only additional factor associated with drop-out in our study was parents' status, with a higher prevalence of separation or divorce. Parental break-up could be related to inability to form a long-lasting therapeutic bond (Adshead, 1998); it might reflect a discordant early family environment, which prevented the establishment of robust ties (Mahon, 2000). However, parents' status was no longer significant in the Cox model.

These data have clinical implications. The association between Persistence and drop-out indicates that the assessment of personality in the initial interview could be potentially used to adapt treatment to the temperament of individual patients. Patients with high Persistence could be helped to increase their adherence to treatment by proposing therapy as a more relevant goal for self-esteem than the control of shape, weight and eating. On the contrary, patients with low Persistence could be helped by including specific strategies to cope with frustration from the very beginning. A simplification of both the cognitive behavior treatment and the manuals might be useful for patients with lower educational levels. Devoting extra time to form a trusting relationship between patients and therapists might help subjects who have experienced parental break-up.

The study has limitations. Firstly, it did not evaluate some potentially important factors relevant to drop-out, such as motivation for recovery, expectation of treatment efficacy, insight into illness, self-efficacy, strength of therapeutic alliance, and ward atmosphere, which might also be relevant to generalize our results to other settings. Patients who voluntarily accept a manual-based inpatient cognitive behavior treatment cannot be considered fully representative of patients admitted to units that use different approaches, and studies in different settings are needed.

In conclusion, different personality characteristics might be relevant in predicting drop-out in both the out- and inpatient treatment of eating disorders. These

studies raise the possibility that adapting the program to the personality of individual patients might improve adherence to treatment, a crucial issue in the management of eating disorders.

Appendix A. Supplementary data

Supplementary data associated with this article can be found, in the online version, at [doi:10.1016/j.psychres.2007.07.028](https://doi.org/10.1016/j.psychres.2007.07.028).

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