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## Eating Disorders and MMPI Profiles in a Spanish Sample

**A. Espina, MD**

Full Time Professor and Head of the Master in Family Therapy, Personality, Assessment and Psychological, Treatments Department, Faculty of Psychology, University of the Basque Country, San Sebastián, Guipúzcoa

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**ABSTRACT** – *Objective:* This study compares Minnesota Multiphasic Personality Inventory (MMPI) profiles of subtypes of eating disorder patients.

*Method:* 112 females: 24 with anorexia nervosa, restricting subtype (ANR), 35 with anorexia nervosa, bulimic subtype (ANB), and 53 with purgative bulimia nervosa (BN) (according to criteria from the *Diagnostic and Statistical Manual of Mental Disorders, 4<sup>th</sup> edition*, [DSM-IV]; American Psychiatric Association [APA], 1994) and a control group of 34 normal females, were assessed with the 566-item version of the MMPI.

*Results:* The patients with an eating disorder (ED) evidenced significantly more psychopathology than did the normal controls. In respect to the patients with an ED, more psychopathology was found in patients with purgative behaviours.

*Discussion:* These findings are consistent with previous studies and suggest that treatment for the ED should be supplemented by interventions aimed at psychopathology.

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### Introduction

Eating disorders present a psychopathological symptomatic pattern that appear in a broad range of psychiatric disorders (Strober 1983). General eating disorder psychopathology has been studied with structured diagnostic interviews and validity psychometric instruments, in which the Minnesota Multiphasic Personality Inventory (MMPI) is the

most used (Vitousek & Manke 1994, Sohlberg & Strober 1994). Vitousek and Manke (1994) emphasize the fact that inpatients show more pathology than outpatients and they point out to a starvation effect, as Keys *et al.* (1950) had already suggested.

The first published reports did not analyze restricting and bulimic anorexia in a separate way. Hendren (1983) using the MMPI found higher levels in scales 2(D), 7(Pt) and 8(Sc)

whereas Small *et al.* (1981) found them in 2(D), 6(Pa), 7(Pt) and 8(Sc) ones.

Studies that compared patients with anorexia nervosa restricting subtype (ANR), anorexia nervosa bulimic subtype (ANB) and bulimia (BN), reported that restricting anorexics showed depressive profiles, social isolation and anxiety, and scored higher in the scale 2(D) of the MMPI (Casper, Hedeker & McClough 1992, Edwin, Andersen & Rosell 1988, Norman & Herzog 1983). The bulimic anorexia group presented depression and anxiety too, but their profiles were more pathological in scales 2(D), 4(Pd) and 8(Sc), with less consistent elevations in scales 3(Hy), 5(Mf), 6(Pa) and 7(Pt). Numerous authors have found more pathology in patients with ANB (Casper, Hedeker & McClough 1992, Cumella, Wall & Kerr-Almeida 2000, Dancyger, Sunday & Halmi 1997, Edwin, Andersen & Rosell 1988, Goodwin & Andersen 1984, Hurt *et al.* 1997, Norman & Herzog 1983, Schork, Eckert & Halmi 1994, Salvemini, *et al.* 2000, Shisslak, Pazda & Crago 1990).

With respect to bulimics, Willianson *et al.* (1985) found more pathology in scales 1 (Hs), 2(D), 3(Hy) and 4(Pd) in these patients in comparison with overweight and controls. Other authors also reported elevations in scales 2(D), 4(Pd), 7(Pt) and 8(Sc), although clinical elevations were only found in scale 2(D) (Hatsukami *et al.* 1982, Pyle, Mitchell & Lokert 1981). Cumella, Wall and Kerr (1999) found that two thirds of the patients with eating disorders (anorexia and bulimia) scored high in scales Hs, D, Hy and Si and indicated the existence of impulsivity in the BN group. Harju and Bolen (1995) reported higher scores in the BN group than in controls and anorexics in all scales of the MMPI except for 5(Mf) and 9(Ma), whereas Pryor and Wiederman (1996) found no differences between AN

and BN patients. Hurt *et al.* (1997) studied samples from USA and France and found more psychopathology in ANB patients than in BN and ANR patients. In our country we have no knowledge of any study about the MMPI in eating disorders.

Schork, Eckert & Halmi (1994) found a positive relationship between eating pathology and clinical MMPI scales, and reported worse prognosis in patients with more psychopathology in the MMPI, emphasizing the use of this instrument in such disorders.

The objective of this report is to study the psychopathology, assessed with the MMPI, in eating disorder outpatients (without severe malnutrition) classified as restricting anorexics, bulimic anorexics and purgative bulimics, who were compared to a control group without pathology.

## Method

### Subjects

The sample consisted of 112 female outpatients with an eating disorder who were sent to the University of the Basque Country by the Association Against Anorexia and Bulimia of Euskadi (ACABE). The criteria for selecting the sample were: diagnosis of eating disorder as outlined in the 4<sup>th</sup> edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV; American Psychiatric Association 1994), age between 14 and 33 years and a minimum illness duration of six months. The exclusion criteria were: to be currently receiving psychotherapeutic treatment and/or to require hospital admission. The sample was distributed as follows: 24 patients (21.4 %) were classified as anorexia nervosa restricting subtype (ANR), 35 (31.3%) as anorexia nervosa

bulimic subtype (ANB) and 53 (47.3%) as purgative bulimia nervosa (BN). The control group was recruited from the general population and was homogenous with the patients in sociodemographic characteristics such as sex, age, environment and studies. This control group was composed of 34 women excluding Health Sciences and Psychology students and professionals. From the total sample (N = 146) the majority came from a urban environment (93.30%), were single (92.25%) and students (82.1%). Some of these students (43.2%) were studying at high school and some others at university (32.4%). The selection criteria for the control group were: not to have purgative behaviours, binges or diets, and to punctuate less than 6 on the Goldberg Health Questionnaire-28 (Goldberg & Hillier 1979) and less than 30 on the Eating Attitudes Test (Garner & Garfinkel 1979). Subjects participated voluntarily after informed consent was obtained. The characteristics of the sample are displayed in table I.

#### Assessment

Sociodemographic variables were gathered with an "ad-hoc" scale:

- The Eating Attitudes Test (EAT) (Garner & Garfinkel 1979), a 40-item self-report

questionnaire that evaluates attitudes, feelings and concerns related to food, weight and exercise. Scores under 30 are considered to represent normality.

- The Minnesota Multiphasic Personality Inventory, Revised Manual (MMPI) (Hathaway & McKinley 1951). We have used standardized scores for Spanish population which consider scale scores approaching 50 T to represent normality, and scores at or above 70 T pathological in all clinical scales with the exception of scale Mf (T ≤ 30). The clinical scales are defined as follows: Hypochondriasis (Hs), Depression (D), Hysteria (Hy), Psychopathic Deviate (Pd), Masculinity-femininity (Mf), Paranoia (Pa), Psychasthenia (Pt), Schizophrenia (Sc), Hypomania (Ma) and Social Introversion (Si). The second-order factors are: Ego Strength (Es) (pathological T ≤ 30: The personality structure has more personal integration and cohesion as the score becomes higher), Dependency (Dy) (pathological T ≥ 70: the higher the score is, the more dependence shown), Dominance (Do) (pathological T ≤ 30: higher score, higher social initiative), Responsibility (Re) (pathological T ≤ 30: higher score, more responsibility and integrity), Control (Cn) (pathological T ≤ 30: higher score, more personality control).

Table I: Characteristics of the subjects by groups

	Restricting Anorexia Nervosa n = 24		Bulimic Anorexia n = 35		Bulimia Nervosa n = 53		Control n = 34	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
Age(years)	20.63	6.36	20.63	5.19	22.85	5.27	22.85	5.35
Age at onset (years)	16.71	3.03	16.91	3.77	17.89	4.09		
Duration of illness (months)	46.80	53.30	41.66	40.16	58.72	48.33		
BMI	16.39	1.64	17.05	1.06	22.48	3.72	21.90	2.15
EAT	60.17	17.37	62.49	16.6	51.21	14.75	9.52	6.41

BMI = Body Mass Index.

EAT = Eating Attitude Test.

Additional scales are: Neuroticism (Ne), Psychoticism (Ps) and Introversion (In).

- Goldberg Health Questionnaire (GHQ-28) (Goldberg & Hillier 1979), a 28 item self-report that is designed to assess the general mental health state.

- Beck Depression Inventory (BDI) (Beck *et al.* 1961) 21 items version.

## Procedure

Assessment: patients were evaluated consecutively as they were sent to us by ACABE. Four clinical psychologists, trained in administration of the assessment measures, evaluated the individuals to gather information about the history of the illness, weight and height. Afterwards they administered the scales of symptoms and made a diagnosis according to the criteria of the DSM-IV (APA 1994). Information about sociodemographic and clinical variables and the case history were also gathered from the parents.

The statistical analyses used were: Kolmogorov-Smirnov test for studying the distribution of the variables, multivariate analysis of variance (MANOVA), multivariate analysis of covariance (MANCOVA) with Bonferroni's confidence interval adjustment, univariate analysis of variance (ANOVA) with Scheffe's multiple comparisons post hoc, and Chi-square test. The analyses were conducted with the Statistical Package for the Social Sciences (SPSS) V. 10.

## Results

When the distribution of the variables was seen to be normal, L, F and K scales and the clinical scales of the MMPI were analyzed using a multivariate analysis of

variance (MANOVA). The group variable was introduced to observe group differences and the overall group effect was significant [Wilks' Lambda = 0.386,  $F(42.000) = 3.449$ ,  $p < 0.0001$ ].

As the literature suggests that depression can influence personality dimensions (Casper, Hedeker & McClough 1992), we performed multivariate analyses of covariance (MANCOVA) with Bonferroni's confidence interval adjustment to determine which group differences remained significant on the MMPI scales once BDI scores were introduced into the model, and the overall group effect remained significant [Wilks' Lambda = 0.510,  $F(56.000) = 1.634$ ,  $p = 0.004$ ].

No differences were found among eating disorder groups in duration of illness and age at onset. In order to study the differences among ANR, ANB, BN and CN groups in the MMPI scales, we performed a univariate analysis of variance (ANOVA). As we can see in table II there is a relationship between clinical scales and groups. However, if we performed multiple comparisons with Scheffé's "post hoc" test, we can observe significant differences between groups: between Control vs. ANR group in scales D ( $p = 0.001$ ) and Hy ( $p < 0.0001$ ); Control vs. ANB in scales F, K, D, Hy and Si ( $p < 0.0001$ ), and in Pd ( $p = 0.010$ ); Control vs. BN in F ( $p = 0.003$ ), K ( $p = 0.020$ ), D and Hy ( $p < 0.0001$ ), and Pd ( $p = 0.005$ ); between ANR vs. ANB groups in scales D ( $p = 0.027$ ) and Si ( $p = 0.019$ ); between ANB vs. BN groups in scale Si ( $p = 0.024$ ).

A multivariate analysis of variance (MANOVA) was conducted with second-order factors and additional scales. Overall significant group differences were observed when introducing the group variable as an intergroup factor [Wilks' Lambda = 0.543,  $F(24.000) = 3.834$ ,  $p < .0001$ ].

Table II. MMPI clinical scores by group

		N	Mean	SD	<i>df</i>	<i>F</i>	<i>Sig.</i>
L	ANR	24	47.38	5.40	3	2.483	0.063
	ANB	35	43.23	7.65			
	BN	53	45.51	8.00			
	CONTROL	34	47.76	8.07			
	Total	146	45.79	7.68			
F	ANR	24	10.58	7.74	3	8.540	0.000
	ANB	35	15.03	6.16			
	BN	53	13.28	6.65			
	CONTROL	34	7.79	5.22			
	Total	146	11.98	6.91			
K	ANR	24	13.08	4.23	3	8.557	0.000
	ANB	35	10.00	3.39			
	BN	53	12.42	3.89			
	CONTROL	34	15.38	6.07			
	Total	146	12.64	4.78			
Hs	ANR	24	53.96	17.28	3	2.168	0.094
	ANB	35	58.23	15.04			
	BN	53	59.43	14.78			
	CONTROL	34	52.21	10.14			
	Total	146	56.56	14.54			
D	ANR	24	62.88	16.79	3	25.250	0.000
	ANB	35	72.51	10.49			
	BN	53	67.68	11.42			
	CONTROL	34	49.35	9.24			
	Total	146	63.78	14.48			
Hy	ANR	24	62.54	9.59	3	17.071	0.000
	ANB	35	62.54	11.09			
	BN	53	64.55	9.94			
	CONTROL	34	50.09	7.53			
	Total	146	60.37	11.17			
Pd	ANR	24	52.88	13.38	3	6.585	0.000
	ANB	35	60.09	10.66			
	BN	53	59.85	11.21			
	CONTROL	34	51.03	8.76			
	Total	146	56.71	11.57			
Mf	ANR	24	49.92	11.96	3	1.197	0.313
	ANB	35	46.46	8.66			
	BN	53	47.11	10.33			
	CONTROL	34	50.53	12.77			
	Total	146	48.21	10.89			
Pa	ANR	24	57.58	11.45	3	14.874	0.000
	ANB	35	62.40	11.00			
	BN	53	61.36	9.73			
	CONTROL	34	48.50	7.35			
	Total	146	57.99	11.20			
Pt	ANR	24	47.46	19.48	3	3.226	0.024
	ANB	35	55.34	13.09			
	BN	53	54.91	16.74			
	CONTROL	34	47.38	5.71			
	Total	146	52.03	14.92			

Table II. MMPI clinical scores by group (continue)

		N	Mean	SD	df	F	Sig.
Sc	ANR	24	49.46	20.42	3	3.389	0.020
	ANB	35	56.54	14.08			
	BN	53	54.91	15.79			
	CONTROL	34	46.68	8.15			
	Total	146	52.49	15.25			
Ma	ANR	24	43.79	13.48	3	1.912	0.130
	ANB	35	47.71	11.64			
	BN	53	49.66	11.00			
	CONTROL	34	45.21	10.06			
	Total	146	47.19	11.50			
Si	ANR	24	52.63	10.18	3	8.839	0.000
	ANB	35	61.80	10.04			
	BN	53	54.45	11.65			
	CONTROL	34	48.68	10.66			
	Total	146	54.57	11.66			

Hs = Hypochondriasis.

D = Depression.

Hy = Hysteria.

Pd = Psychopathic deviate.

Mf = Masculinity-femininity.

Pa = Paranoia.

Pt = Psychastenia.

Sc = Schizophrenia.

Ma = Mania.

Si = Social introversion.

ANR = Restricting Anorexia Nervosa.

ANB = Bulimic Anorexia Nervosa.

BN = Bulimia.

Table III displays the differences between groups when using a univariate analysis of variance (ANOVA), but multiple comparisons performed with Scheffé's "post hoc" test indicate that significant differences are found between: Control vs. ANR in Es ( $p = 0.010$ ), Dy ( $p = 0.001$ ) and Ne ( $p = 0.026$ ); Control vs. ANB: Es, Dy, Do, Ne and In ( $p < 0.0001$ ) and Cn ( $p = 0.023$ ); Control vs. BN in Es, Dy and Ne ( $p < 0.0001$ ), Do ( $p < 0.002$ ), Cn ( $p = 0.008$ ), Ps ( $p = 0.041$ ), and In ( $p = 0.016$ ); between ANR vs. ANB in scales Dy ( $p = 0.010$ ) and Do ( $p = 0.017$ ); between ANB vs. BN in Dy ( $p = 0.025$ ); Do ( $p = 0.029$ ), and In ( $p = 0.046$ ).

Finally we have compared the four groups in the dichotomized variables patho-

logical/non-pathological (MMPI 9 clinical scales  $T \geq 70$ , Mf  $T \square 30$ ) and we have found statistically significant differences between them in some scales: D ( $\chi^2 = 33.068$ ,  $df = 3$ ,  $p < 0.0001$ ), Hy ( $\chi^2 = 13.313$ ,  $df = 3$ ,  $p = 0.004$ ), Pa ( $\chi^2 = 8.636$ ,  $df = 3$ ,  $p = 0.035$ ), Pt ( $\chi^2 = 8.009$ ,  $df = 3$ ,  $p = 0.046$ ) and Sc ( $\chi^2 = 8.112$ ,  $df = 3$ ,  $p = 0.044$ ). Pairwise group comparison were also performed using Bonferroni correction, alfa level was set at  $p = 0.0083$  ( $0.05/6$ ), finding significant differences between BN vs. control group: D and Hy ( $p < 0.0001$ ), Pa, Pt and Sc ( $p = 0.003$ ). Between ANB vs. control group: D ( $p < 0.0001$ ), Hy ( $p = 0.001$ ), Pa ( $p = 0.008$ ). Between ANR vs. control group: D ( $p < 0.0001$ ); Hy and Sc scales were near significance ( $p = 0.009$ ).

Table III. MMPI second-order factors and additional scales by group

		N	Mean	SD	<i>df</i>	<i>F</i>	<i>Sig.</i>
Es	ANR	24	45.13	13.25	3	16.129	0.000
	ANB	35	37.26	11.06			
	BN	53	43.49	10.31			
	CONTROL	34	55.03	9.24			
	Total	146	44.95	12.37			
Dy	ANR	24	55.79	9.97	3	24.952	0.000
	ANB	35	64.06	8.08			
	BN	53	57.94	8.82			
	CONTROL	34	45.59	9.72			
	Total	146	56.18	11.09			
Do	ANR	24	49.63	10.93	3	13.913	0.000
	ANB	35	41.91	8.43			
	BN	53	47.85	9.05			
	CONTROL	34	55.74	7.74			
	Total	146	48.55	10.09			
Re	ANR	24	49.54	8.95	3	1.971	0.121
	ANB	35	44.20	11.82			
	BN	53	47.45	9.80			
	CONTROL	34	49.47	9.76			
	Total	146	47.49	10.29			
Cn	ANR	24	55.50	7.86	3	4.895	0.003
	ANB	35	58.46	9.10			
	BN	53	58.57	8.36			
	CONTROL	34	51.97	8.86			
	Total	146	56.50	8.92			
Ne	ANR	24	60.96	15.11	3	10.920	0.000
	ANB	35	64.56	13.07			
	BN	53	65.19	11.97			
	CONTROL	34	51.13	7.40			
	Total	146	61.07	13.13			
Ps	ANR	24	44.95	16.33	3	4.367	0.006
	ANB	35	52.15	12.13			
	BN	53	52.27	13.49			
	CONTROL	34	44.17	8.02			
	Total	146	49.15	13.08			
In	ANR	24	54.96	12.95	3	10.494	0.000
	ANB	35	63.80	10.94			
	BN	53	56.70	12.09			
	CONTROL	34	48.51	9.31			
	Total	146	56.21	12.45			

Es = Ego strength.

Dy = Dependency.

Do = Dominance.

Re = Responsibility.

Cn = Control.

Ne = Neuroticism.

Ps = Psychoticism.

Tn = Introversion.

ANR = Restricting Anorexia Nervosa.

ANB = Bulimic Anorexia Nervosa.

BN = Bulimia.

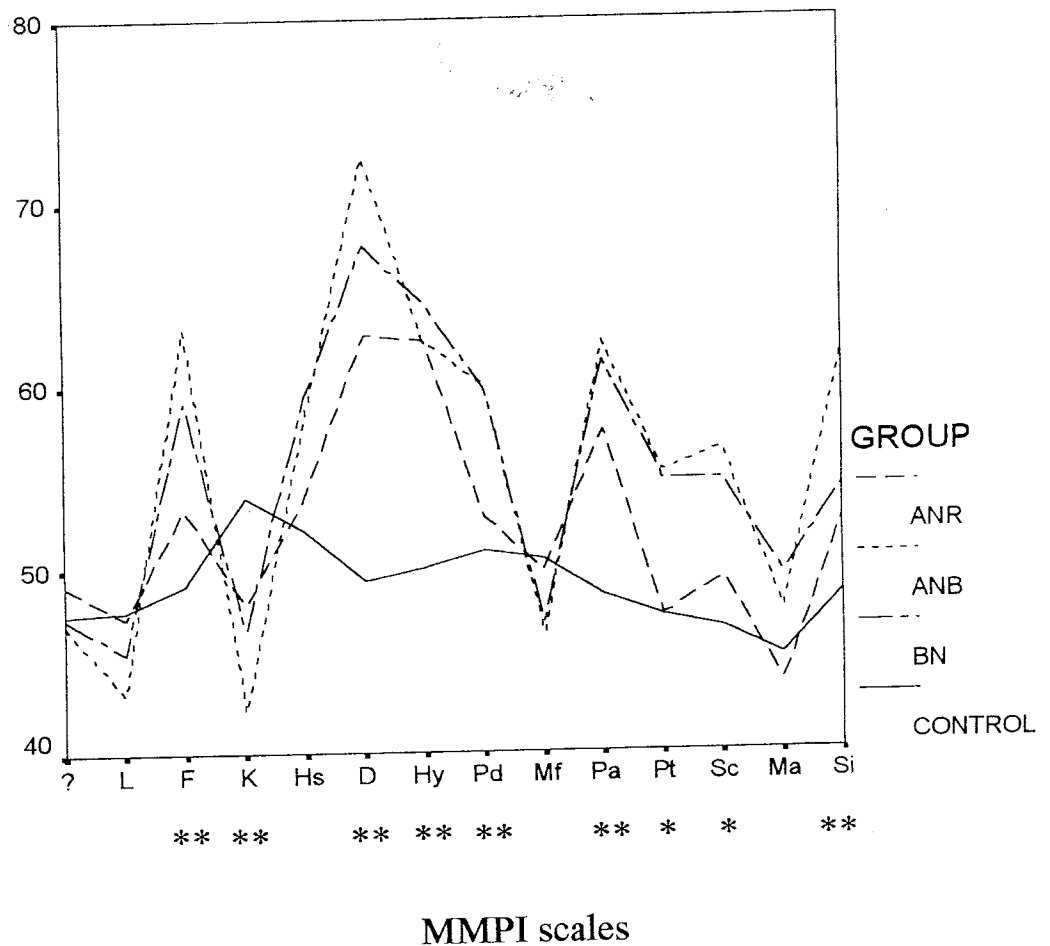


Figure 1. MMPI profiles in the 4 groups.

In second-order factors dichotomized: Dy ( $T \geq 70$ ) and the other second-order factors ( $T \leq 30$ ) we observed statistically significant differences among groups in scales Es ( $\chi^2 = 11.485$ ,  $df = 3$ ,  $p = 0.009$ ) and Dy ( $\chi^2 = 14.116$ ,  $df = 3$ ,  $p < 0.003$ ). Pairwise group comparison were also performed using Bonferroni correction, alfa level was set at  $p = 0.0083$  ( $0.05/6$ ), finding significant differences between ANB vs. control group: Es ( $p = 0.001$ ) and Dy ( $p = 0.006$ ); and between ANB vs. BN group: Dy ( $p = 0.006$ ), with less Ego Strength and higher dependence in ANB group.

## Discussion

Most authors cited have found higher scores in scale D in patients with an eating disorder compared to controls which confirms the relationship between eating disorders and depressive symptomatology. Elevations in scale Hy (which indicates physical troubles, irritation and familiar problems) have been also shown by Williamson *et al.* (1985) and Schork, Eckert & Halmi (1994). In patients with ANB and BN elevations in scales F (indicates arrogant, unstable, unsatisfied and could also be stressed rebellious attitudes and dis-



ness) and K (indicates defensive attitude). These results fit in with Hurt *et al.*'s statement (1997) in which they say psychopathology in ED, specially in patients with bulimic behaviours, reflects trait characteristics and a stress severity index. Elevated scores in Pd (indicates rebelliousness, impulsivity, poor interpersonal judgment, social alienation and little responsibility) in patients with ANB and BN coincide with previous studies (Casper, Hedeker & McClough 1992, Hurt *et al.* 1997, Vitousek & Manke 1994, Shisslak, Pazda & Crago 1990, Sohlberg & Strober 1994). Our results suggest that patients with ANR are a more homogenous group compared to the bulimic anorexics and the bulimics themselves, who tend to have a wide variation of personality characteristics and more severe psychopathology. Our findings are similar to other authors (Hurt *et al.* 1997, Cumella, Wall & Kerr-Almeida 2000).

In the ANB group, we also found higher scores in Si (indicates shyness, insecurity, rigidity, control and frustration in interpersonal relationships) faced with the other three groups, and higher in scale D faced with ANR group. The majority of authors already mentioned also support the appearance of more pathology in the bulimic anorexics group and less in the restrictive one.

When we studied pathological scores in the MMPI: 9 clinical and Dy scales ( $T \geq 70$ ), Mf and the other second-order factors ( $T \leq 30$ ), we observed that five scales differentiate between patients with bulimia nervosa and controls: D, Hy, Pa, Pt and Sc, two of them from the neurotic triad (D, Hy) and the other three from the psychotic tetrad (Pa, Pt, Sc). Anorexic bulimics present more pathology than controls in D, Hy, Pa, Es and Dy scales, whereas ANR group present more pathology in D scale. This shows that ED present a varying and severe pathology in many cases, specially in patients with bulimic behav-

ours. Schork, Eckert & Halmi (1994) also found more psychopathology in anorexics than in controls in five scales: four of them were the same as ours. In bulimics they found similar results but less strong. Biederman *et al.* (1986) compared anorexics and controls and found significant differences in seven clinical scales.

Schork, Eckert & Halmi (1994), and Pryor and Wiederman (1996) did not find differences between anorexia and bulimia groups. We only found that bulimic anorexics are more shy, insecure and rigid (Si) than bulimics. It is important to underline that no significant differences among ED groups emerged with regard to age at onset and duration of ED, similar findings were found by Salvemini *et al.* (2000).

In second-order factors and additional scales we can observe that patients with ED have a weaker ego, are more dependent and score higher in neuroticism than controls. Biederman *et al.* (1986) also found lower scores in Es in anorexics compared to controls. With regard to patients with bulimic behaviours (ANB and BN) the fact of having a low social initiative, little control and being more introverted also make them different from controls. Bulimics as well score higher in psychoticism than do controls.

Comparisons with the second-order factors and additional scales in patients with ED indicate that bulimic anorexics are characterized by being more dependent and having less social initiative than restrictive anorexics and bulimics. Compared to bulimics, bulimic anorexics are more introverted, dependent and have a weaker ego. All this is related to the results found in clinical scales since patients with bulimic behaviours present more pathology and this reinforces the findings about more severe disorders in bulimic anorexics.

In respect to the clinical implications of psychopathology in ED, some authors have reported that ED patients with severe psychopathology and personality disorders have poor outcome following treatment, and a high rate of drop-outs (Carroll, Touyz & Beaumont 1996, Edwin, Andersen & Rosell 1988, Schork, Eckert & Halmi 1994). Sohlberg and Norring (1995) found that bulimics who gained more in ego strength more often stopped vomiting. Steiger *et al.* (1993) found, in bulimics, that the borderline/nonborderline distinction predicted comorbid symptoms and features, independent of the severity of BN before and after therapy. A important reason for evaluating psychopathology and personality variables in ED is to assist in the identification of patients with poor prognostic.

Steiger and Stotland (1996) added that, in eating disorders, changes in the psychiatric problems should be treated with longterm therapies. Whereas Willianson *et al.* (1985) suggested, referring to bulimic patients, that the interventions on ED should be complemented with other interventions which fall into the affective and cognitive components of these syndromes.

Our findings confirm these authors and suggest the necessity of providing long-term therapies, specially in patients with bulimic behaviours, in addition to eating-focused treatments. In ANB patients the high introversion and low dominance found, suggest the indications for individual psychotherapies, because a dual relationship could be less dangerous than a group.

Long-term psychotherapies for eating disorders are not offered by public services in our country. Public services specialized in eating disorders should provide access to alternative therapeutic resources to avoid chronicity in these patients.

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## Address of correspondence:

Alberto Espina  
 e-mail: ptpeseia@ss.ehu.es  
 Faculty of Psychology  
 Department of Personality  
 Assessment and Psychological Treatment  
 Avenida de Tolosa, 70  
 20018 San Sebastián  
 Guipúzcoa  
 SPAIN