

BODY IMAGE PERCEPTION AND PREFERENCE  
IN ANOREXIA NERVOSA

by

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## ABSTRACT

Nineteen female anorexic patients (10 anorexic-abstainers and 9 anorexics with episodes of bulimia) and 19 matched normal weight females participated in a study designed to investigate underlying dimensions of body image perception and body image preferences. The test materials consisted of a series of silhouettes which varied systematically in the sizes of four body parts: breasts, abdomen, buttocks, and legs. First, the subjects sorted the silhouettes into categories. Subjects then ordered the silhouettes along a 100-unit scale reflecting their preference for each silhouette. Finally, the subjects selected the silhouette which resembled themselves most and completed a semantic differential for this and the most and least preferred silhouettes. Multidimensional scaling analyses (INDSCAL & PREFMAP) were performed. Five underlying dimensions of perception were interpreted: four of those dealt with size of buttocks and abdomen and one with breast size. The dimensions were similar for both groups. Contrary to expectation, no group differences were found regarding body image preferences. Subjects within each group were heterogeneous. Preference ratings of own body silhouette were significantly lower for anorexic abstainers than for bulimic anorexics ( $p < .05$ ) and normal controls ( $p < .01$ ). The semantic differential scales yielded no group differences. It was concluded that variables other than a distorted body image and a thin body image ideal are important to the etiology of anorexia nervosa; future research should investigate alternative etiological concepts such as

weight phobia and fear of losing control. The distinction between anorexic abstainers and bulimic anorexics appears to be useful and the characteristics of these subgroups need to be investigated further.

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## Preface

Patients with anorexia nervosa present a striking appearance: emaciated, they look like 'skeletons clad in skin'. Anorexia nervosa occurs mostly in women and typically starts during puberty. Most patients are of normal weight or a little over when they first start to diet. After reaching the target weight, however, they continue to diet and can become emaciated. Central to the disorder is the patients' denial of illness, their insistence that they are just fine. Some adopt bizarre food handling habits, and many are overactive subjecting themselves to physical stresses. Presence of bulimia is common and the eating binges are often followed by vomiting or use of laxatives. Physical symptoms in anorexia include amenorrhea which is almost always present, lanugo, and bradycardia. If the anorexic relies heavily on vomiting or laxatives, metabolic balance might be seriously disturbed. Only about two-thirds of anorexics recover or improve, and though mortality rate is lower now than it had been in the past, many anorexics continue to lead marginal lives. Although true anorexia nervosa is not very common, incidence appears to be rising, probably due to society's emphasis on slimness. Studies of anorexia nervosa appear to be warranted. Several etiological theories have been proposed, including one which focusses on body image distortion. If the anorexic girl overestimates her body size she will continue to diet in order to look slim. There is some experimental evidence that some anorexics distort body size perception. Another body image issue deals with body image ideal; the

assumption is made that anorexics have adopted an extremely thin body ideal and constantly strive to achieve and maintain this ideal. It is implied that normal females have a much more realistic and healthy body ideal. Variables influencing such body image ideals have not yet been studied systematically. The present study investigated underlying dimensions of perception in anorexic and normal females and how body image preferences differ among these groups. In the introductory chapter, the first section deals with methods of testing body size perception and summarizes results of studies on body size perception by normal subjects. In the following section, the anorexic syndrome is described in more detail and etiological theories are presented. Research on body size perception and preference by anorexic subjects is then reviewed. The final section presents the purposes and hypotheses of the present study. The remaining chapters present in detail the methods and results of the present study and discuss and summarize their implications.

## Chapter 1

### Introduction

#### Perception of Body Size

The classic definition of body image is 'the picture of our own body which we form in our mind, that is to say the way in which the body appears to ourselves' (Schilder, 1935, cited in Shontz, 1969). A vague and all-encompassing definition, Schilder's body image includes body schemata and emotional and evaluative components attached to the body schemata. Historically, body image disturbances were studied by neurologists. After brain damage and/or loss of limb patients often fail to perceive their body accurately and to adapt to their impairment. For example, pain might be experienced from a phantom limb some time after amputation. Paralysis of limbs or body sites results in disuse of the affected body part and the patient might adopt a distorted attitude to this part of the body. Body image disturbances have also been observed in psychiatric patients. For example, schizophrenics might experience that parts of their body are shrinking, expanding, or rotting away. A loss of body image boundaries might also be present.

One component of body image concerns spatial properties of body image perception. Studies have attempted to determine accuracy of body image perception and factors that influence possible inaccuracies. Four methods of spatial estimation have been developed.

The linear method has been used extensively. The subject estimates body distances with a caliper device, i.e., by moving markers on a rod so that the required distance is indicated.

One distance (e.g. shoulder width, hand length) at a time is estimated. This standard condition may be varied; the subject may actually view his or her own body, the caliper device can be manipulated by the experimenter, and the markers may be moved in an ascending or descending manner (i.e., the markers are set initially next to each other or very far apart). Effects of such manipulations will be summarized below.

In the configurational method, complex body stimuli, rather than individual body parts, are presented, and the subject makes a single global judgment as to which stimulus is the appropriate one. The stimuli can be body silhouettes of varying size or actual pictures of the subject. These pictures are distorted either by mirrors (Traub & Orbach, 1964) or by an anamorphic lens (Garner, Garfinkel, Stancer, & Moldofsky, 1976). The subject's task is to eliminate the distortion. The discrepancy between the subject's judged undistorted picture and the size of the actual picture can then be calculated.

The rarely used pictorial method requires the subject to draw himself or herself. The drawing can be life-size, e.g., the subject stands in front of a wall and draws the body boundary as accurately as possible. Alternatively, the drawing is made to scale. The dimensions are then measured. This procedure is similar to the Draw-a-Person Test, except that in the latter accuracy of body distances are not scored.

One last method is simply a verbal report. The subject is asked to respond verbally, i.e., to give estimations in actual numbers. In one study (Shontz, 1969) subjects expressed their

estimates of body distances as proportions of their height.

Shontz (1969) reported a series of studies investigating body image perception. The caliper device was used in most studies. In the standard condition the subjects were required to make estimations by moving markers on a rod, without being able to view their own body. The subjects were verbally instructed to estimate five body distances; head width, waist, arm length (elbow to wrist), hand length, and foot length. Comparison non-body objects were also estimated with subjects allowed to touch but not to view them. Comparison stimuli were mostly wooden dowels. Under such "standard" conditions patterns of estimation errors were consistent. Overall, body stimuli were overestimated whereas comparison non-body objects were underestimated. Among body stimuli head width and arm length were overestimated, and hand length and foot length were underestimated. Estimation of waist width was intermediate; some studies have found sex differences with women overestimating waist width when compared with men (Shontz, 1969), while others failed to find such differences (Fuhrer & Cowen, 1967). Variability of estimation scores was larger for body stimuli than for comparison objects. Some experimental variations influenced the magnitude of the estimation scores. For example, underestimation of distances was more likely to occur in a dark rather than in a lighted room (Fuhrer & Cowen, 1967), or when little visual feedback to the responses was given, or under ascending marker conditions (Shontz, 1969). The presence of projected images on a screen and descending marker conditions

initially produced overestimation. Other manipulations such as tactile vs. verbal descriptions of body stimuli to be estimated or visual cues from the body did not influence the magnitude of estimation (Shontz, 1969). Comparison objects were judged larger if they could be seen in addition to being touched. In one study (Shontz, 1969), when comparison objects were matched with body stimuli in terms of complexity, i.e., they looked more like body parts, subjects produced more estimation errors. These errors, however, did not resemble the pattern found consistently with estimation of body stimuli. The higher variability of error scores of the comparison objects might have reflected in part complexity of contour.

Orbach, Traub and Olson (1966, cited in Shontz, 1969) used a distorting mirror apparatus for body size estimation. Their subjects accepted a wide range of images as good representations of their bodies. Subjects were, however, able to discriminate among the degrees of distortion. Practice effects were observed. Subjects often complained that they did not know what they looked like. In a similar study (Schneidermann, 1957, cited in Shontz, 1969) subjects' estimations of their faces were more accurate if they had seen their face prior to the task. The observation that subjects appear to need a reference point when making estimations with the configurational method contrasts with Shontz's finding that estimation scores were not more accurate when subjects actually viewed their body. In fact, Shontz noted that many subjects did not look at their bodies prior to the estimation asserting that they knew what they looked like. This seeming confidence contrasts with the

consistent pattern of estimation errors. Two points are relevant in this connection: in the first place, body size and body distances change throughout life in the course of development, growth, weight change, pregnancy, and even changes of clothing. People become used to accepting a larger range of body sizes as realistic. Secondly, although subjects did show a clear pattern of estimation errors when tested with the caliper device, differences between subjects are easier to observe when a configurational method is used. The latter provides a more realistic image of the subject, and thus probably also elicits affective and evaluative components of the body image. According to Shontz, such research does not deal strictly with perceptual ability to estimate accurately one's body size but also reflects the influence of personality characteristics on body size estimation and the interplay between personality and estimation. Schonbuch and Shell (1967) were interested in the relationship between weight and body size estimation. Underweight, normal weight, and overweight male students selected from a series of graded silhouettes the one that resembled their own body. This silhouette was also chosen by two independent observers in order to assess estimation errors. Both the underweight and the overweight groups made more errors than the normal weight group. Errors were made more often by overestimation than underestimation. This study was the first to suggest that body weight might influence body size perception. Body size distortion has also been associated with anorexia nervosa.

### Anorexia Nervosa

Anorexia nervosa is most probably a psychosomatic disorder: psychological disturbances lead to a deterioration of physical health which in turn produces additional problems. The first account of an anorexic woman was given by Morton, an English physician, in 1689, (cited in Bruch, 1973). A young woman had severely reduced her food intake, becoming quite emaciated. Despite progressive weakening, she continued to be very active and denied that she was ill. Like a 'good' anorexic she refused all help and eventually died during a fainting spell. Description of the anorexic syndrome has changed little since that time. Anorexia nervosa occurs mostly in young females (only about 10% of anorexics are males). Age of onset had been generally associated with adolescence, although late onset (i.e., after age 25) anorexia is now more widely recognized. Although mild forms of the disorder are probably widespread, true anorexia nervosa is rare. Incidence varies with studies (.24 to 1.6 per 100,000 population; see Bemis, 1978), although some investigators report an increasing number of cases. This increase can be attributed to more accurate diagnoses and to society's continuing and increasing emphasis on slimness. Prognosis is not very encouraging, with at best only about three-quarters reported improved or recovered (see Hsu, 1980). The reduced mortality rate (with some studies reporting as few as 2%, see Bemis, 1978; Hsu, 1980), can be in part credited to earlier recognition. Many anorexics become chronic patients, alternately gaining weight in a hospital and promptly losing it after discharge. The central



feature of anorexia nervosa - voluntary self-starvation - is accompanied by other symptoms. Overactivity is frequently observed; the patient exercises strenuously until exhausted in order to burn off calories. Bizarre food handling habits are often present. Only a few, so-called 'healthy' foods are permitted and those might be spiced excessively. Food fads such as vegetarianism are common. Others eat secretly, cut up the food in small pieces, or look for food in garbage pails. Many spend much time reading cookbooks and preparing nutritious meals for others, and insist that all food be eaten. Anorexics might experience bouts of bulimia when foods rich in carbohydrates are consumed. This binge eating is followed by fasting, vomiting, or laxative use. Vomiting if induced repeatedly can become involuntary. Excessive use of laxatives and reliance on vomiting can cause severe metabolic disturbances which can result in admission to hospital. Strong feelings of guilt, shame, and depression usually follow a binge. Presence of bulimia has been linked to poor prognosis (Russell, 1979). Denial of illness is probably universally present. Anorexics refuse to admit that they are too thin and ill, and generally fail to recognize required nutritional needs. A diet of, say 600 calories a day is considered to be adequate. Behaviours involving food and weight loss become obsessive. For example, a perfect record of number of calories eaten daily is kept (though not necessarily shown to the therapist); when food is presented calories are added automatically; the goals of exercise are adhered to strictly. Anorexics are often perfec-

tionists. In school they are conscientious, studious, and compliant. Although this trend appears to be changing, many families of anorexics belong to the middle or upper social classes. Achievement and ambition are valued: thus, when the girl decides to diet she is determined to succeed. Anorexics rely on external information regarding weight loss: a scale, smaller size of clothes, loose-fitting clothes, little fat on bones. Many complain that they are fat and feel fat even when they see their body in a mirror. This apparent inability to perceive accurately body size (overestimation), has led to corresponding etiological formulations (Bruch, 1973). As weight loss progresses, this distortion of body size seemingly increases. A desire for extreme thinness is often expressed along with a real fear of becoming obese. This fear can become phobic (Crisp, 1967). In order to eliminate any risk of becoming obese the anorexic loses even more weight. The safety margin increases but gives no reassurance. One aspect of the weight phobia is the fear of losing control, of not being able to stop eating. As one anorexic put it when it became apparent that her intake was less than 800 calories daily: 'I know that we agreed to 1,500 calories per day. But if I have less than 800 then there is no danger that I'll go over the 1,500.'

Physical symptoms include amenorrhea, lanugo, and bradycardia. Amenorrhea is almost always present and often appears before significant amounts of weight are lost. Menstruation often does not resume immediately after weight gain. Stress can only in part account for the early and persistent ameno-

rrhea; e.g., it has been shown that women in concentration camps were only amenorrheic for an initial period of their imprisonment (Bemis, 1978). Lanugo and bradycardia are symptoms of emaciation.

Two sets of diagnostic criteria for anorexia are currently in use. Diagnosis is based frequently upon the Feighner, Robins, Guze, Woodruff, Winokur and Munoz (1972, see Appendix 1) criteria. Denial of illness, a desire for extreme thinness, unusual food handling habits, and symptoms such as amenorrhea, lanugo, and bulimia are required for this diagnosis. The criteria for anorexia nervosa contained in the Diagnostic and Statistical Manual (DSM-III, American Psychiatric Association, 1980, see Appendix 2) include intense fear of becoming obese, disturbance of body image, and refusal to maintain appropriate body weight. Anorexia nervosa is classified on Axis I. Both sets of criteria refer to the presence of body image disturbance. Although obsessive and depressive symptoms are often present, absence of other psychiatric or physical illnesses which could cause the weight loss is required for a positive diagnosis of anorexia nervosa.

One further comment regarding anorexic symptomatology is in order. Though the symptoms described above characterize anorexia nervosa, it is by no means clear which symptoms constitute anorexia nervosa per se and which ones result from emaciation. Studies on starvation (Keys, Brozek, Henschel, Mickelson, Taylor, 1950) have reported similar behaviours, e.g., an increase in preoccupation with food, bizarre food handling habits, excessive use of spices, etc. Interests

become centered almost exclusively on food.

To date, no physiological causes of anorexia have been found. Research has focussed on hypothalamic centers that appear to regulate eating behaviour and on hormonal levels, especially with respect to amenorrhea. There have been relatively few psychological theories advanced to explain the etiology of the disorder (for a review, see Bemis, 1978).

Since anorexia frequently starts in puberty when sexual maturation occurs, psychoanalytic interpretations have been suggested. When the adolescent feels unable to accept mature sexuality she regresses to an early stage of development where the sexual instinct is expressed in terms of oral gratification. Consequent fear of oral impregnation leads to food refusal, while bouts of bulimia reflect strong sexual instincts, and amenorrhea is viewed simultaneously as a symbol of pregnancy and a rejection of femininity. There is, however, little evidence of, e.g., widespread fantasies of oral impregnation. Traditional psychoanalytic psychotherapy has had very limited success because anorexics do not easily form transference relationships.

Ego psychologists have focussed instead on a disturbed mother-child relationship. A dominant mother prevents strong ego formation in the girl. Demands for independence such as going to college cannot be met easily by the anorexic, and food rejection symbolizes rejection of mother and femininity and allows a return to childhood. Precipitating factors of this kind are often observed.

Family interactional approaches emphasize family functioning at the time of onset of anorexia. Proponents of this theory such as Minuchin (cited in Bemis, 1978) have found that family disturbances become displaced on the anorexic child. Therapy emphasizes treatment of the family, and some follow-up studies are encouraging.

Behavioural approaches do not address themselves directly to etiological questions but focus on treatment. By removing any secondary gain and rewarding eating behaviour many anorexics gain weight. This weight gain, however, is not always lasting. Behavioural treatment has been severely criticized because it does not encourage anorexics to exercise control over their eating behaviour (Bruch, 1974).

Hilda Bruch (1962) has described three areas of psychological disturbance underlying the etiology and maintenance of anorexia nervosa. A disturbance of body image interferes with the anorexic's perception of severe weight loss and leads to denial of illness. A fear of being ugly, of becoming obese, and a thin body ideal reinforce anorexic behaviour. A second disturbance causes interference with the accurate perception of bodily stimuli. Hunger awareness appears to be very confused, ranging from denial of need for food to bulimia. Complaints of stomach pains are frequent after ingestion of only small amounts of food. Overactivity is often present, but fatigue and exhaustion are not perceived and are not attributed to malnutrition. Finally, a pervasive sense of ineffectiveness is seen as central to the disorder. Anorexics satisfy demands of others such as parents but have few skills in expressing

their own wishes. The fear of losing control and not being able to stop eating reflects this sense of ineffectiveness. So when puberty offers new challenges the anorexic feels unable to cope and attempts to return to childhood. Bruch considers resolution of those disturbances central to the recovery from anorexia nervosa.

Thus two related aspects of body image disturbance - distortion of body size and an extremely thin body ideal - can be linked to the etiology of anorexia nervosa. Most research has dealt with distorted perceptions of body size. One of the earliest reports (Gottheil, Backup & Cornelison, 1969) indicated that body size perception becomes more accurate as the patient's weight increases. In this case study ( $n = 1$ ) an anorexic patient initially claimed that she was unable to see how thin she was when she viewed herself on videotape. Concurrent with psychotherapy she was also regularly confronted with videotape recordings of interviews with her and she was asked to comment on the tapes. As the patient gained weight and recuperated she remarked increasingly that she looked too thin and unhealthy. Eventually, she accepted how thin and emaciated she was and viewing pictures of her thin body became abhorrent to her.

The first researchers to experimentally test for body size distortions in anorexia nervosa were Slade and Russell (1973). Using the caliper device described earlier, 14 anorexics and 20 normal controls estimated the widths of their faces, chests, waists, and hips. Slade and Russell found that in contrast to

normal controls who judged those body parts accurately, the anorexics overestimated the size of all four body regions. This overestimation did not extend to non-body physical objects. In a second study (also reported in Slade and Russell, 1973), 10 anorexics estimated their height and the widths of the face, chest, waist, and hips of a model. The results showed that anorexics estimated their height accurately but overestimated the size of the model although to a lesser degree than their own size. In a third, longitudinal study (also in Slade and Russell, 1973) body image distortion was correlated with weight gain. As weight increased, body image distortion decreased. Weight loss after discharge from hospital was found to be correlated with magnitude of body image distortion at admission. The investigators concluded that body image distortion can be a prognostic indicator. Crisp and Kalucy (1974) continued this line of research, also using the caliper device. Anorexics overestimated their body widths when they had lost significant amounts of weight and their estimations became more realistic after weight was restored. The two anorexics who were most accurate continued to do very well after discharge from hospital. Interestingly, when after making estimations subjects were asked to repeat their estimations and to be very realistic, they all were more accurate and overestimated less. Crisp and Kalucy also found that anorexics ( $n = 6$ ) overestimated more after ingestion of a seemingly high-calorie meal than after a seemingly low-caloried meal although both meals contained the same amount of calories. This was not

observed with normal controls. Recovered anorexics were more like normals in making estimations under such conditions. In this study, however, normals also tended to overestimate their body widths though less so than the anorexics. The authors found some evidence that the normal controls who were within 10% of average weight at time of testing had had a history of weight loss.

Russell, Campbell, and Slade (1975) investigated factors of body image perception in anorexia nervosa. They demonstrated that anorexics respond to external information about their body weight; e.g., their weight increased if they believed that they had lost some weight. They also repeated earlier work. Again using the caliper device, they showed that anorexics overestimated their widths of face, chest, waist, and hips, and that normals were accurate in their estimation. Anorexics also overestimated the body widths of a model but to a lesser degree (significant only for bust and waist). Again it was shown that after weight gain (especially if slow) patients distorted their body size less. Russell et al. concluded that restoration of weight is crucial in the treatment of anorexia nervosa. Garner, Garfinkel, Stancer, and Moldofsky (1976) studied body image disturbances in anorexia nervosa. All groups (anorexics, obese, psychiatric controls, normal controls, and thin controls) were tested with two procedures: the caliper device and the anamorphic lens. Results obtained from the caliper device failed to distinguish between the groups, i.e., all groups overestimated their sizes. However, when the groups



used the anamorphic lens to make their estimations, anorexic and obese subjects differed from all control groups. Whereas all control groups underestimated their body sizes, one-half of the anorexic and one-half of the obese subjects overestimated; the remaining subjects, like the controls, underestimated their sizes. Overestimation in anorexics was linked to neuroticism (measured by the Eysenck Personality Inventory) and to lack of self-control (as measured by Rotter's Locus of Control Scale). There were no differences between groups on size estimations of a model and an inanimate object. Garner et al. also obtained ideal size estimations. Except for anorexics and thin control subjects, all groups wanted to be significantly thinner than their perceived body size. Such a tendency could explain why normal weight females underestimate their size. Garner et al. concluded that body image disturbances are related to eating disorders but not to weight loss. Such disturbances, however, are found only in half of the subjects.

Goldberg, Halmi, Casper, Eckart, and Davis (1977) attempted to identify pretreatment predictors of weight change. Part of their assessment was the body width estimation task developed by Slade and Russell. In a sample of 44 patients they confirmed earlier work that anorexics overestimate body sizes but not the sizes of inanimate objects. Overestimation was correlated with low appetite and denial. Weight gain was associated with a lesser degree of overestimation. In a study investigating anorexia and secondary amenorrhea, Fries (1977) compared anorexics with a clear diagnosis with women whose

symptoms included secondary amenorrhea associated with weight loss but who did not fulfill all criteria for true anorexia nervosa. Both groups overestimated on the Slade and Russell task, whereas a group of normal controls was more accurate. Patient groups did not differ from each other on other measures. Fries noted that some normal controls overestimated themselves just as anorexics did. Overestimation, thus, could not be associated solely with anorexia nervosa: it also occurred in normals and in women with only some anorexic features.

Button, Fransella, and Slade (1977) compared anorexics at various stages of treatment with controls. Using the caliper device, they failed to find any differences between anorexic patients and controls: both groups overestimated. Interestingly, they found the anorexic patients to be quite a heterogeneous group. When data were analyzed separately for anorexics who were non-vomitters and anorexics who were vomitters, results showed that overestimation was associated with vomitters; the non-vomitters were accurate. For the entire anorexic sample there was a high positive correlation between overestimation and amount of weight gained since admission. The study is, however, flawed with methodological problems. As the authors noted, they had switched from the manual caliper device to an automated one midway through the study. This change was not recorded. They also found correlations between amount of overestimation and different treatment settings. It is, therefore, quite difficult to interpret the findings.

Garfinkel, Moldofsky, Garner, Stancer, and Coscina (1978) attempted to demonstrate that body image distortions can be modified by external cues and that they are related to satiety aversion to sucrose tastes. Anorexic and control subjects estimated themselves and the size of a vase with the anamorphic lens technique. Body image and ideal image measurements were obtained before and after looking in a mirror and before and after high and low calorie connotation meals. Garfinkel et al. found body image perceptions to be stable over time (one week), particularly for anorexics. Body image perception was not modified by external cues. Again, some anorexics overestimated whereas controls were accurate in their perceptions. The Garner et al. (1976) finding that normals want to be thinner than they are was confirmed. Only those anorexics who were overestimators failed to develop an aversion to sucrose, indicating lack of responsiveness to interoceptive stimuli. A year later, Garfinkel, Moldofsky, and Garner (1979) retested the same subjects. Stability of body size perception was clearly demonstrated for anorexic women. Controls tended to be less stable in body size perception. Ideal size perception was very stable for both groups. Anorexics who had gained weight were more similar to normals in their ideal size perception. Five anorexics were at average weight at the time of the second testing; their body size estimates were, however, very similar to their earlier ones. This result contrasts with other studies which associated a decrease in overestimation with weight gain. Again, overestimation in anorexics was asso-

ciated with an absence of aversion to sucrose tastes.

Strober, Goldenberg, Green, and Saxon (1979) failed to distinguish between anorexics and controls using the Image Marking Procedure, a pictorial method. Both groups overestimated at both times of testing six months apart. Anorexics endorsed more items on the Fisher Body Distortion Questionnaire than did normals. These differences persisted at the time of re-testing during the recuperative phase. Within the anorexic group body image distortions as measured by the questionnaire were associated with the presence of vomiting, a finding consistent with the Button et al. (1977) study.

The results of the studies reviewed above can be summarized in the following way:

- 1) There appears to be some body image distortion among some anorexics. Variables influencing the distortion cannot be specified clearly.
- 2) Anorexics appear to be a very heterogeneous group. The presence or absence of vomiting might differentiate true subgroups.
- 3) Normal controls can exhibit body image distortions. Their body image perception appears to be less stable over time. Factors associated with overestimation in normals are presently not clearly identified.
- 4) Ideal size estimations are stable over time. Normals, prefer to be thinner than they perceive themselves.
- 5) None of the methods of measuring body image appears to be entirely satisfactory. For example, studies using the

caliper device report more overestimation than studies using the anamorphic lens. With the caliper device, the subject makes one judgment at a time; however, this task might be quite difficult because no reference point is given. With the anamorphic lens, subjects use a picture of their own body as a reference point, and thus the task appears to be more realistic. Still, subjects might not be very familiar with their own body, since people do not spend much time looking at their own bodies. Furthermore, when adjusting the lens, the amount of distortion is identical for all body parts and any possible differences between parts cannot be assessed. Gross distortion of any one body part might anchor the overall judgment. One variant of the pictorial method (life-size drawing of one's body) has not been used extensively; this task probably requires drawing skill. In all methods comparison objects were usually not matched on complexity with the body stimuli.

The presence of overestimation in some studies must be interpreted with caution. As Shontz (1969) already noted, head width is always overestimated. He also found evidence that women overestimate the widths of waist and hips (Shontz, 1969). Unfortunately, Shontz did not obtain estimates of chest width; normative standards are, therefore, not yet available. Overall, subjects in Shontz's studies overestimated body widths although magnitude of overestimation was influenced by experimental procedure. Shontz concluded that patterns of

estimation errors (e.g., head width was much more overestimated than hand length) are more important than magnitude of particular errors. A more complete design would also include estimations of other body regions such as hand length where normative standards are known. Normal subjects have been shown to exhibit a clear pattern of estimation; it would be of interest to know whether anorexics differ. Overall, the findings suggest that some anorexics show more body size distortion than others although variables underlying those distortions cannot be identified yet.

#### The Present Study

Although it is accepted clinical lore that anorexics express a preference for extremely thin body image, only two studies included estimations of body image ideals. As noted above, both studies found that normals want to be thinner than they are. Ideal size estimations by anorexics did not differ much from actual size. None of the studies, however, specified how body image preferences differ between anorexic and normal females. The present study addresses this issue.

Because of demonstrated success in distinguishing between clinical and normal groups, a configurational method was chosen. Rather than using an anamorphic lens, a series of female silhouettes varying in sizes of breast, abdomen, buttocks, and legs were used. It was hoped that through the use of standard stimuli any differences between groups would become more distinct. Based upon similarity and preference judgments, multi-dimensional scaling techniques were employed in order to specify

underlying dimensions of body image perception and body image preference by anorexic and non-anorexic females. The INDSCAL model, developed by Carroll and Chang (1970), determines underlying dimensions of perception which are common to all individuals. A common space for all stimuli is assumed and stimulus coordinates are calculated in this space for a specified number of dimensions. The program then solves for each subject matrix and determines the weights of every subject on the dimensions. Thus, individual differences can be accommodated by, for example, giving a weight of 0 on one dimension and a weight close to 1 on another. The solution is unique and cannot be transformed. Preference judgments were analyzed with the PREFMAP model (Carroll, 1972). This model requires a stimulus space (e.g., from the INDSCAL solution) and determines an ideal point in this space for each subject. The more preferred a stimulus is, the closer it approaches the ideal point. The PREFMAP analysis takes into account any group differences regarding underlying dimensions of perception. The model is hierarchical; four levels are possible. At level 1 subjects may differentially rotate the dimensions whereas in level 2 only differential weighting is allowed. In level 3 all subjects have a common space, and in level 4 the preferences are expressed as vectors. Thus, both procedures allow for individual and group differences.

Although no specific hypothesis was formulated, a finding that anorexics differ from normals in their underlying dimensions of body image perception would not be surprising. Anorex-

ics might focus exclusively upon one body region such as abdomen when viewing body silhouettes. It was hypothesized that anorexics would prefer thinner body images than normals. Subjects were also asked to choose a silhouette that best represented their own body. Anorexics' preference ratings for this silhouette were expected to be lower. Although no objective evaluation of the accuracy of this silhouette choice could be made, the number of anorexics who chose fat silhouettes and who were clearly inaccurate was determined. Previous findings suggested that about one-half might do so.

Subjects were asked to complete several semantic differential scales (Osgood, Suci, & Tannenbaum, 1957) measuring evaluation, potency, and activity with respect to the silhouette that was judged to represent themselves and with respect to their most and least preferred silhouettes (see Appendix 3). It was expected that evaluation would be more negative for the least preferred silhouette and become positive for the most preferred silhouette. The silhouette representing one's own body should be evaluated less positively by anorexic than normal females. Also, the potency rating should be lower for this silhouette in anorexic women reflecting perhaps a sense of ineffectiveness (Bruch, 1977). Since overactivity is a common symptom in anorexia nervosa, anorexics might rate themselves more active than normals do. Subjects also completed the Perceptual Aberration Scale (Chapman, Chapman, & Raulin, 1978). This scale was designed to test for deviant body experiences in clinical, particularly schizophrenic groups. The Strober et al. (1979)



findings predict that anorexics may endorse more items than normals. In addition, subjects were asked to complete the Maudsley Personality Inventory (Eysenck, 1959) which is a measure of neuroticism and extroversion. It was expected that anorexics would score higher on the neuroticism scale and lower on the extroversion scale than normals.

## Chapter 2

### Method

#### Subjects

Nineteen anorexic females and 19 matched normal control subjects participated in the study. All anorexics were in treatment at the time of testing. One of the anorexic females was an inpatient; all other anorexics were being treated on an outpatient basis. The diagnosis of anorexia nervosa was based on the criteria of the DSM-III (1980) and on the criteria proposed by Feighner et al. (1972). The anorexics met both sets of criteria with the exception of eight subjects. Seven of these subjects did not show a weight loss exceeding 25% of previous or expected body weight. Their range, however, was still underweight and in any event a weight loss in excess of 25% was not deemed necessary for a positive diagnosis when an otherwise clear clinical picture was present. The eighth subject was unable to remember her premorbid body weight. Only one anorexic subject failed to meet the criterion of onset before 25 years of age. The 19 anorexics were subdivided into two subgroups: anorexics who were mainly abstainers from eating (n = 10) and anorexics who described binge-eating as a significant additional problem (n = 9). The latter group generally fulfilled the DSM-III criteria for bulimia as well. Short clinical descriptions of all patients are presented in Appendix 4. Detailed data concerning height, weight, age, age at onset, and other relevant variables for each patient are contained in Appendix 5. It is sufficient to note here that

age ranged from 13 to 34 years ( $\bar{M} = 22.89$ ), and that age at onset ranged between 11 and 29 years ( $\bar{M} = 17.86$ ). Patients in the BA group weighed significantly more ( $\bar{M} = 52.03$  kg) than patients in the AA group ( $\bar{M} = 46.10$  kg),  $t(17) = 2.19$ ,  $p < .05$ . Other differences were not significant, though the following trends were observed: age at onset was generally lower for the AA group ( $\bar{M} = 16.85$ ) than for the BA group ( $\bar{M} = 19.00$ ). More BA than AA subjects (56% vs. 20%) had been hospitalized. Duration of anorexia was longer in the BA group (with one notable exception: subject #9). Only four of the nine BA patients were currently amenorrheic, although all except one had had earlier episodes of amenorrhea; all AA subjects, on the other hand, were currently amenorrheic.

The 19 anorexic patients were matched with 19 normal females of average weight for their height as determined by the Metropolitan Life Tables (Metropolitan Life, 1969). Each anorexic subject was closely matched with a control subject on age, educational background, and socio-economic status. The Blishen Scale (Blishen, 1952) was used to determine social class of the subject or her family. Appendix 6 presents the relevant characteristics of all control subjects. It had been hoped that control subjects could be divided into two groups, dieters and non-dieters on the basis of their responses to the Restraint Questionnaire (Herman & Polivy, 1975). It was found, however, that the Restraint Questionnaire failed to separate clearly dieters from non-dieters. Therefore, control subjects were considered as a single group throughout the analysis (see

Appendix 7).

Permission to carry out the research was obtained from the hospital research committee prior to the start of the study. In addition, informed consent was obtained from all patients and control subjects.

### Materials

A series of 19 female silhouettes<sup>1</sup> varying in sizes of body parts was constructed. Four body parts were allowed to vary in size: breasts, abdomen, buttocks, and legs. Five variations were used: +2 (large), +1 (moderately large), 0 (standard), -1 (moderately small), -2 (small). For 16 silhouettes three of the four parts assumed the standard size and the fourth part varied from it. The remaining silhouettes represented +2, 0, and -2 respectively on all four parts. Each silhouette was printed in black on a 8 x 20.5 cm white card (see Appendix 8).

Other materials included an Eating Attitude Test (Garner & Garfinkel, 1979, see Appendix 9) and a Restraint Questionnaire (see Appendix 10). A Background Information Sheet provided demographic and menstrual history information for each subject. In addition, a brief psychiatric history was obtained from the anorexics. All subjects also completed the Maudsley Personality Inventory (Eysenck, 1959), the Perceptual Aberration Scale (Chapman, Chapman, & Raulin, 1978, see Appendix 11), and several Semantic Differential scales (Osgood, Suci, & Tannenbaum, 1957).

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<sup>1</sup>The silhouettes were obtained from a study by Wiggins, Wiggins, and Conger (1968) by permission of the senior author.

## Procedure

The study consisted of three parts. All subjects were tested individually.

Part 1: The subjects were shown all silhouettes in a random array and were asked to sort them into 2, 5, 8, 11 and 14 different categories. The order in which the sortings were carried out was determined by means of a latin square to control for order effects. Thus some subjects began with eight categories, others began with two categories, and so on. Subjects were told to sort those silhouettes which they felt belonged together into the same category; however, sorting was unspecified, i.e., subjects chose their own criteria for the categories. Sorting was also unrestricted, i.e., items that were sorted into different categories could be combined again at a later sort. After each sort the silhouettes were mixed and again presented in random array to encourage unrestricted sorting. The results from each sort were recorded by the experimenter. Although usually similarity judgments are based on pairwise comparisons of stimuli, the procedure employed in the present study yields equivalent results (Ward, 1977) and is faster to complete.

Part 2: The silhouettes were presented in a random array on a long table. Along the table a tape measure indicated 100 units each 20.5 cm wide. Subjects were asked to order the silhouettes along this 100-unit scale according to their preference. The most and least preferred silhouettes were chosen first and assigned to the endpoints of the scale. The remaining silhouettes were then ordered along the scale so that the distances

between them reflected distances in preference. Again, the experimenter recorded the results.

Part 3: Subjects selected from the randomly arrayed silhouettes the silhouette that resembled most closely their own body. Following this, they completed the semantic differential scales for this silhouette and for the most and least preferred silhouettes.

Subjects then completed the Background Information Sheet, the Restraint Questionnaire, the Eating Attitude Test, the Maudsley Personality Inventory, and the Perceptual Aberration Scale. Items of the last scale were presented interspersed with items from the MMPI. Finally, height and weight data were determined from each subject.

In order to assess the reliability of the silhouette judgments, 15 subjects were asked to repeat their selections of the least and most preferred silhouettes and of the silhouette that resembled them most.

## Chapter 3

### Results

#### Similarity Judgments

It will be recalled that subjects were asked to sort the 19 silhouettes into two, five, eight, eleven, and fourteen different groups. Silhouettes that were placed in the same group were assumed to have been judged by the subject as more similar than silhouettes that were placed in different groups. Furthermore, silhouettes that were sorted together at higher sorts (e.g., in one of 14 different categories) were assumed to have been judged more similar than silhouettes sorted together at lower sorts (e.g., in one of two different categories). In this fashion, a similarity matrix was generated for each of the 38 subjects. For example, a pair of silhouettes that occurred at the 2, 5, and 11 category sorts received a similarity rating of  $2+5+11 = 18$ . The maximum possible similarity rating for any pair was  $2+5+8+11+14 = 40$ . The 38 similarity matrices were then subjected to the INDSCAL (Carroll & Chang, 1970) computer program. Solutions for one up to six dimensions were computed. The 5-dimensional (5-D) solution was chosen as a workable solution. Although no strong elbow was apparent, little seemed to be gained in terms of variance accounted for (VAF) by going beyond five dimensions (see Figure 1).

The choice of the 5-D solution was supported by other considerations. The number of stimuli should be twice the number of dimensions and the VAF/degrees of freedom ratio should be as large as possible, and certainly greater than five. Since

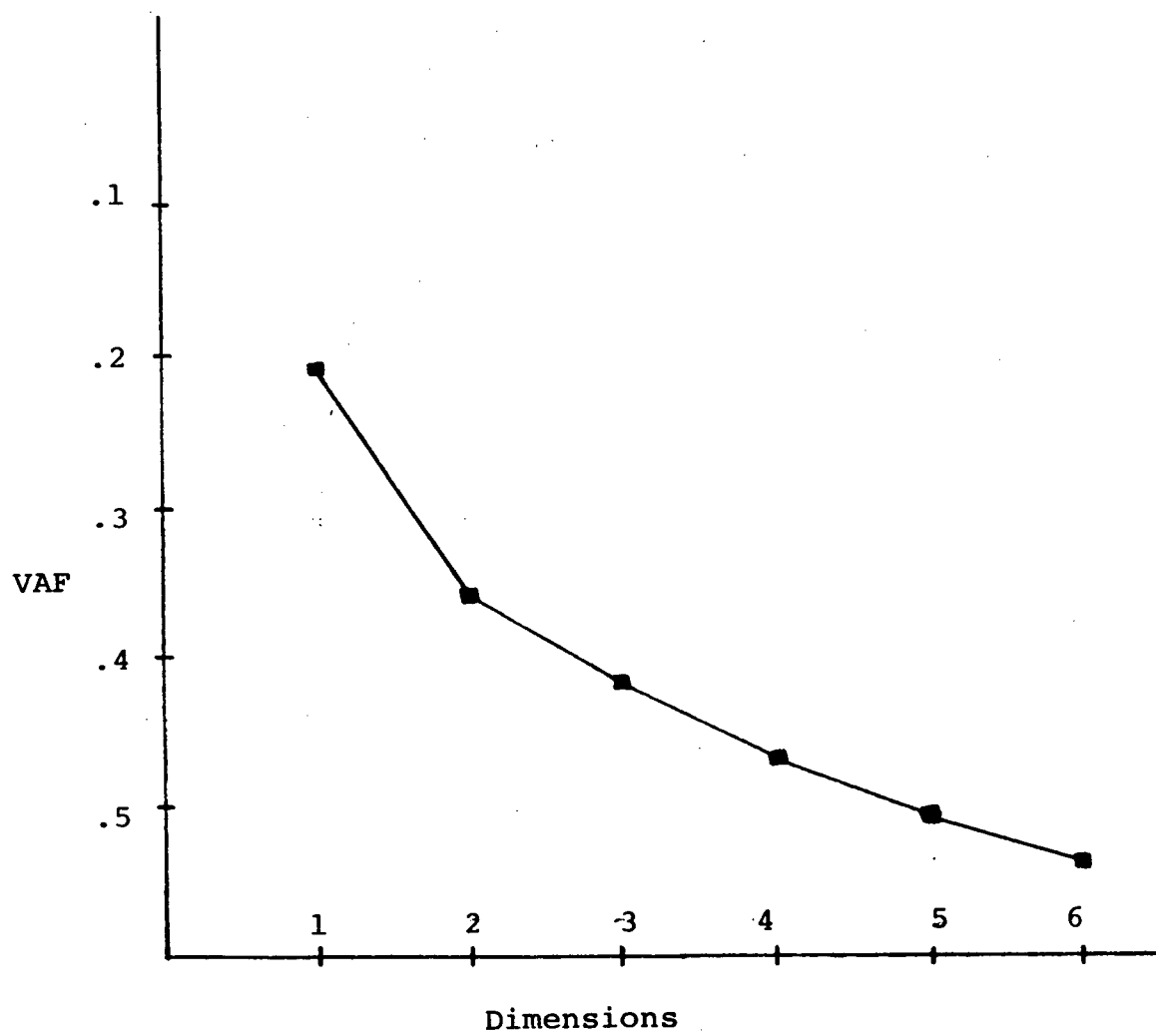


Figure 1. Variance Accounted For (VAF) for All Dimensions



the study used 19 stimuli and the VAF/degrees of freedom ratio was 12.05, the 5-D solution easily met both criteria. The overall correlation of the solution with the data was .717. The average correlations for the three groups ranged from .700 (control group) to .721 (AA group) to .735 (BA group). The solution seemed to fit subjects equally well in all three groups. One additional important criterion was interpretability of data. Unlike the 2-D, 3-D, and 4-D solutions which all contained one dimension that was not readily interpreted, all dimensions in the 5-D solution could be interpreted. Dimension 5 was not prominent in earlier solutions. Interpretability of the data was arrived at by examining the stimuli that had the largest positive and negative weights on any dimension. Those stimuli characterized the poles of each dimension. Since the characteristics of every stimulus were known, it was possible to see directly which characteristics defined each dimension. The position of every stimulus on all dimensions can be seen in Figures 2 to 11 which are presented in the next section. The five dimensions can be polarized in the following way:

D-1	buttock, large	vs.	buttock and abdomen, small
D-2	standard silhouette	vs.	buttock, extreme sizes
D-3	buttock, somewhat large	vs.	abdomen, large
D-4	abdomen, small	vs.	buttock, small
D-5	breasts, small	vs.	breasts, large

D-1 is similar to the first dimension obtained in the previous solutions (i.e., 1D-4D) all of which contrasted large and small buttocks and abdomen. All subjects' weights were positive,

another indication of a good solution. The average salience<sup>2</sup> for each group on each dimension was calculated (Table 1).

Table 1

Average Saliences per Group on Each Dimension

	AA	BA	C	Combined
D-1	.350	.320	.360	.345
D-2	.296	.315	.280	.292
D-3	.281	.296	.249	.268
D-4	.253	.317	.217	.250
D-5	.219	.238	.262	.245

Although average saliencies showed some variation between groups on dimensions 3 and 4, the differences are quite small. In order to test further for possible group differences, the similarity matrices were averaged for each group and analyzed for five dimensions with the INDSCAL program. VAF was .73; all saliencies were quite similar for each group on all dimensions. In a third analysis, a separate 5-dimension INDSCAL solution was calculated for each group. The dimensions were similar to the original solution with the possible exception of two dimensions in the BA group. Those two dimensions were unipolar and referred to size of abdomen. Overall, all three analyses failed to show any consistent and clear differences in underlying dimensions of perception between the AA, BA, and control groups.

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<sup>2</sup>Salience refers to the subjects' weights.

### Preference Analysis

Reliability: Fifteen of the 38 subjects (two from the BA group, five from the AA group, and eight from the C group) were able to repeat their selections of the least preferred and the most preferred silhouettes and the silhouette that best represented them. Test-retest reliability was determined for these 15 subjects by computing percentages of agreement between first and second choice. Three levels of agreement were distinguished: exact agreement, i.e., the same silhouettes were chosen both times; agreement within two ranks, e.g., the most preferred silhouette ranked number 19 and the silhouette chosen the second time had ranked number 17 or 18 previously; and, finally, difference of ranks between the two choices was greater than two, indicating disagreement. Because the number of retested subjects was small in every group, only the combined data from all subjects are shown (See Table 2).

Table 2

#### Percentages of Agreement for 15 Subjects (Number of Subjects in Parentheses)

	Exact	Within 2 Ranks	More than 2 Ranks
Least Preferred Silhouette	93.33 (14)	0.00 (0)	6.66 (1)
Most Preferred Silhouette	40.00 (6)	40.00 (6)	20.00 (3)
Silhouette Repre- senting Oneself	66.66 (10)	13.33 (2)	20.00 (3)

Reliability was clearly highest for the least preferred silhouette, and lowest for the most preferred silhouette.

Preference Ratings: The average preference rating for each stimulus was calculated for the following five groups: AA, BA, all anorexics, control group, all subjects. A higher rating indicated greater preference. The stimuli were also ranked from lowest (1) to highest (19). All average ratings and rankings are shown in Table 3. The silhouettes were coded in the following manner. As described earlier, silhouettes varied in four dimensions, breast (br), abdomen (a), buttock (b), and legs (l). Five sizes were possible: +2, +1, 0 (standard), -1, -2. For 16 silhouettes one of the four body parts varied from the standard and the other three parts assumed the standard size. So a +1br silhouette refers to the silhouette with a +1 breast and 0 abdomen, 0 buttock, and 0 legs. Three silhouettes represented the two extremes and the standard on all body parts and are referred to as -2, +2, and 0. This coding system appears in Table 3 and is used throughout the remainder of this thesis.

Contrary to expectation, preference ratings were very similar for all groups. In fact, the silhouettes which ranked 1, 2, 3, and 4 were identical for all groups. All subjects disliked the same silhouettes. Though not identical, ratings and rankings for more preferred silhouettes were also very similar in all groups. The three silhouettes most preferred by the AA group were characterized by one body part being small; -1 buttocks, -2 breast, and -a abdomen. Subjects in

Table 3

Average Preference Ratings and Rankings (in Parenthesis) for all SilhouettesCode of  
Silhou-  
ettes

	+2	0	-2	+2br	+1br	-1br	-2br	+2b	+1b	-1b	-2b	+2l	+1l	-1l	-2l	+2a	+1a	-1a	-2a
AA	(1)	(16)	(6)	(7)	(15)	(12)	(18)	(3)	(5)	(19)	(8)	(11)	(13)	(9.5)	(9.5)	(2)	(4)	(17)	(14)
Group	1.3	69.7	45.5	59.0	65.4	63.2	73.2	18.8	38.7	80.5	59.9	62.8	64.7	60.7	60.7	7.9	22.3	71.6	64.8
BA	(1)	(15)	(10)	(5)	(13)	(14)	(7)	(3)	(6)	(19)	(17)	(8)	(12)	(9)	(11)	(2)	(4)	(18)	(16)
Group	1.1	72.7	59.2	40.5	68.3	71.8	53.0	20.4	42.1	81.7	76.5	54.0	66.6	56.5	62.0	8.5	29.4	78.3	74.3
All anor- exics	(1)	(17)	(7)	(6)	(13)	(14)	(11)	(3)	(5)	(19)	(15)	(8)	(12)	(9)	(10)	(2)	(4)	(18)	(16)
	1.2	71.1	51.9	50.2	66.7	67.3	63.6	19.5	40.3	81.1	67.7	58.6	65.6	58.7	61.3	8.2	25.6	74.7	69.3
Controls	(1)	(17)	(5)	(6)	(11)	(15)	(8)	(3)	(7)	(16)	(10)	(18)	(19)	(12)	(13)	(2)	(4)	(14)	(9)
	1.4	82.3	35.0	41.2	62.3	74.7	57.2	13.0	46.8	81.4	58.7	82.5	84.3	64.3	67.0	9.8	25.6	73.0	57.8
All Sub- jects	(1)	(18)	(5)	(7)	(13)	(15)	(8)	(3)	(6)	(19)	(10)	(14)	(17)	(9)	(12)	(2)	(4)	(16)	(11)
	1.3	76.7	43.4	45.7	64.5	71.0	60.4	16.2	43.6	81.2	63.2	70.5	74.9	61.3	64.1	9.0	25.8	73.9	63.6

the BA group also preferred most -1 buttocks, followed by -1 abdomen, and -2 buttocks. Control subjects preferred most +1 legs, then +2 legs, and 0, the standard. The standard silhouette was also well-liked by the anorexic subjects. The most disliked silhouettes for all subjects were +2, +2 abdomen, +2 buttocks, +1 abdomen. Preference ratings for the thinnest silhouette, -2, ranged from 1 to 100 in each group but overall this silhouette was not rated highly by any group. Preference ratings for the +1 legs silhouette ranged from 11 to 100 in the AA and BA group, and from 54 to 99 in the control group. Ratings for the -1 buttocks silhouette ranged from 25 to 100 in the anorexic group and from 11 to 100 in the control group. Clearly, there are subjects in every group who like and dislike those silhouettes. Correlation coefficients of rank orders (Spearman's  $\rho$ ) were large and highly significant for the following group comparisons: AA with BA, AA with C, BA with C, and all anorexics with C, clearly indicating an absence of group differences (Table 4).

Table 4

Spearman's  $\rho$  for Preference Ratings Comparison

	$\rho$
All Anorexics with C	.7474
AA with BA	.7723
AA with C	.7521
BA with C	.7167

Note: All  $\rho$ s  $< .01$

PREFMAP analysis: The preference ratings were also analyzed with the PREFMAP algorithms. Using the 5-dimensional space obtained from the INDSCAL analysis, the program establishes the ideal space for the stimuli. Results for phase 2 - 4 were computed. Inspection of the root mean squares showed that phase 4 had a sufficiently large root mean square and that little was to be gained by going to a higher phase (See Table 5).

Table 5

Root Mean Squares

Phase	Root Mean Square
2	.9313
3	.8948
4	.8805

The F-ratios between phases allow one to choose the most appropriate model for the data. Only for one subject was the F-ratio between phases 3 and 4 greater than 9.33 ( $p < .01$ ), indicating a poor fit of phase 4 for this subject's data. Because phase 4 fit well all other subjects' data, it was decided to include this subject in the vector model. Subjects' preferences were represented as vectors in the 5-dimensional space where stimuli project onto the vectors so that they correlate with the preference data. The overall correlation between the original preference ratings and phase 4, the vector model, of the PREFMAP analysis was  $r = 0.938$ .

The preference vectors of all subjects were plotted for all pairs of dimensions. The plots are shown in Figures 2 - 11. The dimensions are identical to the ones obtained from the INDSCAL solution and, consequently, the positions of the stimuli also remained the same. The preference vectors were coded by subject number and group membership as indicated on the bottom of the figures. Inspection of all plots showed that the preference vectors are distributed over a large area but still form a cluster. Supporting previous analysis, group differences did not emerge: the preference vectors of each group were not arranged in separate clusters but appear to belong to a single group. Vectors of subjects from all groups are scattered throughout the cluster. Inspection of the actual positions of the preference vectors along the dimensions revealed a consistent pattern. On dimension 1 most vectors are situated along the --buttocks, -abdomen rather than the +buttocks side. Quite a few of the direction cosines are large, e.g., 0.89 for subject 9 in group BA. On dimension 2, almost all vectors (except for subjects 1, 4, 5, and 6 of group AA, and subjects 1, 2 of group BA) are on the positive side which represents the standard and moderate stimuli. Again, the direction cosines of several subjects are quite large. The six subjects whose vectors fell on the negative side of the dimensions will be discussed in more detail in a later section. On dimension 3, the vectors are located on the +buttocks stimulus rather than the +abdomen side, though many vectors are quite distant to the +buttocks stimulus which characterizes this dimension



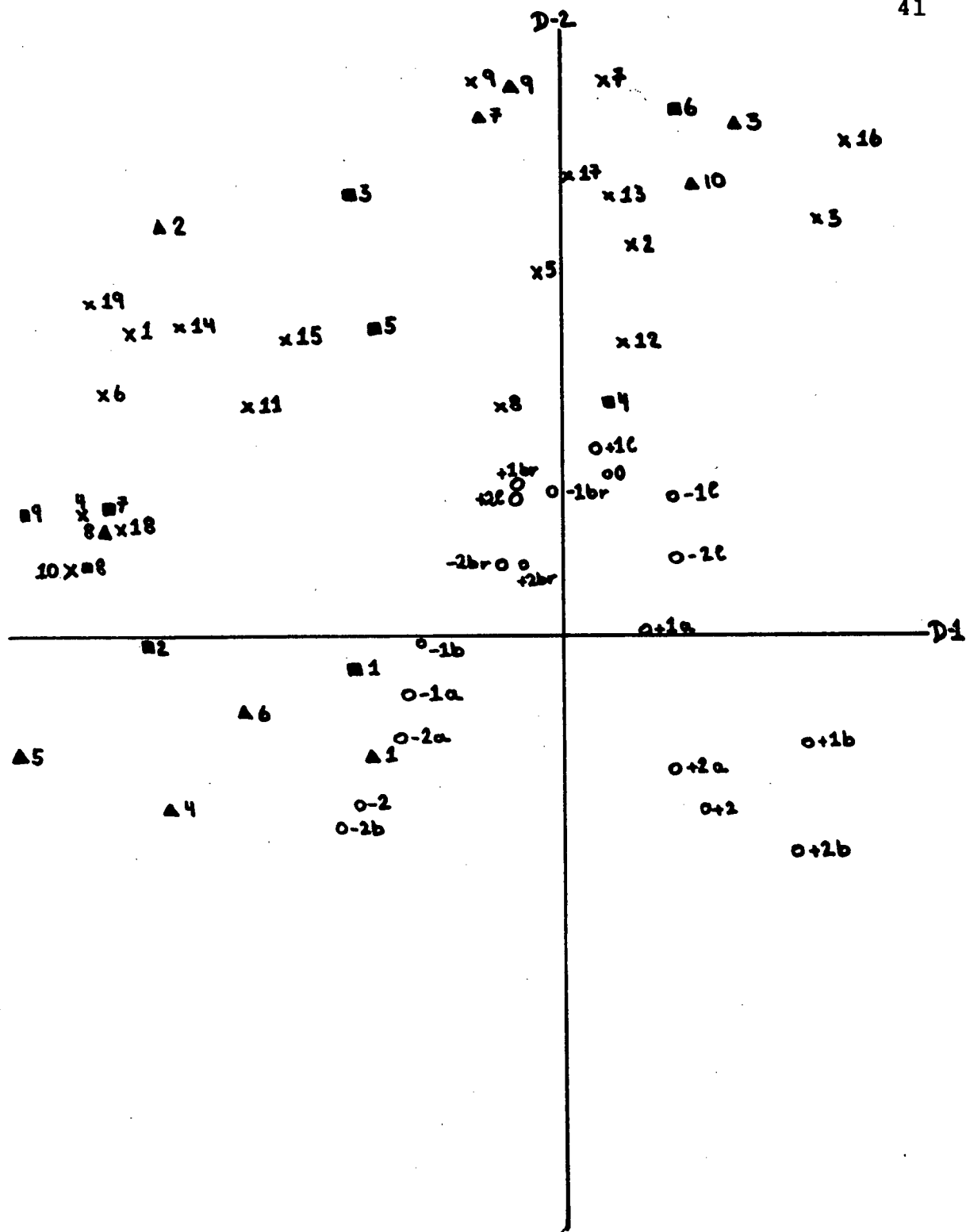


Figure 2. Positions of Stimuli and Preference Vectors with respect to Dimension 1 and Dimension 2

Note:    ● - stimuli  
          br = breast  
          b = buttocks  
          a = abdomen

1 = legs

X - C group  
▲ - AA group  
■ - BA group





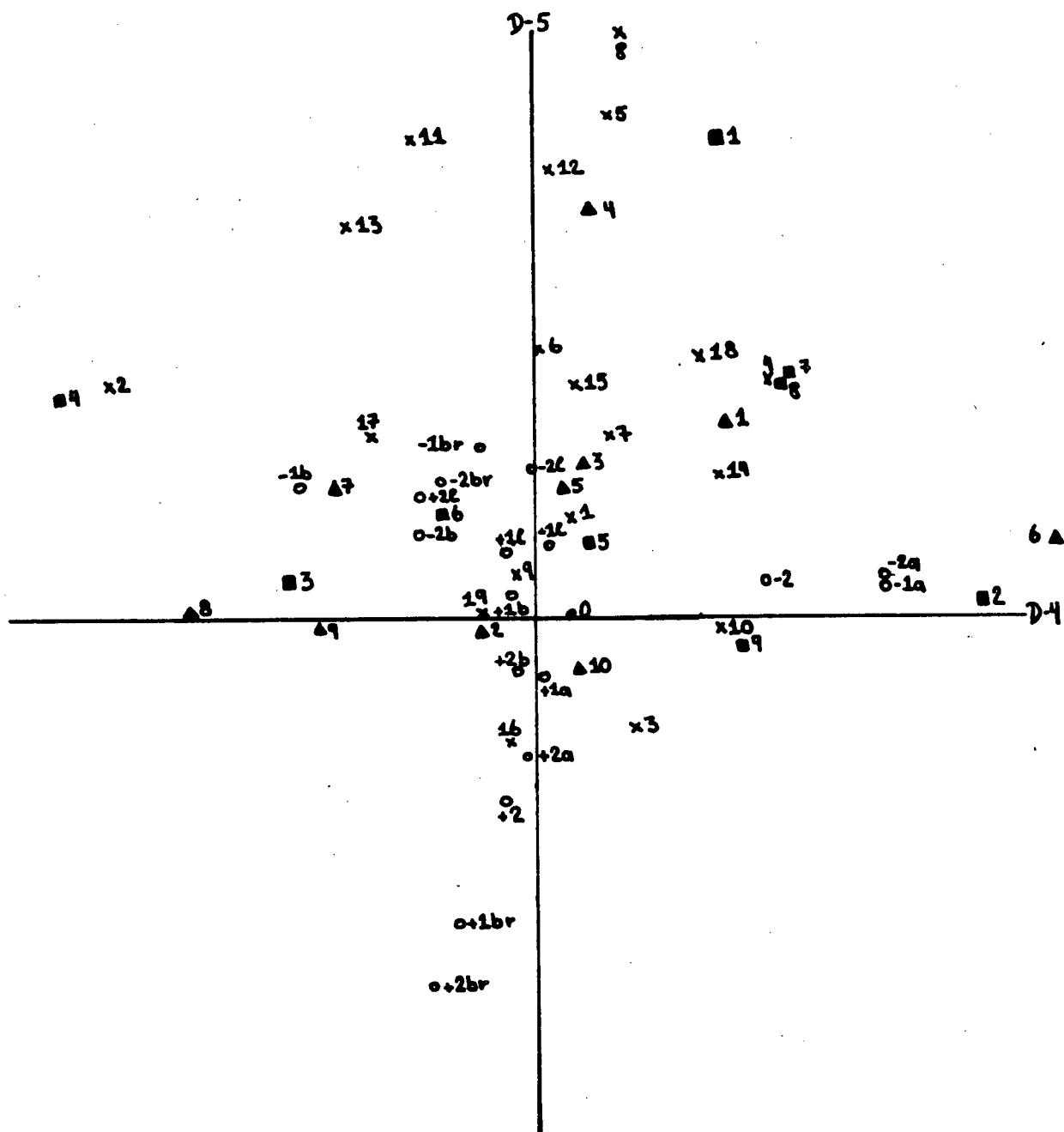


Figure 5. Positions of Stimuli and Preference Vectors with respect to Dimension 4 and Dimension 5.

Note: ○ - stimuli  
 br = breast  
 b = buttocks  
 a = abdomen  
 l = legs

x - C group  
 ▲ - AA group  
 ■ - BA group



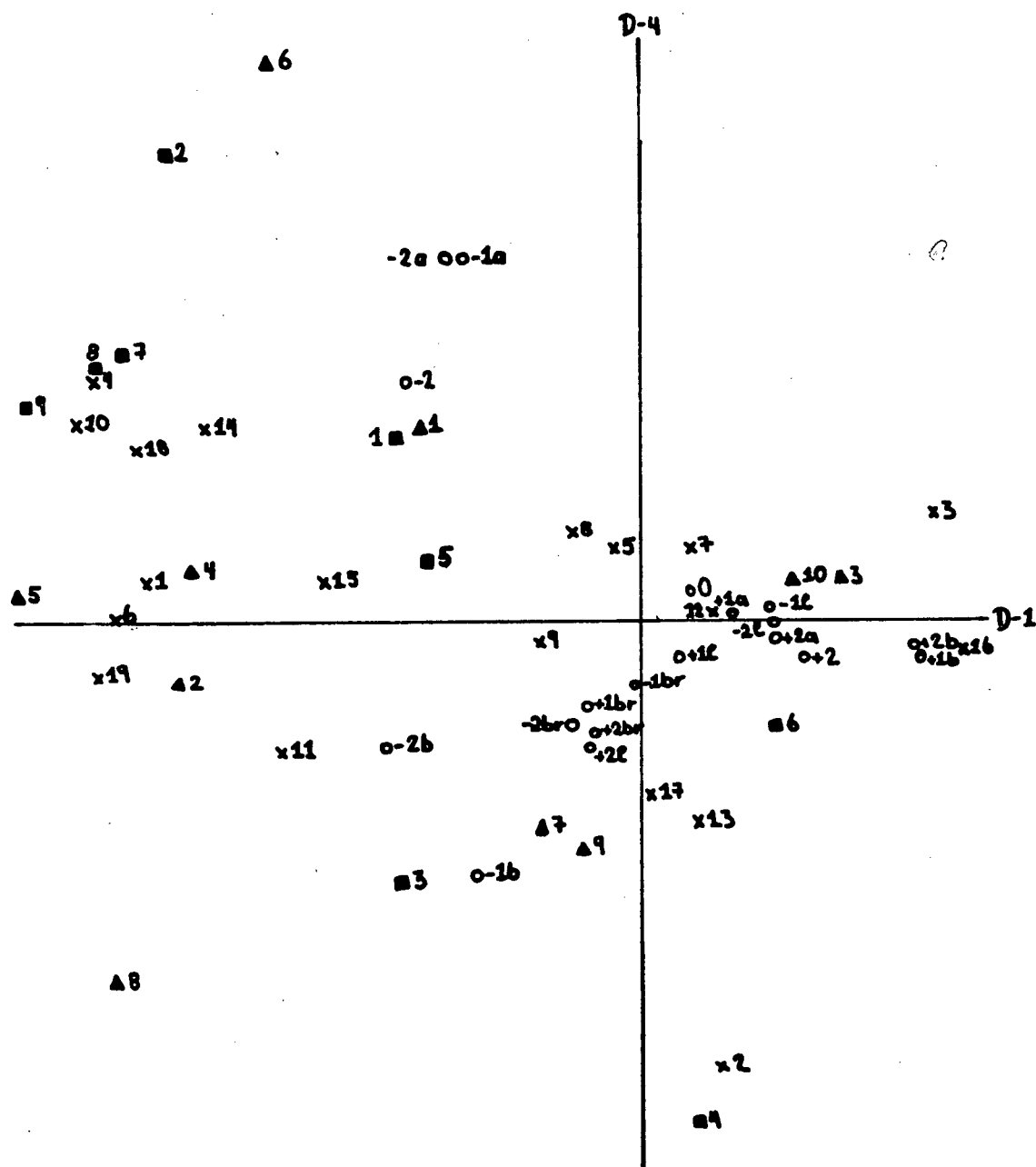


Figure 7. Positions of Stimuli and Preference Ratings with respect to Dimension 1 and Dimension 4

Note: ○ - stimuli  
 br = breast  
 b = buttocks  
 a = abdomen  
 l = legs

× - C group  
 ▲ - AA group  
 ■ - BA group

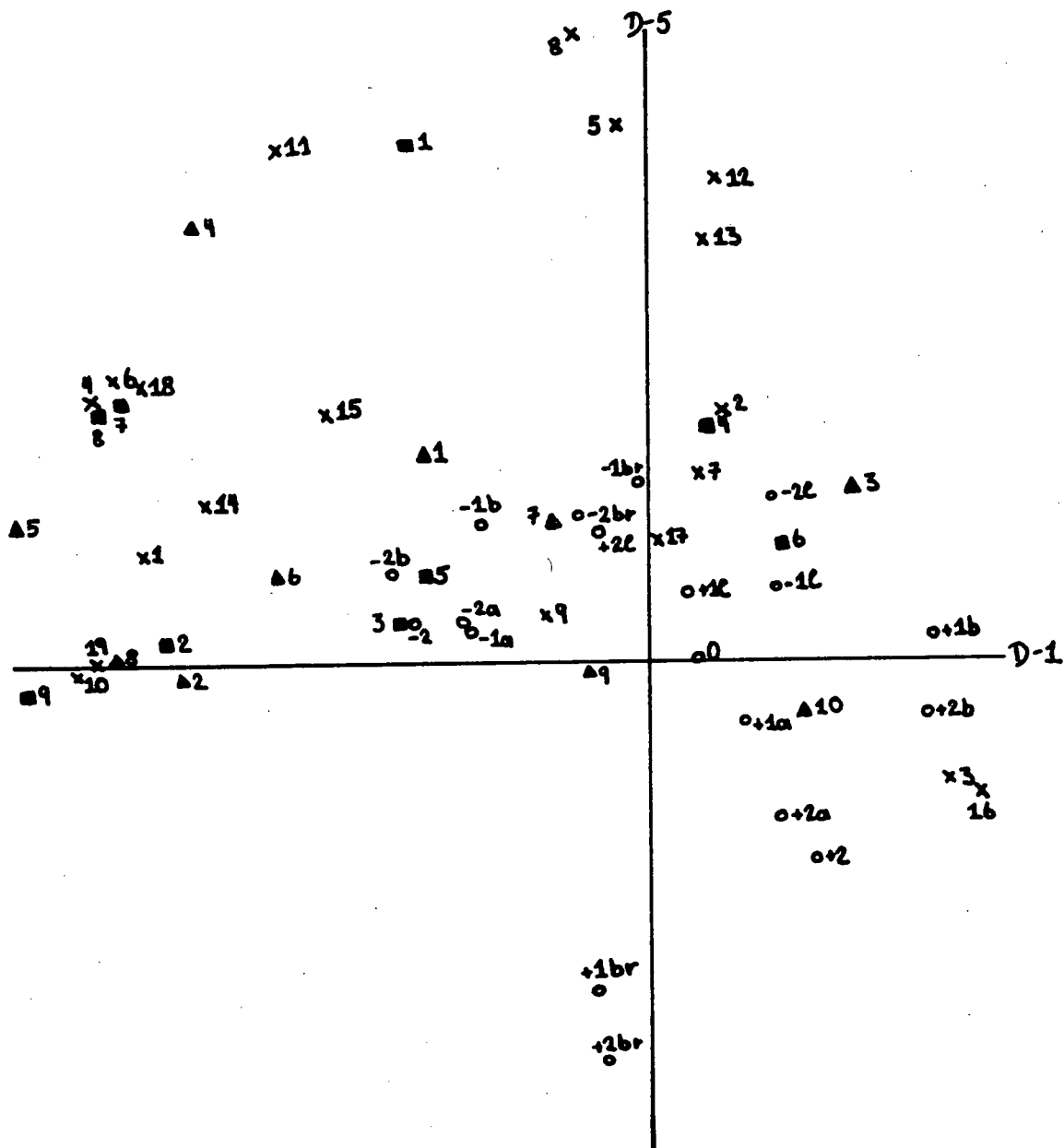
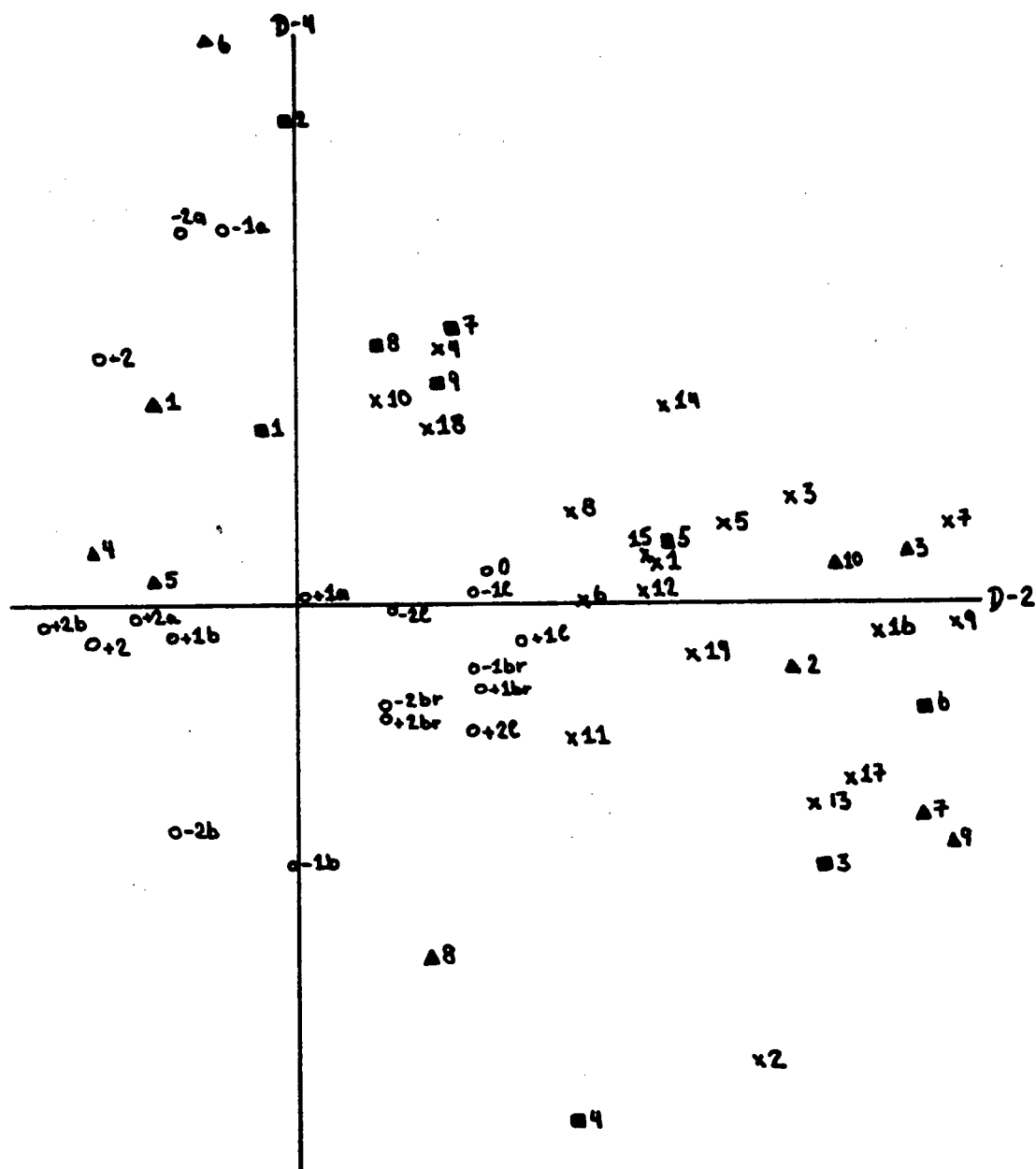


Figure 8. Positions of Stimuli and Preference Vectors with respect to Dimension 1 and Dimension 5.

Note: O - stimuli  
 br = breast  
 b = buttocks  
 a = abdomen  
 l = legs

X - C group  
 ▲ - AA group  
 ■ - BA group





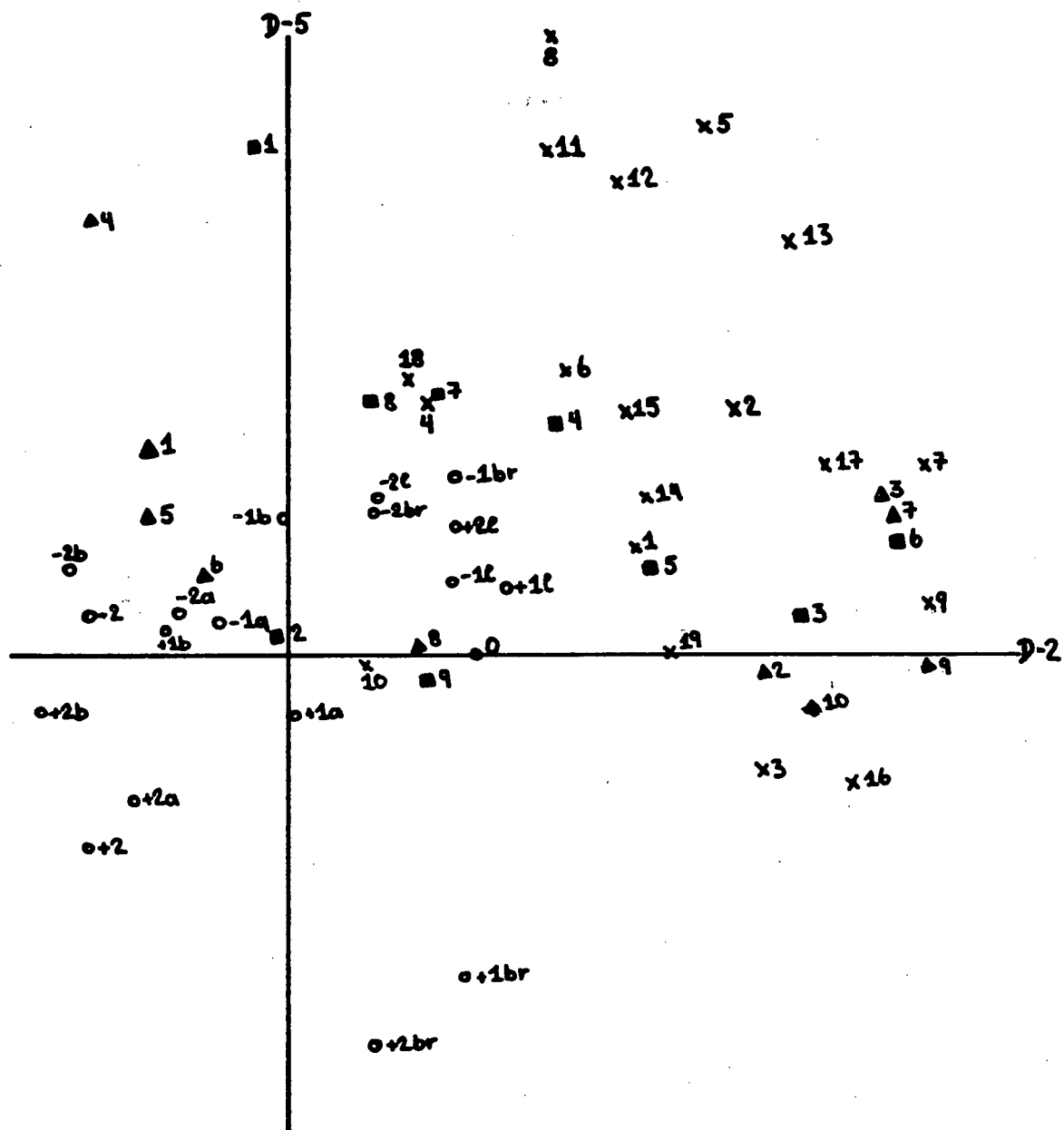


Figure 10. Positions of Stimuli and Preference Vectors with respect to Dimension 2 and Dimension 5

Note: O - stimuli  
 br = breast  
 b = buttocks  
 a = abdomen  
 l = legs

X - C group  
 ▲ - AA group  
 ■ - BA group



(see Figure 3). Generally, the direction cosines are not very large. Along dimension 4, which contrasts small abdomen with small buttocks, the preference vectors do not cluster at one end of the dimension but are distributed quite evenly. The direction cosines are overall not very large. On dimension 5 (large breasts vs. small breasts), the position of the vectors indicates a strong preference for small breasts. A few of the direction cosines are large. Overall, earlier analyses are confirmed. Subjects prefer small abdomen and buttocks over large ones. Highly preferred stimuli are the standard silhouette and the moderate silhouettes such as +1 and -1. Subjects prefer both small abdomen and small buttocks. Moderately large buttocks are preferred over large abdomen. On the last dimension subjects expressed a preference for small breasts. No group differences were found.

Size of the direction cosines is believed to show the importance of particular dimensions of preference judgments, because large direction cosines on a dimension indicate that this dimension accounts for most of the variance. The analysis showed that dimension 1 (large buttock vs. small buttock and small abdomen) and dimension 2 (standard vs. buttock extremes) influence most preference judgments, though dimension 5 (size of breasts) is also important for some control subjects. The average direction cosines for each dimension are shown for each group in Table 6 on page 52.

Table 6

Average Size of Direction Cosines for Each Group

	D-1	D-2	D-3	D-4	D-5
AA	.4612	.4895	.3541	.2647	.1856
BA	.4947	.3484	.3873	.3798	.2548
C	.4113	.5434	.3210	.1810	.3714

Choice of Silhouette Most Like Oneself

Though no independent assessment was made in order to verify whether subjects' choice of the silhouette that best represented them was objectively accurate, it was expected that anorexics would choose a thin silhouette because generally they were thinner than control subjects. Nonetheless, four of the anorexics in the AA group and two in the BA group chose clearly inaccurate silhouettes, i.e., silhouettes that were +2, +2 abdomen, and +1 abdomen. Three control subjects chose the +1 abdomen silhouette, possibly realistically. None of the anorexic subjects chose a +1 buttock silhouette, though two of the controls did so.

All other anorexic subjects chose, however, thin silhouettes as best representations of themselves. Of the remaining six subjects in the AA group three chose the -2 silhouette and the other three selected the -2 buttocks silhouette. The silhouette chosen by the remaining BA group subjects were -2 buttocks (three subjects), -2 breasts (three subjects), and -1 breast (one subject). Thirteen of the remaining 16 control subjects chose a +1 -1 silhouette or the standard as the best

representation of themselves.

Preference ratings of the silhouettes that were later selected as best representations of oneself had been obtained earlier. Theoretically, these preference ratings could range from 1 to 100. The obtained ranges in each group were 1 to 99 for AA subjects, 4 to 99 for BA subjects, and 2 to 100 for controls. As can be seen the preference ratings ranged from very low to very high in all groups; however, only in the AA group did two subjects choose the least preferred silhouette as the one that represented them best whereas only in the control group did three subjects choose the most preferred silhouette as the one that best represented them. The mean preference ratings of these silhouettes in each group are shown in Table 7.

Table 7

Average Preference Ratings of Silhouettes Chosen As  
Best Representations of Oneself

	AA	BA	C
<u>M</u>	24.90	59.88 <sup>a</sup>	66.10 <sup>b</sup>
<u>SD</u>	33.75	31.52	35.38

<sup>a</sup>  $p < .05$  compared with AA group.

<sup>b</sup>  $p < .01$  compared with AA group.

Preference ratings of the silhouette that was chosen as best representation of oneself are lowest in the AA group whereas

such ratings are significantly higher ( $t(17) = 2.201, p < .05$ ) in the BA group. The silhouettes selected by the C group have the highest preference ratings, which are significantly higher than the ratings by the AA group ( $t(27) = 2.921, p < .01$ ), but only slightly (non-significantly) higher than the ratings by the BA group. These differences are not the result of differential selection of +abdomen silhouettes by the AA group. The +abdomen silhouettes had received consistently low ratings. When the +abdomen subjects are excluded, the new means of preference ratings are 33.83 in the AA group ( $n = 6$ ), 73.00 in the BA group ( $n = 7$ ), and 77.81 in the C group ( $n = 16$ ). All means were higher but the same ordering of group means was observed and the distances between the means were also quite similar; however, because of the small number of subjects in the AA and BA groups, no significance tests were performed.

Three of the four subjects in the AA group and one of the two subjects in the BA group whose preference vectors were different on dimension 2 than all other subjects' preference vectors chose the +abdomen silhouette as best representation of themselves. Those subjects gave also high preference ratings to the -2, -1 abdomen, and -2 abdomen silhouettes. However, no other variables could be observed which would distinguish further these subjects from others.

Thus, the results show that overall the preference ratings ranged from very low to very high in each group. Anorexics who are abstainers do not select highly preferred silhouettes as best representations of themselves whereas anorexics who

are also bingers are more like normals, i.e., they choose more preferred silhouettes as best representations of themselves. In addition, the low preference ratings in the AA group were not caused by the four anorexics who saw themselves with a +abdomen.

### Semantic Differential Scales

After the subjects had selected the silhouettes that best represented them, they completed semantic differential scales for this silhouette and for the most and least preferred silhouettes. Table 8 shows the means for each group of the three sets of semantic differential scales that measure evaluation, potency, and activity. Theoretically, these means could have a range between -3 and +3.

Overall, the least preferred silhouette was evaluated negatively and the most preferred silhouette positively. Ratings of potency and activity followed a similar pattern. No significant differences between groups were found, though some expected trends were noted. For example, anorexic abstainers saw the self-representing silhouette as more active, less potent, and more negative. Control subjects evaluated this silhouette more positively. Subjects in the BA group also saw this silhouette as less potent, quite inactive, and evaluated it neutrally.

### Restraint Questionnaire and Eating Attitude Test

The Restraint Questionnaire assesses dieting behaviour, whereas the Eating Attitude Test is designed to diagnose anorexia nervosa. Table 9 shows group means and standard

Table 8

Means of Semantic Differential Scales Measuring  
Evaluation (E), Potency (P), and Activity (A)

	Groups		E	P	A
Least Preferred Silhouette	AA	<u>M</u>	-1.725	-.533	-.900
		<u>SD</u>	1.232	1.156	1.149
	BA	<u>M</u>	-1.555	-.185	-.861
		<u>SD</u>	1.762	1.081	.985
	C	<u>M</u>	-1.236	-.280	-.605
		<u>SD</u>	1.608	1.436	1.410
Most Preferred Silhouette	AA	<u>M</u>	1.025	.721	.825
		<u>SD</u>	1.386	.799	.957
	BA	<u>M</u>	1.111	.147	.694
		<u>SD</u>	1.193	.819	.982
	C	<u>M</u>	1.36	.108	.631
		<u>SD</u>	.958	.840	.813
Silhouette Most Like Oneself	AA	<u>M</u>	-.175	-.341	.550
		<u>SD</u>	1.716	1.540	1.466
	BA	<u>M</u>	.072	-.296	-.305
		<u>SD</u>	1.188	.965	1.102
	C	<u>M</u>	.638	.021	.236
		<u>SD</u>	1.125	.958	.765



deviations.

Table 9

Scores on the Restraint Questionnaire and Eating Attitudes Test

		AA	BA	All Anorexics	C
Restraint Questionnaire	<u>M</u>	19.30	29.66	24.21	14.36
	<u>SD</u>	5.90	6.89	8.17	4.89
Eating Attitude Test	<u>M</u>	58.10	51.77	55.10	14.15
	<u>SD</u>	27.59	18.38	23.26	8.90
Restraint Questionnaire	C vs A	total		p < .001	t(36) = 4.571
	C vs A			p < .050	t(27) = 2.413
	C vs B			p < .001	t(26) = 6.852
	A vs B			p < .010	t(17) = 3.605

The scores for controls ranged from 5-26 on the Restraint Questionnaire and from 4-35 on the Eating Attitude Test and, as mentioned earlier, most control subjects described some dieting behaviour. Anorexics scored significantly higher indicating their concern with dieting. The scores for the AA group ranged from 11 to 29 on the Restraint Questionnaire and from 16 to 106 on the Eating Attitude Test. Subjects in the BA group had the highest scores on the Restraint Questionnaire (with a range from 20-43), and their scores on the Eating Attitude Test (with a range from 27-73) were similar to the AA subjects' scores. As expected, anorexics scored much higher than controls on the Eating Attitude Test ( $t(36) = 7.266$ ,  $p < .001$ ).

The overall correlation between the Restraint Questionnaire and the Eating Attitude Test was  $r = 0.64$ . The correlation for the control group was  $r = 0.62$ . The correlations among the anorexic groups were very inconsistent:  $r = 0.88$  in the AA group and  $r = 0.01$  in the BA group. Group membership (AA vs.

BA) appears to be a moderator variable that influences the correlation between the two questionnaires.

#### Perceptual Aberration Scale

Means and standard deviations of the number of items endorsed which indicates body image aberrations are presented in Table 10.

Table 10

#### Means of Perceptual Aberration Scores for Each Group (Standard Deviations in Parentheses)

AA	BA	C
7.400 (7.089)	6.880 (3.620)	4.315 (4.781)

None of the group mean comparisons were significant. Scores ranged from 1 to 24 in the AA group, from 1-12 in the BA group, and from 0 to 14 in the control group. The highest score (24 in the AA group) was the only high score (>14).

#### Maudsley Personality Inventory

The Maudsley Personality Inventory is designed to measure degrees of neuroticism and extraversion. The maximum score that can be obtained on each scale is 48, a high score indicating a greater degree of neuroticism or extraversion. On the extraversion scale, the scores ranged from 8 - 44 in the control group, from 8 -33 in the AA group, and from 12 -36 in the BA group. The scores of three anorexic subjects were

excluded from the analyses because those subjects used frequently (more than ten times) the option '?', indicating that they could not answer the question. Such frequent endorsement decreases the value of the results (Eysenck, 1959). The means and standard deviations for the extraversion scale and the neuroticism scale by each group are presented in Table 11.

Table 11

Means and Standard Deviations of the Extraversion (E)  
and Neuroticism (N) Scales for Each Group

		E	N
C	<u>M</u>	30.47	25.73
	<u>SD</u>	(8.40)	(12.8)
AA	<u>M</u>	20.22	37.22
	<u>SD</u>	(10.03)	(6.99)
BA	<u>MD</u>	27.00	38.71
	<u>SD</u>	(8.34)	(5.96)
All Anorexics		23.18	37.87
		(9.67)	(6.39)

Anorexics were significantly more neurotic than normal controls,  $t(33) = 3.43$ ,  $p < .01$ . The latter group was, however, more extraverted,  $t(33) = 2.39$ ,  $p < .05$ . The results of the study do not permit an assessment of a possible relationship between degrees of overestimation and neuroticism.

## Chapter 4

### Discussion

#### Dimensions of Body Image Perception

The INDSCAL analyses based on the similarity judgments suggest that five dimensions can be described that underlie the perception of female body images. Though no specific hypothesis had been formulated, clinical observations suggest that anorexics may focus on specific dimensions such as size of abdomen or thighs to, e.g., ascertain weight loss. It was expected that such differential emphasis would be reflected in the test results. This, however, was not the case: no group differences were found. Both normal weight females and anorexics utilize the same dimensions in a similar fashion. Of particular interest are the five dimensions that characterize the common space of stimuli. Although the silhouettes varied in size on four body parts (breasts, abdomen, buttocks, and legs), only three of those are recovered in the five dimensions. Size of legs appears to be irrelevant to body image perception. Sizes of buttocks and abdomen are important variables underlying body image perception: four of the five dimensions deal with one or both of these variables. Dimension 1 suggests that females notice first whether abdomen and buttocks are large or small. A second variable in body image perception distinguishes between figures of average size and those which deviate from the average in terms of buttock size. The next two dimensions contrast the extreme sizes of buttocks and abdomen. The remaining dimension deals with breast size. In earlier solutions

(1D-4D) breast size did not appear as a distinct dimension and, although this dimension is important for some subjects, it is the size of buttocks and abdomen that clearly guides body image perception.

### Body Image Preferences

Although the reliability of preference choices is far from perfect, it appears to be adequate. Studies (Orbach, Traub & Olson, 1966, cited in Shontz, 1969) indicate that normal females accept a wide range of distortions as acceptable self-representations. Regression to the mean might account for the lower reliability of the most preferred silhouettes. Subjects possibly prefer highly several silhouettes and use them interchangeably.

The hypothesis that anorexics (both abstainers and bingers) prefer thinner body images than normals was not supported. There was exact agreement as to which silhouettes were disliked. Moreover, subjects liked the same silhouettes, with few exceptions. Generally, moderate silhouettes were preferred, a finding consistent with other research (Minahan, 1971) that found that tenth and twelfth grade females rated medium silhouettes as most attractive; (Minahan, 1971) reported that the most preferred silhouette had large breasts, medium buttocks, medium thighs, and medium calves. Although anorexics showed a tendency to prefer more of the smaller figures (e.g., -2 abdomen, -2 buttocks, or -2 breasts), the differences were not significant. The thinnest silhouette was both liked and disliked by subjects in all groups, and also failed to distinguish

anorexic from non-anorexic subjects. The positions of the vectors in the PREFMAP analysis confirm the absence of group differences and the presence of much variation among all subjects. Again, small abdomen and buttocks are preferred over large ones, and most subjects like medium size body stimuli. Given a choice, the lesser evil seems to be a +buttock rather than a +abdomen silhouette; the mean preference ratings confirm this interpretation. Nonetheless, small buttocks are preferred equally to small abdomen. A few control subjects whose preference is influenced by the breast dimension strongly prefer small breasts, a finding that contradicts Minahan's result (1971) who observed that large breasts were found to be attractive. This change may reflect the increasing ideal of slimness during the last decade and perhaps the realization that small breasts are common. The disliked figures were fat and, again, buttock and abdomen sizes predominate. Surprising is the rejection of the +1 abdomen silhouette (over, e.g., the +1 buttocks silhouette); presence or absence of a flat tummy appears to influence preference ratings considerably. Since most of the subjects were rather young, it would be of interest to compare preference ratings of older women, who presumably have not all retained a youthful figure.

Two implications follow. Although some anorexics apparently prefer moderate, average looking silhouettes as body ideal they nevertheless remain anorexic. On the other hand, some normal weight females express a strong preference for thin body ideals but do not show any signs of an eating disorder. The large

range of preference ratings for some of the more preferred silhouettes indicates a large variation of body image ideals among females. It can be concluded that such variation is not by itself either a symptom or a cause of eating disorders.

#### Choice of Silhouette that Best Represents Oneself

It should be kept in mind that the choice of the silhouette that was the best representation of oneself was not objectively verified as to accuracy in any way and that studies have shown that such choices are not necessarily accurate (Shontz, 1969). Nonetheless, the results are still meaningful in terms of subjects' self-perceptions. Overall, anorexic abstainers gave the lowest preference ratings for the self-representing silhouette and controls the highest. This finding had been predicted. Bulimic anorexics, unexpectedly, were more like controls and unlike anorexic abstainers, indicating greater preference for their own body silhouette. This observation persisted even after subjects who chose a +abdomen silhouette were excluded from the analysis. Six subjects chose clearly inaccurate silhouettes. Such subjects tend to be called overestimators. In the present study only 31.5% of the anorexics could be described in such a manner, fewer than would be expected from the results of previous studies (Garner et al., 1976; Garfinkel et al., 1978). Contrary to the findings by Button et al. (1977) more 'overestimators' were found in AA group than the BA group. Thus, overestimation was not associated with vomiting. It is not clear, however, whether such overestimation is a true perceptual phenomenon or if it reflects evaluative components of the

body image. Remarks made by some of these subjects such as 'that's what I feel like' tend to support the latter speculation. One bulimic subject implied that such choice would depend on whether she had binged recently.

The remaining anorexics selected very thin (mostly -2) silhouettes, and their body size perception is clearly accurate. There is a paradox here: anorexic abstainers who see themselves as thin appear not to like their thin bodies; though it is precisely their overt wish to be thin. Bulimic anorexics, on the other hand, also see themselves as thin but seem to prefer more those body images. Although their preference ratings are similar to those of normal females, they continue to suffer from an eating disorder. Normal weight females see themselves of average size and prefer average sizes.

Postulations that some anorexics see themselves as grossly distorted on some body parts and suffer from dysmorphophobia were generally not supported by this study. There is insufficient evidence to interpret the overestimators as being dysmorphic regarding abdomen size.

Overall then, the findings cast doubt on the importance of body image perception and ideals in the etiology of anorexia nervosa.

#### Abstainers vs. Bingers

Bulimic anorexics differed from anorexic abstainers in several ways. Their average weight was higher, amenorrhea was not always present, and they expressed a higher preference for silhouettes chosen as best representations of themselves.



The very inconsistent correlations between the Restraint Questionnaire and the Eating Attitude Test which were obtained from the AA group and the BA group support further the concept of valid subgroups in anorexia nervosa. Russell (1979) coined the term 'bulimia nervosa' for bulimic anorexics and described three central characteristics: an uncontrollable urge to overeat, avoidance of the consequences of binges by vomiting or the use of laxatives, and a morbid fear of becoming fat. This last symptom is also present in anorexia nervosa proper. Two other features present in anorexia nervosa are severe weight loss and persistent amenorrhea. Most of Russell's bulimic patients had experienced episodes of true anorexia nervosa. Bulimia nervosa is not described as a distinct syndrome but rather as a heuristic category for the study of two groups of patients who share a common diagnostic feature, i.e., a morbid fear of becoming fat but who also differ on other important variables. Beaumont, George, and Smart (1976) also separated easily two subgroups: dieters vs. vomiters and found them different along similar lines. The differentiation of two subgroups according to the presence of bulimia has been advocated also by other investigators (Casper, Eckert, Halmi, Goldberg & Davis, 1980; Garfinkel, Moldofsky & Garner, 1980). They found that bulimic anorexics differed from fasting anorexics on several variables, e.g., bulimic anorexics weighed more, were more impulsive and extraverted. The usefulness of their distinctions between anorexic-abstainers and bulimic anorexics is supported by the findings of the present study.

### Results of Psychological Tests

The clinical diagnosis of anorexia nervosa was supported by the Restraint Questionnaire and the Eating Attitude Test. Results of the first test confirm that anorexics are dieters and show much concern with food and eating. The very high scores of the bulimic anorexics reflect their large weight fluctuations. Such fluctuations are viewed as part of dieting behaviour. It was, however, impossible to separate control subjects into high and low restraint eaters. All controls indicated some concern with dieting reflecting current cultural ideals for slimness. The Eating Attitude Test discriminated well among anorexic and non-anorexic subjects. The means obtained in the anorexic and control groups were similar to those found in the original validation sample. Garner and Garfinkel (1979) used a cut-off score of 30 to eliminate false negatives and found a false positive rate of 13%. If the lowest scoring anorexic of the present study is excluded (her behaviour was very much characterized by denial) the cut-off score would be 27 with no false negatives and only 10% false positives. The Eating Attitude Test appears to be a useful self-report measure of anorexia nervosa.

There were no significant differences of group means on the Perceptual Aberration Scores. The Strober et al. findings that anorexics experience more body image distortion were not supported. The means of both anorexic groups were very similar to the mean of 1,367 female college students tested by Chapman, Edell, and Chapman (1980). The mean for control subjects in

the present study was lower than the one found by Chapman et al. Only one subject had a high score that could be suggestive of body image distortions, and this subject, moreover, was quite young. Chapman et al. found that their scale was successful in identifying subjects who had psychotic-like experiences. Results of the present study do not lend support to a hypothesis that anorexics experience such distortions in perception of their own body. As expected, controls were more extraverted and less neurotic than anorexics. The mean scores of the anorexics were similar to those obtained by Solyom, Freeman & Miles (1981). The mean extraversion score of the controls is comparable to the American college students test norms (Eysenck, 1959) group; the mean neuroticism score is slightly higher than the one obtained by the standardization group (25.73 vs. 20.91).

### Limitations

The major limitation of this study concerns the method of data collection. As already noted in the introductory chapter, research findings have been influenced by the method that was used; e.g., subjects tested with a linear method may respond differently than subjects tested with a configurational method. The present study used a configurational method. In addition, subjects used a series of standard silhouettes (not their own body representations) to make similarity and preference judgments. It is possible that different results will be obtained if an alternative testing method and/or stimuli are used. Only future research can establish the generalizability of the present results.

### Some Speculations

Overall, the findings suggest that body image distortions are not central to the anorexic disorder and that the significance of other symptoms should be investigated. Diagnostic criteria describe two related symptoms: a fear of obesity and a fear of losing control (not being able to stop eating). These symptoms are common to all anorexics, both abstainers and bingers. Crisp (1967) discussed anorexia nervosa in terms of weight phobia, i.e., the anorexic is phobic of normal weight. The present author suggests that body image research be put aside and that investigations focus on the formulation of anorexia nervosa within a framework of phobias. The feared stimuli could be the weight (normal or obese) or, more immediately, the food itself. Related is the fear of losing control. Anorexic abstainers are often characterized by rigid overcontrol. Overcontrol has been described as a symptom of the obsessive-compulsive style (Shapiro, 1965), and other investigators (Solyom et al., 1981) have found obsessive symptoms in anorexics. Bulimic anorexics, on the other hand, exhibit lack of impulse control. Investigation of these two aspects - overcontrol and lack of impulse control - will increase our understanding of the anorexic disorder in general and may provide a basis for distinguishing two subgroups. If such conceptualizations can be substantiated experimentally, then anorexia nervosa should be treated with therapies that have been found to be effective in those disorders: e.g., behavioural techniques (systematic desensitization and flooding).

### Concluding Remarks

The present study investigated underlying dimensions of body image perception of anorexic and normal weight females and how such dimensions influence preference judgments. Subjects sorted repeatedly a series of female silhouettes (to establish similarity judgments) and then ordered the silhouettes on a 100 unit scale according to their preference. Results were analyzed with multidimensional scaling analyses. Five dimensions underlying body image perception could be identified. Four of these dealt with sizes of buttocks and abdomen, and the remaining one referred to breast size. Anorexic and control subjects did not differ on those dimensions. Unexpectedly, subjects also liked and disliked similar silhouettes and no group differences were observed. Moderate stimuli were generally preferred, as were small abdomen and small buttocks. The thinnest silhouette was generally not rated highly by any group. A large variation of preferences was observed among subjects in all groups. For example, some normal weight subjects tended to prefer thin silhouettes without showing signs of an eating disorder. When choosing a silhouette most like oneself, some anorexics seemingly overestimated and chose large abdomen silhouettes. Most anorexics, however, saw themselves as very thin. Still, anorexic abstainers, who are objectively the thinnest group of subjects, do not give high preference ratings to thin silhouettes. Bulimic anorexics, like controls, tend to like the silhouettes which represent them. Within the limits imposed by the perceptual task, the results do not support the hypo-

thesis that anorexics experience body image distortions. The findings suggest that there might be a small group of anorexics who experience body image problems as part of their anorexic symptoms. However, a thin body ideal is not specific to anorexic subjects but is also found among normal females. The classification of anorexics into subgroups - abstainers vs. bingers - appears to be useful. It was suggested that other variables should be investigated such as a morbid fear of becoming fat and a fear of losing control. Perhaps anorexia nervosa can be formulated as a weight phobia.

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## APPENDIX 1

## Criteria for Diagnosis of Anorexia Nervosa

(Feighner et al, 1972)

- A. Age of onset prior to age 25.
- B. Anorexia with accompanying weight loss of at least 25% of original body weight.
- C. A distorted, implacable attitude towards eating, food, or weight that overrides hunger, admonition, reassurance and threats, e.g.:
  - 1. Denial of illness with a failure to recognize nutritional needs.
  - 2. Apparent enjoyment in losing weight with overt manifestations that food refusal is a pleasurable indulgence.
  - 3. A desired body image of extreme thinness with overt evidence that it is rewarding to the patient to achieve and maintain this state.
  - 4. Unusual hoarding or handling of food.
- D. No known medical illness that could account for the anorexia and weight loss.
- E. No other known psychiatric disorder, with particular reference to primary affective disorders, schizophrenia, obsessive-compulsive and phobic neurosis. (The assumption is made that even though it may appear phobic or obsessional, food refusal alone is not sufficient to qualify for obsessive-compulsive or phobic disease.)
- F. At least two of the following manifestations:
  - 1. amenorrhea
  - 2. lanugo
  - 3. bradycardia (persistent resting pulse of 60 or less)
  - 4. periods of overactivity
  - 5. episodes of bulimia
  - 6. vomiting (may be self-induced).

## APPENDIX 2

## Diagnostic Criteria for Anorexia Nervosa

(DSM-III, 1980)

- A. Intense fear of becoming obese, which does not diminish as weight loss progresses.
- B. Disturbance of body image, e.g., claiming to "feel good" even when emaciated.
- C. Weight loss of at least 25% of original body weight or, if under 18 years of age, weight loss from original body weight plus projected weight gain expected from growth charts combined to make the 25%.
- D. Refusal to maintain body weight over a minimal normal weight for age and height.
- E. No known physical illness that would account for the weight loss.

APPENDIX 2 (cont'd)  
Diagnostic Criteria for Bulimia  
(DSM-III, 1980)

- A. Recurrent episodes of binge eating (rapid consumption of a large amount of food in a discrete period of time, usually less than two hours).
- B. At least three of the following:
  - 1. Consumption of high-caloric, easily ingested food during a binge.
  - 2. Inconspicuous eating during a binge.
  - 3. Termination of such eating episodes by abdominal pain, sleep, social interruptions, or self-induced vomiting.
  - 4. Repeated attempts to lose weight by severely restrictive diets, self-induced vomiting, or use of cathartics or diuretics.
  - 5. Frequent weight fluctuations greater than ten pounds due to alternating binges and fasts.
- C. Awareness that the eating pattern is abnormal and fear of not being able to stop eating voluntarily.
- D. Depressed mood and self-deprecating thoughts following eating binges.
- E. The bulimic episodes are not due to Anorexia Nervosa or any known physical disorder.



## APPENDIX 4

Case Histories

## Patient #1

This 30 year old patient has a long history of anorexia nervosa. Although she remembers being concerned about her weight since she was seven years old, her food intake pattern did not become erratic until she was 24 years old. At that time she was overweight and felt very ugly. She abandoned her studies, isolated herself in an apartment, and lived on tea and bran muffins losing 10 pounds in three weeks. Her weight then decreased to about 100 pounds. Shortly after, she started to binge, followed by vomiting. Since that time her eating behaviour can be characterized as an alternation of binges and vomiting. She has kept her weight around 105 pounds. She was amenorrheic for five years, then resumed menstruation, but is currently amenorrheic again. Unusual food handling habits are present. She has reported compulsive behaviours such as rituals in the past and, generally, is quite obsessive.

## Patient #2

Patient #2 became anorexic at age 17 (she is now 20). She was a little heavy at that time, and when it was suggested to her that she lose a few pounds she went on a starvation diet (less than 800 calories/day) and exercised excessively. She lost about 25 pounds of weight and became amenorrheic. Bulimia was a problem from the beginning. Binge eating was always followed by vomiting. This pattern of bulimia and

vomiting was interrupted once by a period of starvation. Characteristically, she likes to cook for others. The patient complains that her buttocks and thighs are too fat, and she is very self-conscious about it. Her choice of silhouettes showed a strong desire for extreme thinness.

#### Patient #3

This 13 year old patient became anorexic at the beginning of puberty. Although her weight was average for her height she felt too chubby and lost weight through dieting and exercise. She became very preoccupied with food and her weight, and worried that she would become too muscular from the exercises. Some body image disturbance might be present as she chose the +1 abdomen silhouette as representing herself though she is obviously quite slim. She has few friends and is quite shy and insecure. Her parents insisted on treatment when she had lost about ten pounds and her periods had stopped. Her anorexia is not chronic and she is responding well to therapy.

#### Patient #4

This patient is 25 years old. Her weight is currently in the average range due to bulimia. Initially she lost much weight and was amenorrheic for over a year. Her weight increased when she started to binge. Binge eating episodes are followed by fasting, but recently her periods of fasting have shortened. Her weight has had a range of 60 pounds during



the past five years. Currently, she has little control over her binge eating.

Patient #5

This 22 year old patient who has been anorexic for 2 1/2 years was hospitalized at the time of testing. Hospitalization (duration of three months) became necessary because of her low weight. She has been gaining weight and has resumed menstruation. Episodes of bulimia are frequent and are usually followed by vomiting. Although she is still underweight she selected the +1 abdomen silhouette as the best representation of herself.

Patient #6

This 24 year old patient began to diet at age 16 although her weight was normal. At that time, her parents were going through a divorce and the patient might have blamed her mother's obesity for the marital problems. The patient has been on many diets since then as she has been concerned about being overweight. She became anorexic 2 1/2 years ago. For the past two years she has binged almost daily, usually during the evening. Binge eating is always followed by vomiting. Most of her thoughts centre around food. Presently she is motivated to change because of pressures from her boyfriend.

Patient #7

This 24 year old patient's eating disorder began at age

14. She was a very good athlete, particularly a good swimmer, and wanted to lose weight in order to perform better. When she was 16 1/2 she had lost much weight, was amenorrheic, and stopped swimming. Since that time her weight has been irregular. Menstruation resumed for awhile (she has two children), but currently she is amenorrheic. She had gained only ten pounds during one pregnancy, but 25 during the other. Presently her food intake is very low, on some days only 200-300 calories, and she continues to exercise strenuously. Although she now only wants to be slim, not thin, she is afraid of becoming overweight because despite her dieting and exercising she loses weight slowly. Generally, she is quite anxious and obsessive.

Patient #8

This 19 year old patient is currently of very low weight. She loses weight by dieting and exercising compulsively. She recognizes that some of her habits and behaviours are compulsive. She expresses a very thin body image ideal and accurately perceives herself as thin. She has been amenorrheic since she became anorexic three years ago.

Patient #9

This 31 year old patient was overweight when she started to diet two years ago. However, when she reached her target weight (somewhat low for her height) she continued to diet. Currently she is amenorrheic and gaining weight very slowly.

Test responses showed that she does not see herself as very thin: she selected the +1 abdomen silhouette as the best representation of herself. Overactivity is present. Therapeutic progress is very slow as the patient has devised many good arguments favouring her starvation diet and refuses to agree to any contracting based on weight gain.

Patient #10

This 16 year old patient professes to have much insight. She admits that she is an anorexic but at the same time attempts to show that she has recovered. She carefully tries to give non-anorexic responses and emphasizes a preference for average size body image. Her weight remains, however, low and she is still amenorrheic. She is not particularly worried about other people's concerns regarding her weight. She admits that at times she is afraid of losing control. She is quite athletic and generally, ambitious and competitive.

Patient #11

This 32 year old patient is a truly chronic anorexic (17 years). She became anorexic at the beginning of puberty and has maintained a very low weight throughout the years. She could describe a two year period during her teens when she put on some weight though she still remained underweight and amenorrheic. Many classic anorexic behaviours can be observed: she only eats health foods, she is very active, does volunteer work (including cooking for others), and exercises strenuously

(e.g., rides a bicycle in cold weather). Currently she is motivated for therapy and feels she will improve as she has just gained half a pound without being in panic about it. Prognosis, however, is poor.

#### Patient #12

This is the second episode of anorexia nervosa for this 23 year old patient. The first one lasted half a year and the patient made a good recovery. The current episode started less than a year ago. The patient could identify two precipitating factors. During vacation with another couple she felt inadequate, not thin enough, and thought that the other woman looked gorgeous. Some time later at a party she listened to some friends who were talking about someone else who was a little overweight. She became afraid that people would talk about her the same way. She reduced her weight by low calorie intake and vomiting which has become automatic. Soon afterward she became amenorrheic again. She has recently gained some weight but feels it is too much. In the test she preferred the very thin silhouette and saw herself as fat with a +2 abdomen. However, she is now willing to stay at a three-digit number (i.e., over 100 pounds) weight.

#### Patient #13

This 15 year old patient has been anorexic for a year. She lost about 20 pounds to a low of 83 pounds. Weight loss was achieved mainly by reduced calorie intake. The patient

complains of feeling full after a few bites of food and having little appetite. Her parents reported that she eats very slowly. About eight months ago the patient became amenorrheic. No precipitating factors can be identified. The mother recalled, however, that her own sister had been anorexic at about 14 years of age.

#### Patient #14

This 15 year old patient first lost weight two years ago when she was 170 pounds and overweight. After that her weight showed fluctuations. Currently she weighs about 119 pounds though her ideal weight for her height should be between 130 and 140 pounds. She became amenorrheic one year ago. She is an emphatic vegetarian, e.g., she carefully supervises the cleaning of all utensils that are used for preparing her food to ensure that no traces of meat or fat are left on them. She is a good student and quite active in sports. Once a week or so she'll binge on cookies, though her actual calorie intake during a binge is not very high. She feels that she is fat and claims that she sees herself so. She chose the fattest silhouette (+2) as an accurate representation of herself. She selected the thinnest silhouette (-2) as her body image ideal.

#### Patient #15

This patient has been anorexic for two years and amenorrheic for one year. Initially she lost weight until she reached 90 pounds (her height is 1.71 m). Now she is still

underweight at about 112 pounds. Weight loss was achieved through dieting and use of laxatives. Obsessive and hysterical features are also present. She had been hospitalized twice because of her low weight. She perceives how thin she is but considers her weight normal and is afraid of becoming average weight which she now considers overweight. Currently she is bingeing about three times a week, although bulimia was not present initially. Characteristically, at the beginning of her anorexic career she worked as a cook.

#### Patient #16

This patient became anorexic at age 19. Her clinical picture is a mixture of anorexia and bulimia. Her weight has ranged from 45 to 170 pounds in the past four years. When her weight is low she is amenorrheic. Fear of obesity is present, and she is overactive. She binges regularly and uses large amounts of laxatives (e.g., 60 Exlax) to rid her body of the food that she had consumed during the binge. This excessive use of laxatives had led to two hospitalizations. She prefers a very thin body image ideal, but perceives her body size quite accurately.

#### Patient #17

This 21 year old patient has a six year history of anorexia. Bulimia is an important symptom. Regular binge eating is followed by vomiting and periods of severe dieting. She prefers health foods and avoids sugar (except when she binges). Her weight has ranged from 100 to 145 pounds. She has been

amenorrheic for the past year.

Patient #18

This 27 year old patient lost weight gradually over a period of four years. Although she was slightly overweight initially, when she reached her goal she continued to diet. She became amenorrheic prior to any significant weight loss. She went to a low of 88 pounds (height 1.63 m) but denies the seriousness of her weight loss. She is continually preoccupied with food and has begun to exercise. She lost interest in social relationships and broke up with her boyfriend. During the interview she expressed a wish to gain some weight and selected the thinnest silhouette (-2) as the least preferred one. This silhouette was also chosen as the one that best represented herself.

Patient #19

This 34 year old patient has a 18 year history of anorexia. Episodes of bulimia are frequent and usually are followed by vomiting. Her weight has ranged from 68 to 95 pounds (height 1.60 m) during the past 18 years. However, she has never been amenorrheic, even at her lowest weight. She accurately perceived herself as thin, and also selected a thin body image silhouette (-2b) as her body ideal. Currently, she is making a sincere attempt to change her anorexic way of life.

# APPENDIX 5

## Background Characteristics of Anorexics-Bingers

Subject	Age at Onset of Anorexia	Age at Testing	Height / m	Weight / kg	Highest Weight Before Onset of Anorexia	Lowest Weight After Onset of Anorexia	Duration of Amenorrhea (Years) (prev. episodes)	Duration of Anorexia (Years)	# / of Hospitalization	Duration (Months)
1	19.5	22	1,68	48.4	63.6	43.6		2.5	2	.35
2	19	23	1,69	55.3	77.3	43.2	.5	4	2	1.5
3	21	24	1,63	54	61.4	49.1	-	2.5	-	-
4	16	34	1,60	40.5	45.5	30.9	-	18	2	2.5
5	15	21	1,66	52.2		45.5	1	6	-	-
6	24	30	1,65	46.3	73.2	44.1	.16	6	1	2
7	17	20	1,70	57.5	64.1	52.7	2	3	-	-
8	20	25	1,68	61.5	53.6	47.8	(prev. episodes)	6	-	-
9	19.5	21	1,71	52.6	58.6	40.5	(prev. episodes)	1.5	2	4.5
M	19.00	24.4	1,66	52.03	62.1	44.1		5.5		
SD	2.7	4.6	.03	6.2	10.2	6.1		4.9		



APPENDIX 5 (cont'd)

Background Characteristics of Anorexics-Abstainers

Subject	Age at Onset of/ Anorexia	Age at Testing	Height (m)	Weight (kg)	Highest Weight Before Onset of Anorexia	Lowest Weight After Onset of Anorexia	Duration of Amenor- rhea (Years)	Duration of Anor- exia (Years)	# of Hospitalization	Duration (Months)
1	13	13	1,61	48.2	52.3	46.4	.16	.67	-	-
2	29	31	1,52	44.3	64.5	39.5	2	2	-	-
3	15	16	1,65	48.7	59.1	41.8	3	1	-	-
4	16	19	1,68	39.3	54.5	37.7	3	3	-	-
5	18	23	1,65	54.5	61.4	48.6	.58	.67	1	2
6	14	15	1,73	54.5	77.3	53.2	1	1	-	-
7	14	15	1,65	44.2	46.8	36.4	.67	1	-	-
8	16	24	1,68	48	63.2	48.6	.25	8	-	-
9	11	32	1,55	35.9	31.4	13.6	never men- struated naturally	17	4+	-
10	22.5	27	1,63	43	61.4	40	5	5	-	-
<u>M</u>	16.85	21.5	1,63	46.06	57.2	40.5		3.4		
<u>SD</u>	5.3	6.9	.1	5.9	12.2	10.9		5.2		

# APPENDIX 6

## Background Characteristics of Control Subjects: Matched with Anorexic Subjects on Age,

### Educational Background, and Socio-Economic Status

CONTROLS					ANOREXICS			
Subject Number	Height (m)	Weight (kg)	Age (years)	Educational Background (Years of Schooling)	Socio-Economic Status <sup>a</sup>	Age	Educational Background (Years of Schooling)	Socio-Economic Status <sup>a</sup>
1	1,67	60.4	20	12	3	22	11	5
2	1,55	55.9	20	12	5	23	10	5
3	1,65	50.4	24	14 or more	2	24	14 or more	2
4	1,57	49.5	34	12	2	34	12	2
5	1,52	47.7	21	12	2	21	12	2
6	1,62	47.5	29	14 or more	1	30	14 or more	2
7	1,64	56.7	20	13	2	20	13	2
8	1,68	61.2	25	14 or more	2	25	14 or more	2
9	1,72	64.7	21	14 or more	4	21	14 or more	5
10	1,62	50.7	32	14 or more	2	32	13	2
11	1,62	55.5	25	14 or more	3	24	13	2
12	1,65	45.5 <sup>b</sup>	15	9	5	15	10	3
13	1,57	48.2	15	9	3	15	9	3
14	1,65	56.8	23	12	5	23	12	5
15	1,71	57.0	19	13	2	19	13	2
16	1,72	67.3	16	11	3	16	11	3
17	1,55	47.7	30	12	c	31	12	2
18	1,57	50.5	14	8	3	13	8	3
19	1,70	60.5	27	12	4	27	12	4
M	1,63	54.40	22.63		2.94	22.89		2.94
SD	.06	6.39	5.86		1.21	5.99		1.22

<sup>a</sup>Occupation of self; father or husband where appropriate

<sup>b</sup>Subject has gained weight since testing

<sup>c</sup>Housewife

## APPENDIX 7

Scores on the Restraint Questionnaire by  
Control Subjects

Although the scores on the Restraint Questionnaire ranged from 5 to 26 with a mean of 14.36 (median 14.5, mode 15) and a standard deviation of 4.84, closer inspection showed that 78.9% of the control subjects' responses fell within one standard deviation of the mean. Although other studies have used a median split to form subgroups (Herman & Polivy, 1975, Spencer & Fremouw, 1979), this procedure was not deemed appropriate given the distribution of the present scores.

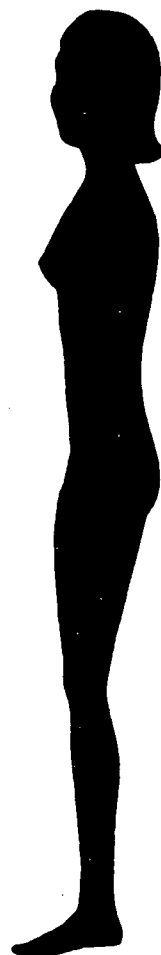
APPENDIX 8



+2



0



-2

APPENDIX 8 (cont'd)



+2



+1



-1



-2

breasts

APPENDIX 8 (cont'd)



+2



+1



-1



-2

abdomen

APPENDIX 8 (cont'd)



+2



+1



-1



-2

buttocks

APPENDIX 8 (cont'd)



+2



+1



-1



-2

legs



## APPENDIX 9

## Eating Attitudes Test

Instructions: Please place an (X) under the column which applies best to each of the numbered statements. All of the results will be strictly confidential. Most of the questions directly relate to food or eating, although other types of questions have been included. Please answer each question carefully. Thank you.

ALWAYS	VERY OFTEN	OFTEN	SOMETIMES	RARELY	NEVER	
( )	( )	( )	( )	( )	( )	1. Like eating with other people.
( )	( )	( )	( )	( )	( )	2. Prepare foods for others but do not eat what I cook.
( )	( )	( )	( )	( )	( )	3. Become anxious prior to eating.
( )	( )	( )	( )	( )	( )	4. Am terrified about being overweight.
( )	( )	( )	( )	( )	( )	5. Avoid eating when I am hungry.
( )	( )	( )	( )	( )	( )	6. Find myself preoccupied with food.
( )	( )	( )	( )	( )	( )	7. Have gone on eating binges where I feel that I may not be able to stop.
( )	( )	( )	( )	( )	( )	8. Cut my food into small pieces.
( )	( )	( )	( )	( )	( )	9. Aware of the calorie content of foods that I eat.
( )	( )	( )	( )	( )	( )	10. Particularly avoid foods with a high carbohydrate content (e.g. bread, potatoes, rice, etc.).
( )	( )	( )	( )	( )	( )	11. Feel bloated after meals.
( )	( )	( )	( )	( )	( )	12. Feel that others would prefer if I ate more.
( )	( )	( )	( )	( )	( )	13. Vomit after I have eaten.
( )	( )	( )	( )	( )	( )	14. Feel extremely guilty after eating.
( )	( )	( )	( )	( )	( )	15. Am preoccupied with a desire to be thinner.

## APPENDIX 9 (cont'd)

ALWAYS	VERY OFTEN	OFTEN	SOMETIMES	RARELY	NEVER	
( )	( )	( )	( )	( )	( )	16. Exercise strenuously to burn off calories.
( )	( )	( )	( )	( )	( )	17. Weigh myself several times a day.
( )	( )	( )	( )	( )	( )	18. Like my clothes to fit tightly.
( )	( )	( )	( )	( )	( )	19. Enjoy eating meat.
( )	( )	( )	( )	( )	( )	20. Wake up early in the morning.
( )	( )	( )	( )	( )	( )	21. Eat the same foods day after day.
( )	( )	( )	( )	( )	( )	22. Think about burning up calories when I exercise.
( )	( )	( )	( )	( )	( )	23. Have regular menstrual periods.
( )	( )	( )	( )	( )	( )	24. Other people think that I am too thin.
( )	( )	( )	( )	( )	( )	25. Am preoccupied with the thought of having fat on my body.
( )	( )	( )	( )	( )	( )	26. Take longer than others to eat my meals.
( )	( )	( )	( )	( )	( )	27. Enjoy eating at restaurants.
( )	( )	( )	( )	( )	( )	28. Take laxatives.
( )	( )	( )	( )	( )	( )	29. Avoid foods with sugar in them.
( )	( )	( )	( )	( )	( )	30. Eat diet foods.
( )	( )	( )	( )	( )	( )	31. Feel that food controls my life.
( )	( )	( )	( )	( )	( )	32. Display self control around food.
( )	( )	( )	( )	( )	( )	33. Feel that others pressure me to eat.
( )	( )	( )	( )	( )	( )	34. Give too much time and thought to food.
( )	( )	( )	( )	( )	( )	35. Suffer from constipation.

## APPENDIX 9 (cont'd)

ALWAYS	VERY OFTEN	OFTEN	SOMETIMES	RARELY	NEVER	
( )	( )	( )	( )	( )	( )	36. Feel uncomfortable after eating sweets.
( )	( )	( )	( )	( )	( )	37. Engage in dieting behaviour.
( )	( )	( )	( )	( )	( )	38. Like my stomach to be empty.
( )	( )	( )	( )	( )	( )	39. Enjoy trying new rich foods.
( )	( )	( )	( )	( )	( )	40. Have the impulse to vomit after meals.

## APPENDIX 10

## Restraint Questionnaire

1. How many pounds over your desired weight were you at your maximum weight? \_\_\_\_\_ pounds
2. How often are you dieting?  
rarely\_\_\_\_\_ sometimes\_\_\_\_\_ usually\_\_\_\_\_ always\_\_\_\_\_
3. Which describes best your behaviour after you have eaten a 'not-allowed' food while on your diet?  
return to diet \_\_\_\_\_  
stop eating for an extended period of time in order to compensate \_\_\_\_\_  
continue on a splurge, eating other 'not-allowed' foods \_\_\_\_\_
4. What is the maximum amount of weight that you have ever lost within 1 month? \_\_\_\_\_ pounds
5. What is your maximum weight gain within a week? \_\_\_\_\_ pounds
6. In a typical week, how much does your weight fluctuate? \_\_\_\_\_ pounds
7. Would a weight fluctuation of 5 pounds affect the way you live your life?  
Not at all \_\_\_\_\_ slightly \_\_\_\_\_ moderately \_\_\_\_\_ very much \_\_\_\_\_
8. Do you eat sensibly before others and make up for it alone?  
never \_\_\_\_\_ rarely \_\_\_\_\_ often \_\_\_\_\_ always \_\_\_\_\_
9. Do you give too much time and thought to food?  
never \_\_\_\_\_ rarely \_\_\_\_\_ often \_\_\_\_\_ always \_\_\_\_\_
10. Do you have feelings of guilt after overeating?  
never \_\_\_\_\_ rarely \_\_\_\_\_ often \_\_\_\_\_ always \_\_\_\_\_
11. How conscious are you of what you are eating?  
not at all \_\_\_\_\_ slightly \_\_\_\_\_ moderately \_\_\_\_\_ extremely \_\_\_\_\_
12. Are you currently dieting?  
yes \_\_\_\_\_ no \_\_\_\_\_
13. What is your desired weight? \_\_\_\_\_ pounds

## APPENDIX 11

## Perceptual Aberration Scale

1. True            Sometimes I have had feelings that I am united with an object near me.
2. True            I have sometimes had the feeling that one of my arms or legs is disconnected from the rest of my body.
3. True            I sometimes have to touch myself to make sure I'm still there.
4. True            Sometimes I have had the feeling that a part of my body is larger than it usually is.
5. True            At times I have wondered if my body was really my own.
6. True            Parts of my body occasionally seem dead or unreal.
7. True            Sometimes I have had a passing thought that some part of my body was rotting away.
8. True            Occasionally I have felt as though my body did not exist.
9. True            Sometimes I have felt that I could not distinguish my body from other objects around me.
10. True           It has seemed at times as if my body was melting into my surroundings.
11. False          I have never felt that my arms or legs have momentarily grown in size.
12. False          The boundaries of my body always seem clear.
13. True           I can remember when it seemed as though one of my limbs took on an unusual shape.
14. True           I sometimes have had the feeling that my body is abnormal.
15. True           I have sometimes had the feeling that my body is decaying inside.
16. True           I have had the momentary feeling that the things I touch remain attached to my body.

## APPENDIX 11 (cont'd)

17. True                      Occasionally it has seemed as if my body had taken on the appearance of another person's body.
18. True                      Sometimes I feel like everything around me is tilting.
19. True                      Ordinary colors sometimes seem much too bright to me (without taking drugs).
20. False                     My hands or feet have never seemed far away.
21. True                      I have sometimes felt that some part of my body no longer belonged to me.
22. True                      I have felt that something outside my body was a part of my body.
23. True                      I have felt that my body and another person's body were one and the same.
24. True                      Now and then when I look in the mirror, my face seems quite different than usual.
25. True                      I have felt as though my head or limbs were somehow not my own.
26. True                      Sometimes when I look at things like tables and chairs, they seem strange.
27. False                     I have never had the passing feeling that my arms or legs had become longer than usual.
28. True                      I sometimes have had the feeling that some parts of my body are not attached to the same person.
29. True                      I have had the momentary feeling that my body has become misshapen.
30. True                      Sometimes part of my body has seemed smaller than it usually is.
31. True                      My hearing is sometimes so sensitive that ordinary sounds become uncomfortable.
32. True                      Sometimes people whom I know well begin to look like strangers.

## APPENDIX 11 (cont'd)

33. True            I have sometimes felt confused as to whether my body was really my own.
34. True            Often I have a day when indoor lights seem so bright that they bother my eyes.
35. True            For several days at a time I have had such a heightened awareness of sights and sounds that I cannot shut them out.