

**EMPIRICALLY BASED SUBGROUPING OF
EATING DISORDERS IN ADOLESCENTS BY
PRINCIPAL COMPONENTS ANALYSIS :
A LONGITUDINAL PERSPECTIVE**

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ABSTRACT

From a clinical perspective many authors consider the eating disorders as one syndrome with a common core symptomatology and a broad spectrum of manifestations during the course of illness. Successive DSM-versions struggle with the heterogeneity of the eating disorders. In a four-year prospective study of 55 eating-disordered adolescents we investigated whether patients could be grouped other than according to DSM-criteria, using principal component analysis with no a priori assumptions. Classification was based on Morgan-Russell subscales (16 behavioral, psychosocial, psychosexual and psychological variables), each measured four times. Analyses identified two subgroups of patients, divided by the axis bulimic-versus-restrictive behavior. DSM-IV classification was confirmed only for bulimic-versus-restrictive behavior at referral, but not over time. Anorectic and psychosocial symptoms differed in severity, but not in course. Core symptomatology (preoccupation with food, disturbed body perception and inadequate sexual behavior) did not differ between patients, either at referral, or over time.

INTRODUCTION

From a clinical perspective many authors consider the eating disorders as one syndrome with a broad spectrum of expressions or manifestations (Giuora, 1967; Bruch, 1973; Lowenkopf, 1982; Katz and Sitnick, 1982; Holmgren et al., 1983; Vandereycken et al., 1983, 1984; Mickelide and Andersen, 1985; van Strien and van Furth, 1987; Sunday, Halmi, Werdam and Levey, 1992). According to this view the core symptoms of the eating disorders are the same, but the symptomatology can be differently expressed in the severity of the disorder and in the kind of eating behavior (fasting and/or bingeing and/or vomiting and/or purging) during the course of illness. It is not always clear which symptoms must be considered as core symptoms. Bruch (1973) considers core-symptoms to be a disturbed body perception, disturbances in the perception and cognitive interpretation of such sensations as hunger and fatigue, and a paralyzing sense of ineffectiveness. Crisp (1977, 1982) speaks of a weight-phobia and an avoidance of the puberty-process and maturation. Mickelide and Anderson (1985) consider the core symptom to be an intense fear of becoming fat.

Following van Strien and van Furth (1987) we consider the following characteristics to be core symptoms of the eating disorders: an intense fear of becoming fat, a disturbed body perception, preoccupation with food and body(weight). In this study we especially want to investigate the dynamics of a disturbed body perception and preoccupation. Unfortunately we were not able to study the variable 'fear of becoming fat', because efforts to score this symptom were abandoned early in the study.

The DSM-classification system focuses on mutually exclusive syndromes and symptoms and on the present state. This implies that no attention is paid to the course of the illness and to the aetiology of the eating disorders. Consequently, difficulties in the classification of the mixed manifestations of the eating disorders, either at present, or in the course of the illness, arise. However, one can detect a tendency to acknowledge considerable overlap between anorexia and bulimia nervosa in the subsequent DSM-versions. Psychological symptoms essential to the eating disorders were included in the criteria, but were attributed mostly to anorexia nervosa, whereas the psychological criteria for bulimia nervosa were variable.

DSM-III (APA, 1980) distinguished Anorexia Nervosa (AN) and Bulimia as mutually exclusive syndromes. Psychological characteristics specific to the eating disorders (intense fear of becoming fat and disturbed body perception) were only mentioned in connection with AN, whereas in the case of Bulimia more general

psychological symptoms such as a depressed mood and self-deprecating thoughts had to be present. DSM-III-R (APA,1987) did more justice to the heterogeneity of the eating disorders by allowing simultaneous classification of AN and Bulimia Nervosa (BN). In this version other and less severe manifestations of eating disorders could be placed in the category Eating Disorder Not Otherwise Specified (EDNOS). Fear of becoming fat and a disturbed body perception were again only mentioned as criteria connected with AN, whereas in the case of BN lack of self-control and preoccupation with body shape and weight had to be present as psychological characteristics.

In the criteria for DSM-IV (APA, 1994) the overlap between AN and BN is becoming even clearer as a result of the introduction of the categories AN-restrictive type and AN-bulimic type (see also DaCosta and Halmi, 1992). In this version bingeing is no longer the central or constitutive characteristic of BN: when bingeing is accompanied by an intense fear of becoming fat, a disturbed body perception, severe weight loss and amenorrhoea the AN diagnosis prevails. Consequently, in DSM-IV BN is always normal-weight bulimia.

In contrast to this clustering of patients with emphasis on their anorectic features, several authors point out that patients with bulimic characteristics, either in combination with AN or without AN, or with a history of AN, seem to show considerable similarity, especially with regard to personality characteristics and Axis-I and II comorbidity (Calloway, Fonagy and Wakeling 1983; Norman and Herzog, 1983; Herzog and Norman, 1985; Paul, Meyer and Pudel, 1987; Swift and Wonderlich, 1988; Laessle et al., 1989a, 1989b; Wonderlich, Swift, Slotnick and Goodman, 1990; Mitchell, 1992; Garner, Garner and Rosen, 1993). In these studies, which are based on descriptive and inferential analyses, the restrictive AN-type distinguishes itself more from the bulimic patients than the bulimic groups do from each other.

In a small number of studies multivariate classification and clustering techniques were used to identify subgroups of eating disorders. Strober (1983) derived three types of anorexia nervosa patients based on MMPI-profiles. Type-I patients exhibited a need to conform and exercise control, but maintained a sense of well-being and self-acceptance and came from fairly normal families. Type-II patients displayed a more neurotic personality structure with high levels of anxiety, self-doubt and social inhibition, and higher levels of pre-morbid social avoidance and obsessionality. They experienced greater intrafamilial tension. Type-III patients presented a distinct profile of low ego-strength, impulsiveness, affective instability and significant family psychiatric disequilibriums. Welch, Hall and Renner (1990) reported two clusters based on the psychological dimensions of the Eating Disorder Inventory, whose

membership did not confirm the classification used in DSM-III or the dichotomy between AN-restrictive type and AN-bulimic type. Clusters were characterized by differences in the degree of preferred weight, weight estimation, weight dissatisfaction and self-esteem deficits. The interpretation of these results is difficult, but in both studies clustering seems to be related to the severity of pathology. Although these studies used sophisticated statistical techniques, they were cross-sectional and did not take the course of illness into account.

In a 4-year prospective study with repeated measurement of 55 adolescents with eating disorders, we investigated whether the patients could be grouped in ways that differ from those based on DSM-III-R criteria, using multivariate classification techniques with no a priori assumptions. In particular we wanted to study the relation between various symptoms (eating behavior and its consequences (weight loss, amenorrhoea), psychosocial, psychosexual and psychological symptoms) over time and we tried to obtain answers to the following questions:

1. Which symptoms separate the patients into groups during the course of illness and which symptoms do patients have in common? Is there a common core symptomatology?
2. What are the dynamics of the course of illness? How does the symptomatology change over time? Is there a difference between the course of abnormal eating behavior and its consequences and the course of the core symptoms?

METHODS

1. Sample selection and data collection

All 90 patients with eating disorders, who came to the Outpatient Department for Child and Adolescent Psychiatry of Utrecht University Hospital between 1983 and 1987, were followed prospectively for four years. In this period we saw each patient four times: at intake (T1), one year later (T2), a year-and-a-half later (T3) and again a year-and-a-half later (T4).

By T4 38% of the patients had dropped out. These patients differed significantly from those who continued to cooperate in the study with regard to their family background, level of education and personality characteristics (van Strien, van der Ham and van Engeland, 1992). Therefore we decided to remove the drop-outs

retrograde from the sample, as well as one patient with normal-weight bulimia. We were thus left with a sample of 55 patients who cooperated at all four time points.

The patients were classified according to DSM-III-R (APA, 1987): 25 patients had Anorexia Nervosa (AN), 9 patients had Anorexia Nervosa and Bulimia Nervosa (ANBN), 14 patients had Bulimia Nervosa with a history of Anorexia Nervosa (BNhAN) and 7 patients had Eating Disorder Not Otherwise Specified (EDNOS).

At the four time points all patients were interviewed by the same psychiatrist according to a semi-structured interview, based on the Morgan-Russell Outcome Schedule (Morgan and Hayward, 1988), modified by us for the occurrence of bulimia (van der Ham, van Strien, van Engeland, 1994). Data from the interview were scored on 16 variables, distributed over 5 clusters. For a description of these variables, scored on 3- and 4-point scales, see Table 1.

Table 1. Modified Morgan-Russell subscales.

	lower end (score 1)	upper end (score 3 or 4)
Body weight	outside P10 or P90 for age/length	- between P10 and P90, stable
Menstrual state	amenorrhoea	- regular periods
Restriction of food intake	eating less than 1200 cal. a day	- normal/regular meals
Bingeing	more often than once a week	- no bingeing
Vomiting	more often than once a week	- no vomiting
Purging	more often than once a week	- no purging
Hyperactivity	not able to be at rest	- no hyperactivity
Relationship with family	poor, a lot of quarrels/problems	- good
Emancipation from family	very dependent for age/situation	- adequately emancipated for age
Friends	no good friends	- two or more good friends
School/employment record	stopped school/work	- moderate/good
Sexual attitude	inadequate for age/situation	- adequate
Sexual behavior	no sex.experience adequate for age	- can enjoy sexual experience
Mental state (mood)	very depressed, suicidal	- normal
Preoccupation with food	cannot concentrate on anything else	- no preoccupation
Body Perception	disturbed and not able to correct	- normal

(A more detailed description of the variables and a reliability analysis of the modified Morgan-Russell scales can be obtained from the authors on request).

Intra-rater reliability of the interviewer scoring the Morgan-Russell scales over a 5-year period reached an average kappa of .60 (Cohen, 1988). In none of the cases was the investigator the therapist. Treatment varied in type and intensity, given in our outpatient department and in other institutes.

2. Introduction to the analysis method

Our research resulted in observations on subjects (patients) with respect to a set of 16 variables, each measured four times. Since we wish to discover the relationships between the variables with respect to the different groups of subjects, and the other way around, principal component analysis (PCA) would be the appropriate method: PCA finds a small number of new variables (called principal components) containing as much information as possible from the larger set of original variables, representing the relationship between the variables and the subjects optimally. Our data consist of ordinal categorical variables: observations were collected on scales with a limited number of categories, and although we assume the categories to be ordered, we cannot assume a priori that the distances between the categories are equal. Therefore, straightforward application of classical PCA may not be the most appropriate approach for analyzing our data. Instead, we used a generalization of classical PCA called PRINCALS (Gifi, 1990; SPSS, 1990), which accommodates nominal and ordinal variables in addition to variables measured at an interval level. PRINCALS simultaneously fits the principal components model and finds optimal quantifications for the categories of nominal and ordinal variables. As a result of the process of optimal quantification each original variable is replaced by an optimally transformed one, which reflect the nominal or ordinal information of the original variable. Classical PCA shows how much of the average proportion of variance of the original variables is accounted for by the principal components: optimal quantification in PRINCALS implies that the average proportion of variance accounted for is as large as possible (given the nominal or ordinal information).

The results of a PRINCALS analysis can thus be divided into three main sections: quantifications for the categories of the variables analyzed, scores for the subjects (the principal components, having mean of 0 and unit variance), and component loadings for the variables (the correlations between the subject scores and the quantified, transformed variables).

3. Analyses

PRINCALS analyses a data matrix with subjects in the rows and variables in the columns; our data consist of observations relating to 55 subjects on 16 variables at four time points. Because we are interested in the course of the illness in the different

groups, the data were reshaped as follows. The columns of the data matrix are the 16 measured variables, and the rows are the observations on the 55 subjects at the four time points put below each other; thus, the data matrix contains 220 rows, each subject appearing four times. Now that the data are reshaped in this form, the PRINCALS analysis will give one set of optimal quantifications for the variables and one set of component loadings, but each subject will obtain four sets of scores, one for each time point, displaying the development over time with respect to the variables measured.

In addition to the 220×16 data matrix, a categorical variable was created containing the information about time point and diagnosis: each row in the data matrix was associated with a particular category coding the specific combination of time and diagnosis. Since there are four time points and four different diagnoses, this supplementary variable contains 16 categories. Next, two PRINCALS analyses were performed, both aiming at two principal components. It was assumed that the overall structure in the data could not be summarized by a single principal component, but that two components would represent the structure adequately.

The first analysis was based on the original 16 variables only; in the second analysis the supplementary time \times diagnosis variable was included. The original variables were treated at an ordinal level (only the order of the categories was taken into account). The time \times diagnosis variable was treated nominally, since the combination of time and diagnosis categories cannot be assumed to be ordered a priori. For the particular nominal treatment chosen, PRINCALS gives quantifications of the 16 categories of the time \times diagnosis variable that will be equal to the averages of the subject scores found for the patients who are in the same diagnosis category at the same time point.

First, the results of the two analyses were compared. They showed a remarkable resemblance: the subjects' scores (principal components) gave correlations 0.99 (for the first component) and 0.96 (for the second component). The optimal quantifications of the categories of the 16 ordinal variables were basically identical (the smallest intra-correlation was 0.99); the average proportions of variance accounted for the 16 variables were 0.35 and 0.34 (by the first component in the different analyses) and identical (0.12) by the second component in the analyses. Therefore it was concluded that the supplementary time \times diagnosis variable is strongly related to the recovered structure between the 16 original variables themselves.

4. Display of analysis results

Because the results of the two analyses were virtually identical, the results of the PRINCALS analysis including the supplementary time \times diagnosis variable will be presented. The latter automatically gives a representation of the different groups at different time points. The variety of analysis results will be displayed in the following form.

Variables: the relationships between the variables (represented by their correlations with the principal components) are displayed graphically by depicting the variables as vectors (arrows). The positions of the vectors with respect to the axes of the graph are given by the component loadings. The angles between the vectors represent the correlations between the variables (after optimal quantification). The representation of a correlation is good if two vectors are of reasonable length; a small vector indicates that the associated variable does not fit very well into the overall solution, and that no conclusions should be drawn about its relation to other variables.

Subjects: the relationships between the subjects is displayed graphically by the use of the subject scores. The subjects, represented as points, are positioned according to their relationship with the variables.

Courses of illness: The development of different groups of patients over time is displayed by 16 points whose coordinates are given by the quantifications of the time \times diagnosis variable. These quantifications are the averages of the associated subject scores.

Differential development over time according to key variables: By relating the 16 points for the four groups at the four different time points to three selected key variables, scores can be derived displaying possible differential behavior of the separate groups over time according to these key variables.

RESULTS

1. Transformations of the ordinal variables

PRINCALS gives optimal quantifications to the categories, which result in a transformation of the original variable. The resemblance between the original variable and its transformation can be expressed by the correlation: for our data, the average

correlation is 0.98, with 0.99 as maximum (for Menstruation and Friends) and 0.91 as minimum (for Work/School). Therefore we conclude that the overall transformation does not result in an important departure from interval level.

2. Relationships between variables

The average proportion of variance accounted for by each component equals the mean squared component loading obtained for the variables. The first principal component accounts for 34% of the explained variance and the second principal component for 12%. The component loadings are given in Table 2, and the variables are depicted graphically as vectors in Figure 1.

The first thing to note is that all variables have a positive correlation with the first component (horizontal axis); this means there is a general factor that correlates positively with all the variables (we shall return to the interpretation of this factor shortly). The second component (vertical axis) separates the variables. A few variables (Bingeing, Vomiting and Purging) are clearly distinguished in the vertical direction of the graph.

Table 2. Component Loadings: Correlations between the transformed variables and the two principal components (PC1 and PC2). The average proportion of variance accounted for is given by the mean square.

Variable	PC1	PC2
Weight	0.65	-0.25
Menstruation	0.67	-0.27
Fasting (restriction of food intake)	0.70	-0.12
Bingeing	0.29	0.73
Vomiting	0.39	0.50
Purging	0.44	0.80
Hyperactivity	0.57	0.11
Family Relations	0.55	-0.38
Emancipation from family	0.66	-0.15
Friends	0.46	-0.03
Work/School	0.64	-0.17
Sexual Attitude	0.60	-0.16
Sexual Behavior	0.72	-0.03
Mood (mental state)	0.45	0.15
Preoccupation with food and weight	0.74	0.11
Body Perception	0.63	0.08
Mean Square	0.34	0.12

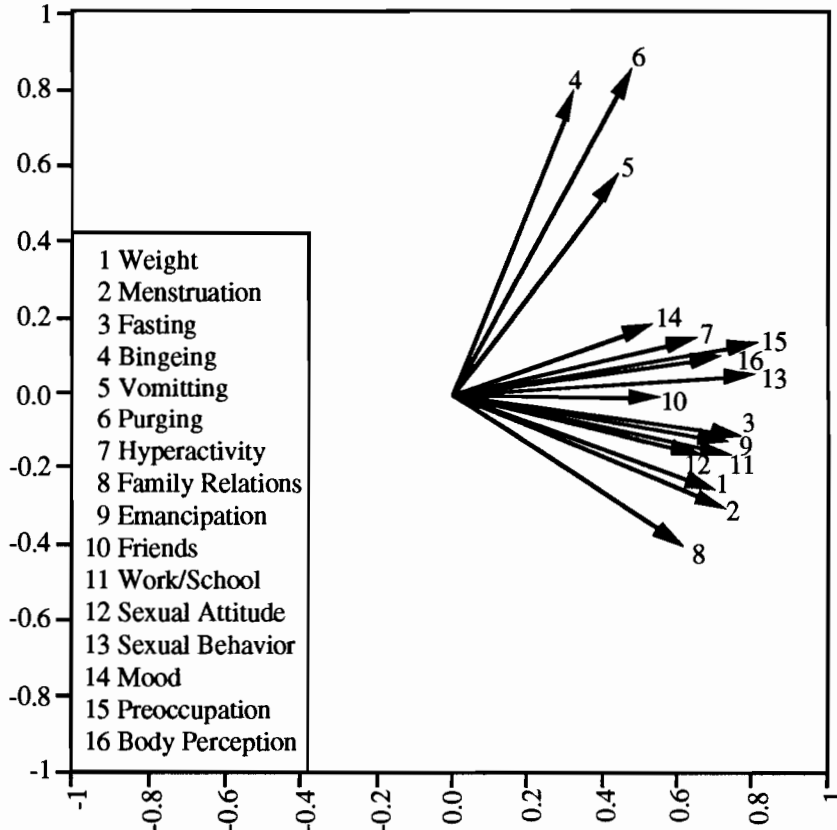


Figure 1. Relationships between variables: graphical display of the component loadings. Second principal component (vertical axis) versus first principal component (horizontal axis).

They typically represent bulimic eating behavior. Because the bulimic vectors are associated much more closely with the second axis (principal component) than with the first, we can conclude that the second principal component distinguishes between bulimic and non-bulimic (= restrictive) behavior. Friends, Mood and Hyperactivity do not fit very well into the overall representation. The variables Weight, Menstruation and Fasting (an anorectic cluster), Family Relations, Emancipation, Work/ School record (the psychological cluster), and Sexual Attitude are shown to have hardly any correlation with the bulimic cluster. Together they form a second bundle of vectors. Preoccupation, Body Perception and Sexual Behavior form a third bundle of variables. This cluster of core symptoms is close to the horizontal axis, which implies that these variables are most closely related to the general factor found in the analysis, and do not distinguish between the subjects, but are present in all patients in a similar way.

From each cluster of vectors a key variable was selected, to represent the other variables in the cluster. Selection was not based on the highest loading, but on the

representativeness for the other variables in the bundle, and in relation to the questions of the study. From the bulimic cluster we selected Bingeing as the key variable; from the anorectic/psychosocial cluster Sexual Attitude, and from the third cluster of core symptoms the key variable selected was Preoccupation.

3. Relationships between subjects

In Figure 2 the 55 subjects have obtained four points each; the points are labeled with the DSM-III-R diagnosis in the upper graph, and with the time point category in the lower graph. (The relationship between the subjects at different time points with the variables can be obtained by superimposing the graphs in Figures 1 and 2.)

The subject points in the upper graph show clearly separated groups: the AN subjects (1) form one group, but within this group the patients with EDNOS (4) form a subgroup. On the vertical axis AN and EDNOS are separated from a cluster of bulimic patients: the ANBN patients (2) and the BNhAN patients (3), which overlap considerably. This result again suggests that the vertical axis (second component) is related to the contrast between bulimic and restrictive behavior. The labels given to the subject points in the lower graph show that the majority of points are associated with T1 (time point 1) on the left versus T4 on the right (with T2 and T3 in the middle). This suggests that the horizontal axis (first component) is related to time. By combining information from the two graphs, one can see that some cases which are diagnosed as AN (1) or EDNOS (4) are positioned within the bulimic group. These are patients who have developed bulimic behavior in the course of their illness.

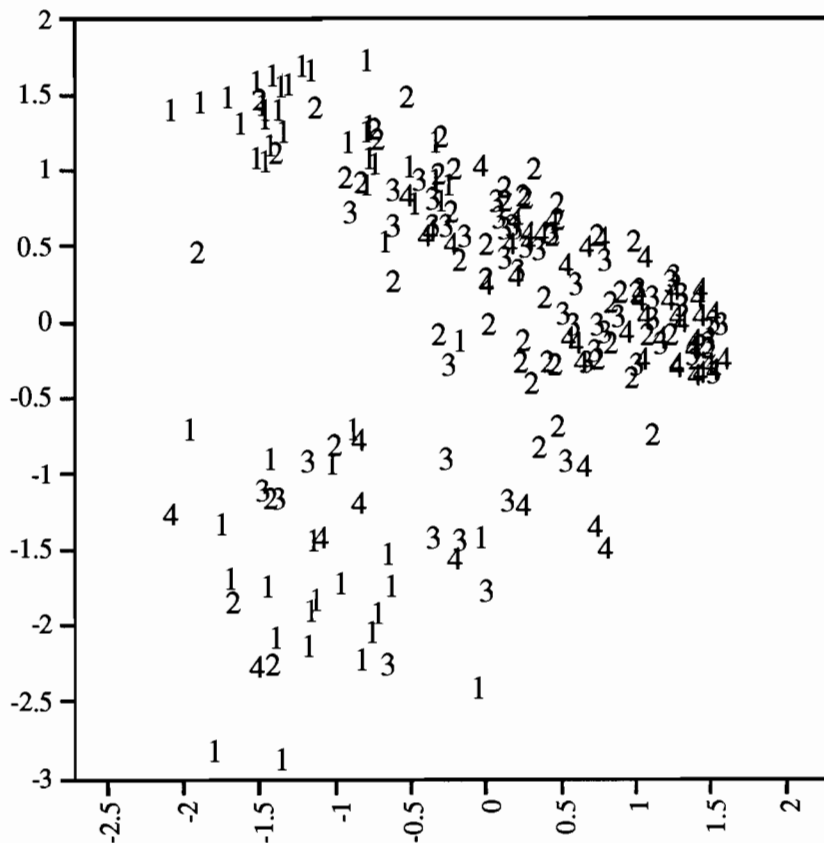
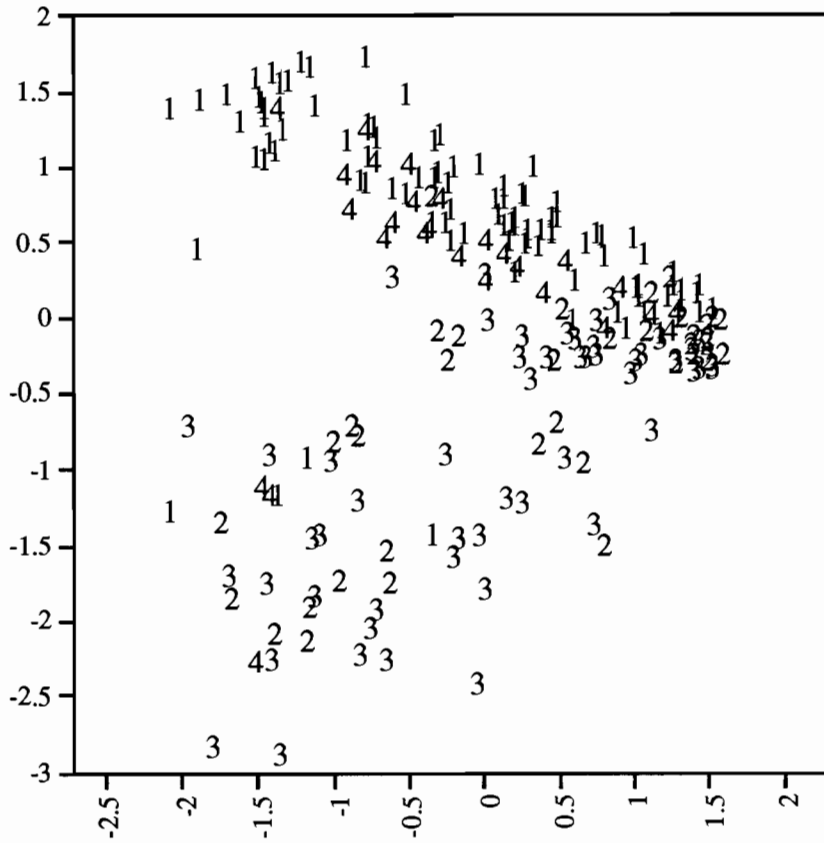


Figure 2. Relationships between subjects: graphical display at four different time points. Subjects labeled by DSM-III-R category (upper graph) and by time point (lower graph).

4. Structures of the courses of illness

The courses of illness for the four diagnostic categories are displayed in Figure 3. For each diagnostic category the category points were connected over time (T1, T2, T3, T4).

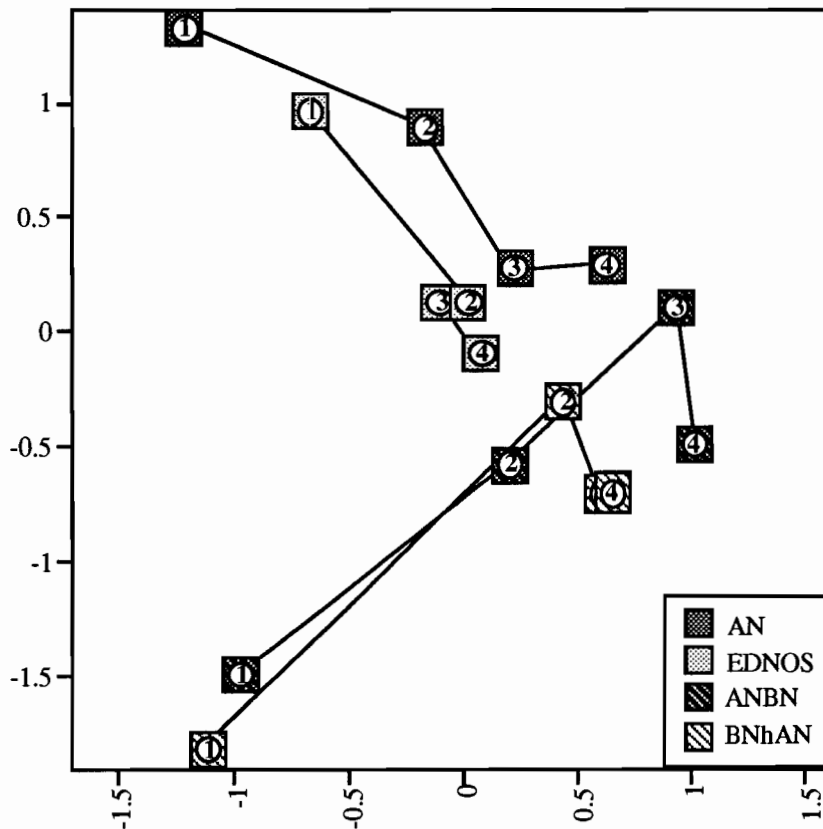


Figure 3. Structures of courses of illness. Second principal component (vertical axis) versus first principal component (horizontal axis).

The representation shows even more clearly than the subject points in Figure 2 that the first axis is related to time, and the second to bulimic-versus-restrictive behavior. The diagnostic categories at T1, on the left of the Figure, separate AN and EDNOS from ANBN and BNhAN on the vertical axis. The structures of the courses of illness of the two bulimic groups almost coincide. These structures differ from those of the AN and EDNOS groups. Over time, category points for the four groups converge on the vertical axis. This means that the illnesses tend to become more alike over time. This is partly due to recovery and improvement. According to the Morgan-Russell General Outcome Categories, based on weight and menstrual status (Morgan and

Hayward, 1988), 36% of the AN-patients, 78% of the ANBN-patients, 50% of the BNhAN patients, and 0% of the EDNOS-patients are functioning well four years after intake; 52% of the AN-patients, 11% of the ANBN-patients, 43% of the BNhAN patients, and 71% of the EDNOS-patients function at an intermediate level; and 12% of the AN-patients, 11% of the ANBN-patients, 7% of the BNhAN patients, and 29% of the EDNOS-patients function poorly (van der Ham, et al., 1994). The convergence is also partly due to diminishing differences in bulimic or restrictive behavior. We will go into this matter in more detail in the discussion of the results of Figure 4.

Because the four trajectories are certainly not parallel, groups develop differently over time. For all groups, change is largest between T1 and T2. From T2 to T3 the AN and ANBN groups show improvement, but the BNhAN and EDNOS groups change very little. From T3 to T4 the four groups show hardly any development.

5. Differential development over time according to key variables.

Figure 4 displays possible differential behavior of the AN, ANBN and BNhAN groups over time with respect to the three selected key variables Bingeing, Sexual Attitude and Preoccupation. The EDNOS-patients were excluded from these results because of the small number in the group and for ease of survey.

The key variables show different levels of severity and different patterns of change over time. With respect to Bingeing (representing bulimic behavior), it is clear that the anorectic groups and the bulimic groups have very different starting values at T1. Over time the anorectic groups hardly change, whereas the bulimic groups show marked improvement from T1 to T2. By T4 the three groups have become much closer.

With respect to Sexual Attitude (representing the anorectic and psychosocial variables), improvement occurs for all groups at all time points in the same way, but at a different level. ANBN and BNhAN do better than AN, both at the beginning and at the end. With respect to Preoccupation, finally, (representing the core symptoms) it is observed that the three groups begin and end very close together and have a similar pattern of change.

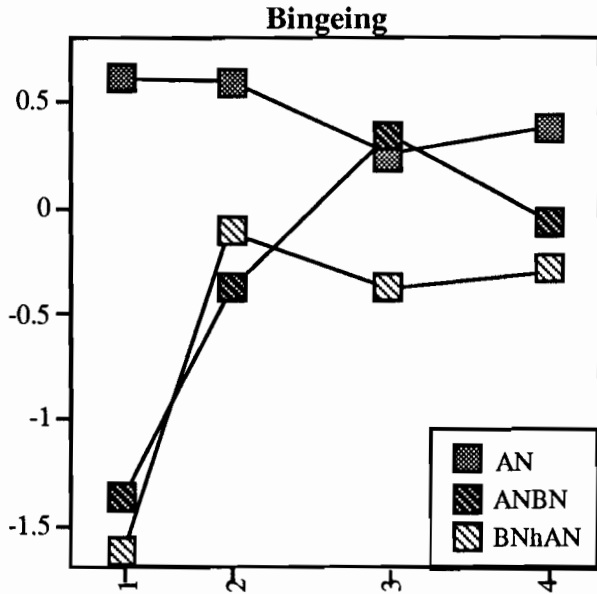
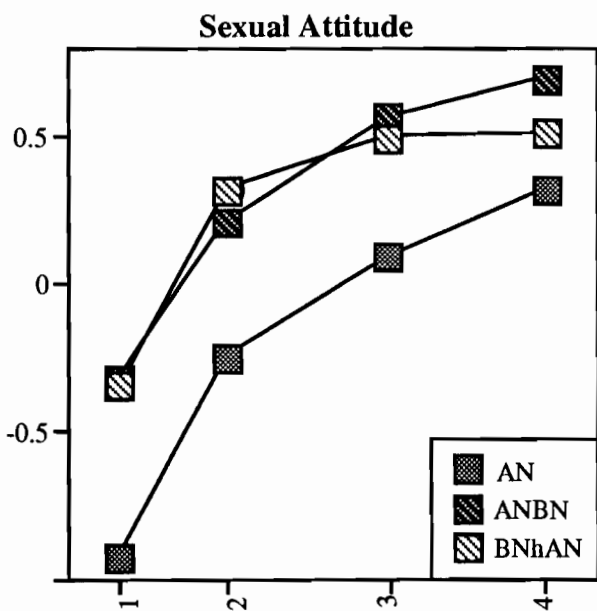
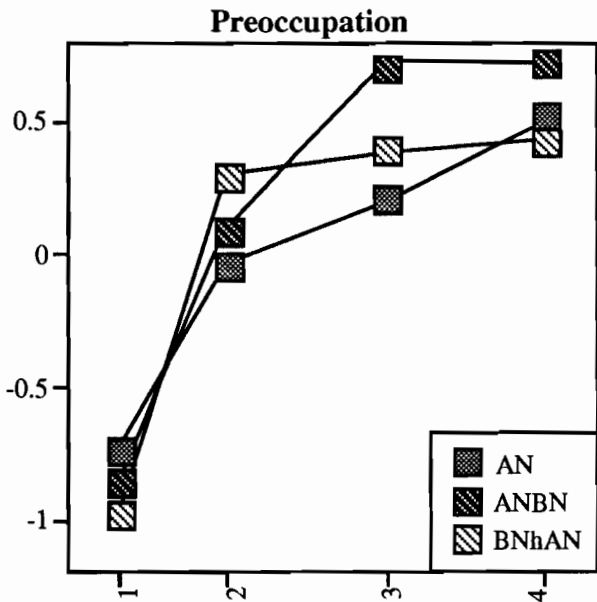


Figure 4. Differential development of key variables over time. Derived scores (vertical axes) versus time points (horizontal axis). 1= at intake; 2 = one year after 1; 3 = one and a half year after 2; 4 = one and a half year after 3.



DISCUSSION

Unfortunately we were not able to engage patients with normal-weight bulimia (BNW) in the analyses. This can be viewed as an important shortcoming of our study. Probably the adolescent population of our University Department is skewed and suffers from a referral bias. Epidemiological research (Hoek, 1991) reports that 37% of bulimia nervosa patients seen by general practitioners in the Netherlands had a normal weight. Only 50% of the bulimic patients were referred to mental health care, compared to 80% of the patients with anorexia nervosa. Besides, only 13% (incidence rate) of the bulimic patients were younger than 20 years (compared to 63% of the anorectic patients). Consequently we have not been able to analyze the whole spectrum of the eating disorders. All patients in our sample had anorectic features, or a history of anorexia, which undoubtedly gives only a partial picture of the eating disorders. In line with the results, however, we expect the BNW patients to cluster at the extreme end of the bulimic side of the bulimic-restrictive principal component.

In contrast to the results of Welch et al. (1990), patients with mixed eating disorders in this study divide into two groups on the principal component bulimic-versus-restrictive behavior. AN patients and EDNOS patients cluster on the restrictive side and ANBN and BNhAN patients on the bulimic side of the principal component. Contrary to the criteria for DSM-IV, patients in this study do not cluster together primarily on the basis of anorectic symptoms, such as amount of weight loss or amenorrhoea. The occurrence of bulimic behavior seems to be more dominant in the clustering of groups.

Bulimic and restrictive behavior turn out to be differentiating symptoms in this study. Core symptoms (shared in a similar way by most subjects) are Preoccupation with Food and Body(weight), Disturbed Body Perception and also Sexual Behavior. These three variables all have to do with the way patients experience their bodies. Preoccupation and Disturbed Body Perception almost coincide as vectors and have strong positive loadings on the same principal component. They are situated between the bulimic and anorectic bundle of vectors. This means that these variables are strongly related and do not appear to differ for anorectic or bulimic patients. These results differ from the allocation of psychological characteristics in successive DSM-versions. There a disturbed body perception is a criterion for AN and preoccupation with food and weight (DSM-III-R) a criterion for BN. In our analysis these core symptoms are shared by all eating-disordered patients. The psychosocial variables

(including Sexual Attitude) all cluster around the bundle representing anorectic eating behavior and its consequences (weight loss and amenorrhoea). As is often mentioned in the literature, it seems as if anorectic patients have relatively more problems in achieving autonomy and intimacy than bulimic patients (Haimès and Katz, 1988).

As to the dynamics of the course of illness the following patterns can be detected. The differentiation of patients on the basis of bulimic or restrictive behavior is greatest at intake. Thereafter this difference decreases and the patients become more alike in their illness. This is partly due to the fact that about 40% of the patients recover after four years, and that another 45% of the patients improve to an intermediate level of functioning. But another part of this convergence is due to different patterns of change in certain clusters of symptoms. All groups change over time on all variables, but in a different way. In bulimic behavior patients are very different at the beginning, but this difference diminishes towards T4. Therefore, bulimic-versus-restrictive behavior divides the patients into mutually exclusive groups at the time of referral, but this division does not hold during the course of illness, due to cross-over of symptoms. The other two clusters of variables do not separate the groups, either at referral, or in the course of illness. In the anorectic/psychosocial cluster patients differ in the severity of symptoms, but not in the kind of symptoms, as with eating behavior. In core symptoms there is no difference between the groups at all, either in kind, or in severity, or in the course of the illness.

We come to the conclusion that this study confirms the classification of the DSM-versions of the eating disorders only as far as eating behavior (fasting and/or bingeing, vomiting, purging) at the time of referral is concerned. In our opinion a classification-system which focuses mainly on explicit, objective and measurable variables like eating behavior and weight, and which restricts itself to present state, will always tend to separate the eating disorders. However, in a classification-system, which does not primarily focus on bulimic-versus-restrictive behavior, but focuses on a broader range of symptoms that admittedly are more difficult to objectify, no solid arguments can be found for unraveling the eating disorders, either at the time of referral, or in the course of illness. In our opinion it would be advisable to replicate this study with the inclusion of BNW patients.

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