

# Psychological Profiles of Women with a Past or Present Diagnosis of Anorexia Nervosa

R Bachner-Melman, A Zohar, I Kremer, R Ebstein

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## Abstract

**Objective:** To examine the relationship between anorexia nervosa (AN) subtype, recovery status, and personality profile.

**Methods:** 195 women with lifetime AN (17 ill, 107 partially recovered, 71 recovered) and 242 controls completed measures of obsessiveness, perfectionism, fear of failure, endorsement of the thin ideal, self-esteem, harm avoidance, novelty seeking, persistence, and reward dependence.

**Results:** Subtypes differed only on novelty seeking (lower for restricting AN). Controls differed significantly in the expected direction from all AN groups on almost all variables. Group scores (except persistence and novelty seeking) were ranked linearly from highest to lowest in the order of ill women, partially recovered, recovered, and then controls.

**Conclusion:** Personality traits of women recovered from AN differ from those of controls (and may be premorbid risk factors), possibly predict prognosis, and may regress to the mean to some extent with recovery. Personality may both predict and correlate with AN; there is an urgent need for longitudinal research to confirm this.

Note: Rachel Bachner-Melman and Ada H. Zohar have equal authorship.

## INTRODUCTION

The association between personality and anorexia nervosa (AN) has been the focus of a growing body of research during recent years. Perhaps the most salient and robust personality characteristics of AN patients have been found to be obsessiveness (1), perfectionism (2), harm avoidance (3), endorsement of the thin ideal (4), and low self-esteem (5). In addition to elevated TPQ (Tridimensional Personality Questionnaire) harm avoidance, high persistence and low novelty seeking and reward dependence have also been reported (3). The results of scarce and limited prospective research point to negative emotionality, perfectionism, drive for thinness, poor interoceptive awareness, ineffectiveness, and obsessive-compulsive personality traits as likely predisposing factors for disordered eating and eating disorders in general (6), although little is known specifically about risk factors for AN. Most studies have focused on currently ill women and little is known about the personality profiles of women recovering and recovered from AN.

The few studies that have compared the personality features of women recovered from AN with those of control women

yield somewhat contradictory results. For example, whereas TPQ harm avoidance has been found in some studies to remain elevated after recovery from AN (7,8,9), others have found harm avoidance levels of women recovered from AN to be comparable to that of controls (10, 11). The number of individuals recovered from AN studied has generally been small (up to n = 45), making it difficult to examine the effect of subtype, and also the inclusion of a partially recovered group is rare.

Perfectionism (12), obsessiveness (13) and low self-esteem (5) have consistently been shown to be robust characteristics underlying AN. Less research attention has been focused on fear of failure in AN, although it has been found to characterize AN patients (14). The TPQ (15) has been shown to characterize the personality structure of eating disorder patients with higher classification accuracy than other personality and symptom scales such as the MMPI and the SCL-90 (16). It measures four temperament dimensions, hypothesized to be mainly genetically influenced: Harm Avoidance, a preference for safe routine and risk avoidance and a tendency to be pessimistic, shy and fatigable; Novelty Seeking, a tendency toward the activation of behavior such as exploratory activity in response to novelty, impulsive decision making, extravagance, and quick loss of temper;

Reward Dependence, a tendency to respond intensely to signals of reward (especially social reward) and to maintain behaviors previously associated with reward or relief of punishment; and Persistence, a tendency to be industrious and perfectionist and to persevere despite frustration instead of becoming discouraged and giving up when expectations are not immediately satisfied. Previous research has shown women with AN to score high on Harm Avoidance<sup>(3,16,17,18)</sup> and sometimes Persistence<sup>(3,19)</sup>, and low on Novelty Seeking (particularly those with the restricting subtype)<sup>(3,20)</sup> and sometimes low on Reward Dependence<sup>(3,20)</sup>.

The low prevalence of AN, 1–3% of adolescent females<sup>(21)</sup>, makes prospective longitudinal studies arduous and expensive. Such studies conducted to date are few and usually use broad outcome measures because of a lack of power to focus on AN. The contribution of cross-sectional studies examining women in various stages of recovery from AN, such as this one, is therefore valuable. This cross-sectional study of a large sample of women in varying stages of illness with AN and recovery from the disorder aims to examine the relationship between a comprehensive range of personality characteristics, AN subtype and illness/recovery status.

## **METHOD**

### **PARTICIPANTS**

Women (n = 437) aged 14–36 participated in the study. They were a subset of women participating in a larger study on the genetics of AN and comprised two groups:

Women (n = 195) with a current or past DSM-IV diagnosis of AN, mostly students, were recruited from the community via announcements in newspapers, on the internet, and on college campuses. Initially 322 women were screened by telephone for past or present symptoms of AN by the first author. Full DSM-IV criteria for a lifetime diagnosis of AN were subsequently confirmed for 219 of them by two psychologists (first two authors), using the eating disorders section of the Structured Clinical Interview for DSM-IV (SCID-IV)<sup>(22)</sup>. The verbatim protocols of the interviews were read by a psychiatrist (third author) who re-interviewed participants by phone when necessary; a lifetime diagnosis of AN was confirmed in 216 women. We relied on self-reported clinical information, since medical records were generally not available and SCID-based current and lifetime diagnoses of AN have been shown to be highly reliable<sup>(23)</sup>. The SCID-IV was also used to determine other current and lifetime axis I diagnosis. An expanded version of the eating

disorders section was used to determine recovery status according to current AN symptomatology. Women were excluded (n = 21) either because their recovery status was difficult to determine (for example, women currently suffering from bulimia nervosa) or because of technical reasons (they had not completed all the questionnaires). The remaining 195 women were stratified into three subgroups:

Women (n = 17) with a current diagnosis of AN. These women strictly fulfilled all DSM-IV criteria for AN at the time of participation in the study.

Women (n = 107) partially recovered from AN. These women had a body mass index (BMI) value of above 17.5 and/or had been menstruating regularly for at least three months. However, they had excessive obsessions about food and weight and/or lingering bingeing/purging symptoms (but not severe enough to warrant a diagnosis of bulimia nervosa).

Women (n = 71) recovered from AN. Recovery was defined as BMI above 17.5, regular menstruation for at least three months (unless birth control pills were taken), no regular bingeing or purging symptoms for at least eight consecutive weeks, and no excessive obsessions about food.

2) The 242 control women with no history of an eating disorder, mainly students, were recruited via announcements on college campuses and by word of mouth. These women were screened for a possible history of an eating disorder. The following criteria were noted as possible indicators of eating disturbance: a BMI of under 17.5 or over 30 currently or since reaching current height, an ideal BMI of under 17.5, amenorrhea, an EAT-26 score of above 20<sup>(24)</sup>, and body dissatisfaction scores in the highest 10% of all female participants in the original genetic study (N=1126; EDI body dissatisfaction score > 38, items scored 0–5). Respondents were also asked whether “eating has ever been problematic or a source of distress for you” and the responses of those replying positively were examined. Women who described symptoms compatible with eating disorders, or who fulfilled at least one of the other criteria above, were contacted and interviewed with the SCID-IV. Those for whom a lifetime diagnosis of the full clinical syndrome of AN was confirmed (7 women; n = 5 recovered, n = 2 partially recovered) were excluded. Those with a lifetime diagnosis of bulimia nervosa or eating disorder not otherwise specified, including subthreshold AN (all AN criteria except amenorrhea or BMI<17.5) and subthreshold bulimia nervosa (BN) (frequency of bingeing and purging under twice a week for

three months), and those who refused to be interviewed were excluded.

**INSTRUMENTS**

The self-report instruments administered are listed in Table 1.

**Figure 1**

Table 1: Self-report measures administered

Scale	Construct	Reference	Reference to Hebrew translation	Alpha
<b>MEASURES OF SYMPTOMATOLOGY</b>				
Brief Symptom Inventory	General symptomatology	(35)	(36)	0.96
Eating Attitudes Test-26	Disordered eating	(37)	(38)	0.93
Eating Disorders Inventory	Body dissatisfaction	(39)	(40)	0.92
	Drive for thinness			0.93
Obligatory exercise questionnaire	Obsessive exercise	(41)	Current study	0.87
<b>MEASURES OF PERSONALITY</b>				
Achievement Motivation Scale	Fear of failure	(42)	Current study	0.91
Child and Adolescent Perfectionism Scale	Perfectionism	(43)	Current study	0.87
Maudsley Obsessive-Compulsive Inventory	Obsessiveness	(44)	(45)	0.79
Rosenberg Self-Esteem Scale	Self-esteem	(46)	Current study	0.90
Sociocultural Attitudes Towards Appearance Questionnaire	Endorsement of the thin ideal	(47)	Current study	0.90
Tridimensional Personality Questionnaire	Harm Avoidance	(15)	(48)	0.86
	Novelty Seeking			0.76
	Persistence			0.57
	Reward Dependence			0.73

Note: Cronbach alpha values are quoted for the present study

Note: Cronbach alpha values are quoted for the present study

Fathers' and mothers' education was measured on a scale of 1 to 5 (1 = primary school, 2 = high school, 3 = B.A., 4 = M.A., 5 = Ph.D.). The number of other DSM-IV psychiatric diagnoses (lifetime), and years of illness (all 4 DSM-IV criteria) were noted from the Structured Clinical Interview for DSM-IV (SCID-IV). A scale assessing the severity of the history of depression was derived from the SCID-IV (no history of depression = 0, depressive disorder not otherwise specified (minor depressive disorder, premenstrual dysphoric disorder or recurrent brief depressive disorder) = 1, dysthymic disorder = 2, major depression single episode = 3, major depression recurring episodes = 4, bipolar II disorder = 5, bipolar I disorder = 6). A scale assessing the severity of restrictive symptoms was derived from a diagnostic interview on weight-control methods used. Participants were asked how often during their illness they a) dieted, b) fasted (skipped at least two meals per day) and/or exercised obsessively in order to lose weight or prevent weight gain. Each method was scored as never = 0, less than once per month = 1, between once a month and once a week = 2,

about once a week = 3, between once a week and daily = 4, daily = 5. Scores for each method were summed for a total score.

**PROCEDURE**

The study was approved by the Israeli Ministry of Health Helsinki Committee and the Ethics Committee of the Hebrew University of Jerusalem. All participants signed informed consent forms, completed the self-report instruments (Table 1), and were screened and interviewed as described above. The data was collected during 2004 and 2005.

**DATA ANALYSIS**

To assess the effect of AN subtype on personality, both a multivariate analysis of variance (MANOVA) and a multivariate analysis of covariance (MANCOVA) were conducted. Bonferroni post-hoc comparisons were performed for the analysis of variance (ANOVA) conducted after these multivariate analyses. For the multivariate analyses, AN subtype (restricting, bingeing-purging) was the fixed factor and the personality measures (endorsement of the thin ideal, fear of failure, obsessiveness, perfectionism, self-esteem, harm avoidance, novelty seeking, reward dependence, and persistence) were the dependent variables. Level of recovery (ill, partially recovered, recovered) was the covariate.

A second MANOVA, along with Bonferroni post-hoc comparisons, was conducted, with group status (ill, partially recovered, recovered, control) as the fixed factor, and the self-report measures (body dissatisfaction, disordered eating, drive for thinness, general symptomatology, endorsement of the thin ideal, fear of failure, obsessiveness, perfectionism, self-esteem, harm avoidance, novelty seeking, reward dependence, and persistence) as dependent variables. All analyses were conducted using SPSS 13.

**RESULTS**

Demographic data for the above groups is shown in Table 2. There were significant differences for BMI and age approached significance.

Figure 2

Table 2: Comparisons of demographic variables across groups

Variable	AN (n=17) M (SD)	PR (n=107) M (SD)	R (n=71) M (SD)	C (n=242) M (SD)	Group differences F (p)
Age (years)	23.00 (2.94)	22.95 (4.38)	23.73 (3.44)	23.91 (2.58)	2.41 (0.07) AN=PR=R=C
BMI	16.82 (0.98)	19.97 (2.15)	21.50 (1.97)	21.91 (2.89)	27.45 (<0.001) AN<PR<(R=C)
Father's education	3.00 (0.94)	2.97 (1.19)	2.84 (1.03)	3.01 (1.09)	0.49 (0.69) AN=PR=R=C
Mother's education	2.94 (0.90)	2.78 (1.09)	2.82 (1.00)	2.92 (0.99)	0.57 (0.64) AN=PR=R=C
No. of siblings in family	3.18 (0.64)	3.53 (1.71)	3.36 (1.21)	3.65 (1.37)	1.25 (0.29) AN=PR=R=C
Birth order (from oldest)	2.12 (0.78)	1.90 (1.20)	2.12 (1.22)	1.87 (1.08)	1.14 (0.33) AN=PR=R=C
Age of menarche	13.97 (2.16)	13.40 (2.11)	13.30 (1.60)	13.31 (1.56)	0.71 (0.55) AN=PR=R=C

Note: M = mean, SD = standard deviation, BMI = body mass index, AN = women with current AN, PR = women partially recovered from AN, R = women recovered from AN, C = female controls with no history of an eating disorder. The group comparisons are a summary of a series of post-hoc Bonferroni comparisons. Group means are described as equal if  $p > 0.05$ . Parental education scale: 1=primary school, 2=high school, 3=BA, 4=MA, 5=PhD

Clinical data for currently ill, partially recovered, and recovered AN women is presented in Table 3. There were significant differences for BMI and years of illness.

Figure 3

Table 3: Comparison of clinical variables (worst ever symptoms) across recovery status in AN women

Variable	AN (n=17) M (SD)	PR (n=107) M (SD)	R (n=71) M (SD)	Group differences F (p)
Age of onset	14.68 (2.34)	15.60 (2.58)	15.27 (2.12)	1.23 (0.29) AN=PR=R
Severity of restrictive symptoms*	12.12 (2.91)	13.07 (2.29)	12.51 (2.32)	2.01 (0.14) AN=PR=R
Minimum BMI	13.75 (1.92)	15.11 (1.77)	15.40 (1.22)	7.26 (0.001) AN<(PR=R)
Severity of history of depression	2.24 (1.86)	2.15 (1.76)	1.79 (1.72)	1.06 (0.35) AN=PR=R
Number of other DSM-IV psychiatric diagnoses (lifetime)	2.41 (2.21)	2.65 (2.86)	2.59 (2.28)	0.06 (0.94) AN=PR=R
Years of illness (all 4 DSM-IV criteria)	6.28 (4.06)	2.87 (2.28)	2.04 (1.41)	25.17 (<0.001) AN>PR>R

Note: M = mean, SD = standard deviation, BMI = body mass index, AN = women with current AN, PR = women partially recovered from AN, R = women recovered from AN, C = female controls with no history of an eating disorder. The group comparisons are a summary of a series of bi-group contrasts. Group means are described as equal if  $p > 0.05$ , and unequal if  $p < 0.05$ . \*Scores based on answers to interview questions about weight control methods

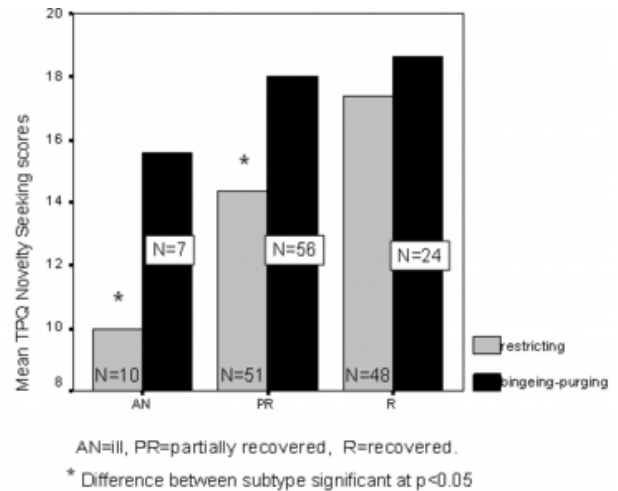
AN SUBTYPE

There was no significant effect of subtype on personality variables (data not shown), with one exception: Women with a past or present diagnosis of bingeing-purging AN scored significantly higher on TPQ novelty seeking than women with a past or present diagnosis of restricting AN ( $F=15.89, p<0.0001$ ; no significant interaction between AN subtype and level of recovery). Also, when age, BMI, severity of symptoms, and years of illness were included as covariates, the results were almost unchanged. Figure 1 shows mean levels of TPQ Novelty Seeking for women with a lifetime diagnosis of restricting versus bingeing-purging AN across

levels of recovery.

Figure 4

Figure 1: Mean TPQ Novelty Seeking scores for women with a lifetime diagnosis of restricting versus bingeing-purging AN across levels of recovery



Note: Significant effect for AN subtype ( $F=11.7, p<0.001$ ) and for level of recovery ( $F=7, p<0.01$ )

LEVEL OF RECOVERY

For the MANOVA overall, the Wilks' Lambda significance test for multiple dependents was significant ( $F=8.05, df=42, p<0.001$ ). Although all variables were included in a single analysis, results are presented separately for symptomatology and personality variables for the sake of clarity. Including age and BMI as covariates through MANCOVA did not change the results presented below.

1. SYMPTOMATOLOGY VARIABLES

For body dissatisfaction, disordered eating, drive for thinness, general symptomatology, and obsessive exercise, there was a pattern where women ill with anorexia scored highest, followed by partially recovered women, recovered women, and then controls in that order. Not all group differences were significant using Bonferroni post-hoc comparisons (see Table 4). Group differences for the depression subscale of the Brief Symptoms Inventory (that correlates 0.91 with the total scale) are almost identical to the group differences for the total scale of general symptomatology (data not shown).

2. PERSONALITY VARIABLES

Group status was significant at  $p<0.05$  for all variables except TPQ persistence, for which it approached significance ( $p = 0.053$ ). As like the symptomatology variables, scores were again ranked from highest to lowest in

the following order: women ill with anorexia, partially recovered women, recovered women, and then controls, for all variables except TPQ persistence and novelty seeking. Using Bonferroni post-hoc comparisons, differences between the three groups of AN women did not reach significance for most variables (see Table 5). However, when the less stringent t-tests were conducted between the ill and the recovered AN groups, group differences for all symptomatology variables, obsessiveness, self-esteem, harm avoidance, novelty seeking and reward dependence were significant at the  $p < 0.05$  level.

**Figure 5**

Table 4: Comparison of symptomatology and personality variables underlying AN across groups using MANOVA

Construct	AN (n=17) M (SD)	PR (n=107) M (SD)	R (n=71) M (SD)	C (n=242) M (SD)	Group differences F (p)
<b>SYMPTOMATOLOGY</b>					
Body dissatisfaction	35.88 (7.48)	30.07 (10.68)	24.87 (11.16)	21.28 (10.10)	(AN=PR)>(R=C) 25.09 (<0.0001)
Disordered eating attitudes and behaviors	39.41 (15.23)	29.08 (17.16)	17.46 (15.82)	7.67 (8.32)	AN>PR>R>C 92.98 (<0.0001)
Drive for thinness	28.24 (5.38)	25.77 (7.79)	20.59 (9.60)	14.19 (8.02)	(AN=PR)>R>C 60.29 (<0.0001)
General symptomatology	101.47 (26.62)	88.61 (40.44)	69.35 (34.27)	50.40 (24.59)	(AN=PR)>R>C 47.29 (<0.0001)
Obsessive exercise	8.06 (2.68)	6.63 (3.34)	6.44 (3.48)	4.12 (2.51)	AN>C 28.23 (<0.0001)
<b>PERSONALITY VARIABLES UNDERLYING AN</b>					
Endorsement of the thin ideal	60.47 (12.72)	57.37 (14.69)	54.86 (15.46)	46.57 (13.24)	(AN=PR=R)>C 19.95 (<0.0001)
Fear of Failure	27.18 (8.99)	26.79 (7.04)	24.59 (7.47)	21.68 (5.81)	(AN=PR=R)>C 17.61 (<0.0001)
Obsessiveness	12.18 (6.09)	10.20 (5.65)	8.77 (5.58)	7.51 (4.50)	(AN=PR)>C 10.17 (<0.0001)
Perfectionism	51.12 (17.28)	48.50 (16.51)	45.52 (16.50)	38.72 (13.88)	(AN=PR=R)>C 13.39 (<0.0001)
Self-esteem	11.88 (4.90)	15.31 (5.96)	17.62 (5.94)	21.19 (5.06)	(AN=PR)<R<C 40.62 (<0.0001)
TPQ Harm Avoidance	21.94 (6.68)	18.64 (6.74)	16.54 (8.04)	13.79 (5.95)	AN>R>C, PR>C 19.56 (<0.0001)
TPQ Novelty Seeking	12.29 (5.18)	16.26 (5.54)	17.73 (5.40)	15.50 (5.05)	AN<(PR=R), R>C 6.24 (<0.001)
TPQ Reward Dependence	12.53 (3.39)	13.91 (4.04)	15.00 (3.27)	15.09 (3.52)	(AN=PR)<C 4.85 (<0.01)
TPQ Persistence	6.29 (5.71)	5.71 (1.84)	5.62 (2.13)	5.26 (2.00)	AN=PR=R=C 2.58 (0.053)

Note: M = mean, SD = standard deviation, AN = women with current AN, PR = women partially recovered from AN, R = women recovered from AN, C = female controls with no history of an eating disorder. The group comparisons are a summary of a series of post-hoc Bonferroni comparisons. Group means are described as equal if  $p \geq 0.05$ .

Note: M = mean, SD = standard deviation, AN = women with current AN, PR = women partially recovered from AN, R = women recovered from AN, C = female controls with no history of an eating disorder. The group comparisons are a summary of a series of post-hoc Bonferroni comparisons. Group means are described as equal if  $p \geq 0.05$ .

**DISCUSSION**

This study confirms the findings of previous studies showing firstly that certain personality characteristics of women with AN differ from those of controls, even after recovery, and secondly that specific personality features are to some extent associated, as is symptomatology, with level of recovery.

We measured symptomatology and a comprehensive range of personality characteristics known to be associated with AN in a sample of ill, partially recovered, recovered, and never-ill women. The three AN groups differed significantly from control women on most variables. This supports a considerable body of research (8, 25, 26) showing that many personality traits of women with AN continue to manifest themselves following recovery.

This may indicate that perfectionism, harm avoidance, fear of failure, obsessiveness, endorsement of the thin ideal, and low self-esteem are risk factors or premorbid vulnerability traits, although these findings are limited by the cross-sectional nature of this study. This is similar to the findings from a meta-analysis of 15 longitudinal studies of eating disorders where perfectionism, negative self-evaluation, and premorbid obsessive compulsive disorder (OCD) were identified as specific risk factors for AN (27). Another possibility is that the traits measured in this study represent a ‘scarring effect’. In other words, the premorbid psychological profiles of the women with AN may not have differed from that of control women, and certain personality traits could have emerged or become exacerbated simultaneously with symptoms, around the time of onset.

Our results further point to some degree of association between attenuation of personality characteristics and level of recovery from AN. Although the specific differences between ill, partially recovered, and recovered AN women tended not to reach significance using post hoc comparisons, women ill with AN differed significantly from women recovered from AN on most variables when these two groups alone were compared. The linear ranking of scores for group obsessiveness, perfectionism, self-esteem, fear of failure, endorsement of the thin ideal, harm avoidance, and reward dependence scores indicates a tendency for ill women to differ the most from controls, partially recovered women less, and recovered women even less.

One explanation for this is that personality profiles tend to regress to the mean, or shift away from the pathological extreme towards normative levels, with recovery from AN. Several longitudinal studies support this claim. For example, self-esteem (28), novelty seeking (7), and reward dependence (7) have been found to increase with recovery, and anxiety (29), obsessions, (29), harm avoidance (7), and persistence (7) to decline. A second explanation is that the group differences in personality traits detected at the time of the study were present premorbidly and are markers for

distinct disease courses with different prognoses. Several studies have shown that personality traits such as novelty seeking (30), and perfectionism (31, 32) are in fact predictive of prognosis.

These two explanations are not necessarily contradictory, in fact they are no doubt both partially true. It makes good clinical sense that whereas extreme levels of personality factors underlying psychopathology predict a poor outcome, the process of recovery is broader and deeper than a mere improvement in symptomatology, with benefits extending to many aspects of being, including personality.

The concept of personality change during recovery from AN (or any other disorder) may appear to contradict the concept of an underlying, genetically determined vulnerability profile. However, it must be kept in mind that the stability of personality over time is relative and personality can be described as “meta-stable” (Cloninger CR, personal communication). Rather than being composed of inflexible or fixed traits, personality is adaptable and dynamic, tending to change with alterations in factors such as life satisfaction, mood, networks of lifestyle contingencies related to eating, and environmental factors. During the process of recovery, often (but not necessarily) as a result of therapy, maladaptive configurations are changed and pathological personality, like symptomatology, may shift in the direction of health.

In contrast to previous studies (3, 27, 28), we did not find any group differences in TPQ persistence. The control group in our study was composed mainly of college students, who may have scored above population norms on this trait.

This study confirms other studies (18,20,32) that have consistently found novelty seeking to differentiate between the AN subtypes. Specifically, women with the restrictive subtype are lower novelty seekers than women with the bingeing/purging subtype. This characteristic may thus provide a clinically useful indication of the likelihood that an individual with AN will develop bingeing and/or purging symptoms.

The finding that women with AN continue to manifest characteristic symptoms and personality traits following recovery seems to depend on the criteria adopted to define recovery. A subset of the recovered sample in this study, who had recovered not only biologically and behaviorally as defined in this and other (10, 33) studies, but in addition no longer exhibited the cognitive symptoms of fear of fatness and body distortion, were not found to differ from control

women on any variables (34).

Strengths of this study include large numbers, a carefully screened control group, the inclusion of a group of women partially recovered from AN, and the broad range of symptomatology and personality variables assessed. A drawback is its cross-sectional design. Also, the number of currently ill women is small, since the vast majority of the women who contacted us to participate in the study were in various stages of recovery. Finally, the high proportion of students might limit generalization of the results.

In conclusion, from our results and from previous research, the relationship between personality variables and AN appears to be a complex one. Many personality traits associated with AN appear to persist following recovery and may thus be premorbid vulnerability markers. The personality profile present at onset may also predict prognosis to some degree. Nevertheless, it seems likely that this profile probably also changes somewhat with an improvement in eating pathology, regressing towards population means. Our results therefore support the possibility that personality traits are both vulnerability endophenotypes and correlates of AN. Large-scale, long-term longitudinal studies measuring a broad range of psychological variables in samples large enough to assess predictive power are clearly needed in order to clarify the course of AN-related personality profiles prior to the development of AN, during illness, and throughout and following recovery. These will provide the ultimate test of the hypotheses that emerge from this and other studies.

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### CORRESPONDENCE TO

Rachel Bachner-Melman, PhD Psychiatry, Hadassah University Medical Center Ein Kerem, Jerusalem, Israel.  
Fax: 972-2-5636828 e-mail: msrbach@plutomail.huji.ac.il

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**Author Information**

**Rachel Bachner-Melman, Ph.D.**

Psychology, (Psychiatry), Hebrew University of Jerusalem, (Hadassah University Medical Center)

**Ada H. Zohar, Ph.D.**

Psychology , Behavioral Sciences, Ruppin Academic Center

**Ilana Kremer, M.D.**

Psychiatry, HaEmek Hospital

**Richard P. Ebstein, Ph.D.**

Research Laboratory, Herzog Memorial Hospital