Chapter 4

Body Size Perception Among Women In The Community

Section 1

Perception of body size and depressed mood

Introduction

There has been considerable research into body size overestimation among patients with anorexia nervosa, and more recently some research among patients with bulimia nervosa (as was reviewed in Chapter 1). Some studies have found that patients with anorexia nervosa overestimate their body size more than normal young women (eg. Garner et al,1976); and most studies have found that patients with bulimia or bulimia nervosa overestimate their size more than normal women (eg. Whitehouse et al,1986), and sometimes more than patients with anorexia nervosa (Touyz et al,1985). However, all studies of body size perception in patients with eating disorders have found a considerable range in estimations, with some patients markedly overestimating and others underestimating. Furthermore, although patients with eating disorders have often been found to overestimate their size more than normal young women, there has been considerable overlap between the estimations of the two groups, with some normal women overestimating as much as the patients. It is therefore conceivable that factors commonly found among patients with eating disorders but which are also found among women in the community may give rise to body size overestimation. Although the significance of body size overestimation in bulimia nervosa has received very little attention, a range of factors have been reported to be associated with body size overestimation among patients with anorexia nervosa. Depressed mood has been one such factor identified (eg. Garfinkel and Garner,1984).

Despite the considerable attention devoted to body size overestimation, there has been very little research into dissatisfaction with body size (ie. the discrepancy between perceived and desired size). This is an important omission since it could be argued that perceived size *per se* is less important than dissatisfaction with body size. A subject may markedly overestimate her size but be content with her size. Conversely, a subject may accurately assess her body size but have a strong desire to be much thinner. Such dissatisfaction would appear to be a useful index of psychopathological disturbance. Results from two published studies (Freeman et al,1985a; Williamson et al,1985) have suggested that patients with bulimia may be markedly dissatisfied with their body size. Only one study (Freeman et al,1983) has made a preliminary assessment of the significance of body size dissatisfaction,[1] and found that among patients with bulimia dissatisfaction was associated with depressed mood.

Thus, among patients with eating disorders, both body size overestimation and body size dissatisfaction have been found to be associated with depressed mood. In Section 5 of Chapter 1

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[1] The study by Freeman et al (1985a) investigated a range of factors associated with both body size dissatisfaction and body size overestimation in patients with bulimia, but the data were analysed using principal components analysis (as was discussed in Chapter 1), and it is therefore difficult to interpret findings.

a hypothesis was outlined in an attempt to account for disturbances in body size perception, which encompasses the association between body size overestimation, body size dissatisfaction and depressed mood. It was suggested that negative self-appraisal as an associated feature of low mood may give rise to overestimating body size and a high level of dissatisfaction with body size, particularly among women for whom body shape is important. A slim shape appears to be important to most women (Rodin et al,1984), but particularly to patients with eating disorders (Fairburn,1985). Patients with anorexia nervosa and bulimia nervosa are characterised by a high level of depression (eg. Eckert et al,1982; Cooper and Fairburn,1986), but clearly depressed mood is also found among women with no eating disorder. An association between body size overestimation, body size dissatisfaction and depressed mood among women with no eating disorder may help to explain why overestimation and dissatisfaction are commonly found among patients with eating disorders.

The aim of this study was to examine further the relationship between depressed mood and disturbances in body size perception. It was predicted that among normal young women with no eating disorder, depressed mood would be associated with body size overestimation and body size dissatisfaction. Since there have been no previous reports on an association between desired size and mood, no specific prediction was made about a possible relationship between these two factors.

Subjects

Ninety-one female students were randomly approached and asked to participate in a *Visual Perception Experiment.* All agreed.

The image distortion method

A Panasonic WV 1400 video camera was modified to allow images in the horizontal plane to be over- or under-scanned, thereby allowing image width to vary from very wide to very narrow. A knob connected to the camera controlled image width. The camera was fitted with a zoom lens and was used to project the image of a photograph onto an 18 inch monitor.

One problem with this equipment was that the image contrast changed across levels of distortion. When narrowly distorted the image was very dark, whereas when widely distorted the image was grey and tended to merge with the background. This was a problem because perception of size is influenced by the contrast between foreground and background (Goldstein,1980). Therefore, a light-coupling device was attached to the camera which varied illumination level with level of distortion, making image contrast constant across all levels of distortion.

Image width was indicated on a voltmeter, and voltmeter readings were converted to percentages expressing degree of distortion. These percentages were derived in the following manner. A piece of graph paper was filmed by the camera and the image of the squares displayed on the monitor. Image width was adjusted so that the width of a square in the centre of the

monitor was equal to its length. This produced a voltmeter reading corresponding to correct width. Image width was then varied at regular intervals across all levels of distortion, and the width of the squares and corresponding voltmeter readings were recorded. Square width was plotted against voltmeter reading and the relationship between the two examined. They were not quite linearly related across all levels of distortion, and so percentages were adjusted to produce a linear relationship. This was achieved using the equation $y=a+bx+cx^2$, where x represented the voltmeter reading in millivolts, y represented the size of the image on the monitor, and a, b and c represented constants which gave the best estimate of y given x.

Since the voltmeter reading corresponding to correct width was known, it was possible to express all voltmeter readings as percentages of correct width: 100 percent represented correct width, percentages less than 100 represented images narrower than correct width, and percentages greater than 100 represented images wider than correct width. Image width varied between 50 and 200 percent of correct width.

Procedure for measuring body size perception

After entering the experimental room subjects were asked to wear a black leotard and to stand in a standardised frontal posture against a white background. They were photographed from a distance of 2m using a Polaroid camera which produced an instantly developed picture 7.3cm by 9.5cm. Subjects then dressed and sat 1m in front of the monitor. The photograph of the subject was scanned by the video camera and the image projected onto the monitor. The subject was asked to:

"Adjust the image so that it corresponds to your actual size"

for estimations of perceived body size, and:

"Adjust the image to the size that you would most like to be"

for desired size. It was stressed that the subject was to be as accurate as possible and that she might move the image width in and out as many times as necessary. Standardised experimental instructions were used throughout (Appendix 19). Image width was adjusted by the subject controlling the knob attached to the video camera. The experimenter recorded estimations from the voltmeter which was concealed from the subject. There were two trials for each estimation; one with the image initially placed on its widest distortion, and one with the image initially placed on its narrowest distortion. Order of adjusting the image from wide and narrow distortions, and order of estimating perceived and desired size were counterbalanced.[2]

Assessments after body size perception

After completing the assessment of body size perception the height and weight of subjects were recorded. Subjects were then questioned about their eating and weight history using a brief

[2] The reliability of this method of measuring body size perception is reported in Appendix 20.

semi-structured interview (Appendix 21). Finally, subjects completed two questionnaires:

(i) The Beck Depression Inventory or BDI (Beck et al,1961) was used to assess level of depression;

(ii) The Eating Attitudes Test or EAT (Garner and Garfinkel,1979) was used to assess disturbed eating attitudes and behaviour.

Results

Subjects

From the total sample of 91 young women tested, data analysis was conducted on those who weighed within 10 percent of average weight and who did not currently suffer from or have a history of problems with eating. Fifty young women satisfied these criteria. The remainder either did not weigh within the required weight range (N=27), or had experienced problems with eating (N=14). Information on the sample of 50 women is presented in Table 4.1.1. None was markedly depressed as measured by the BDI; and none scored above 30 on the EAT, which is a score often accepted as a threshold indicating disturbed eating attitudes and behaviour (Garner and Garfinkel,1979). Indeed, all subjects scored considerably lower than this, with only 2 (3.9 percent) scoring above 20.

Table 4.1.1
Information on the 50 normal young women

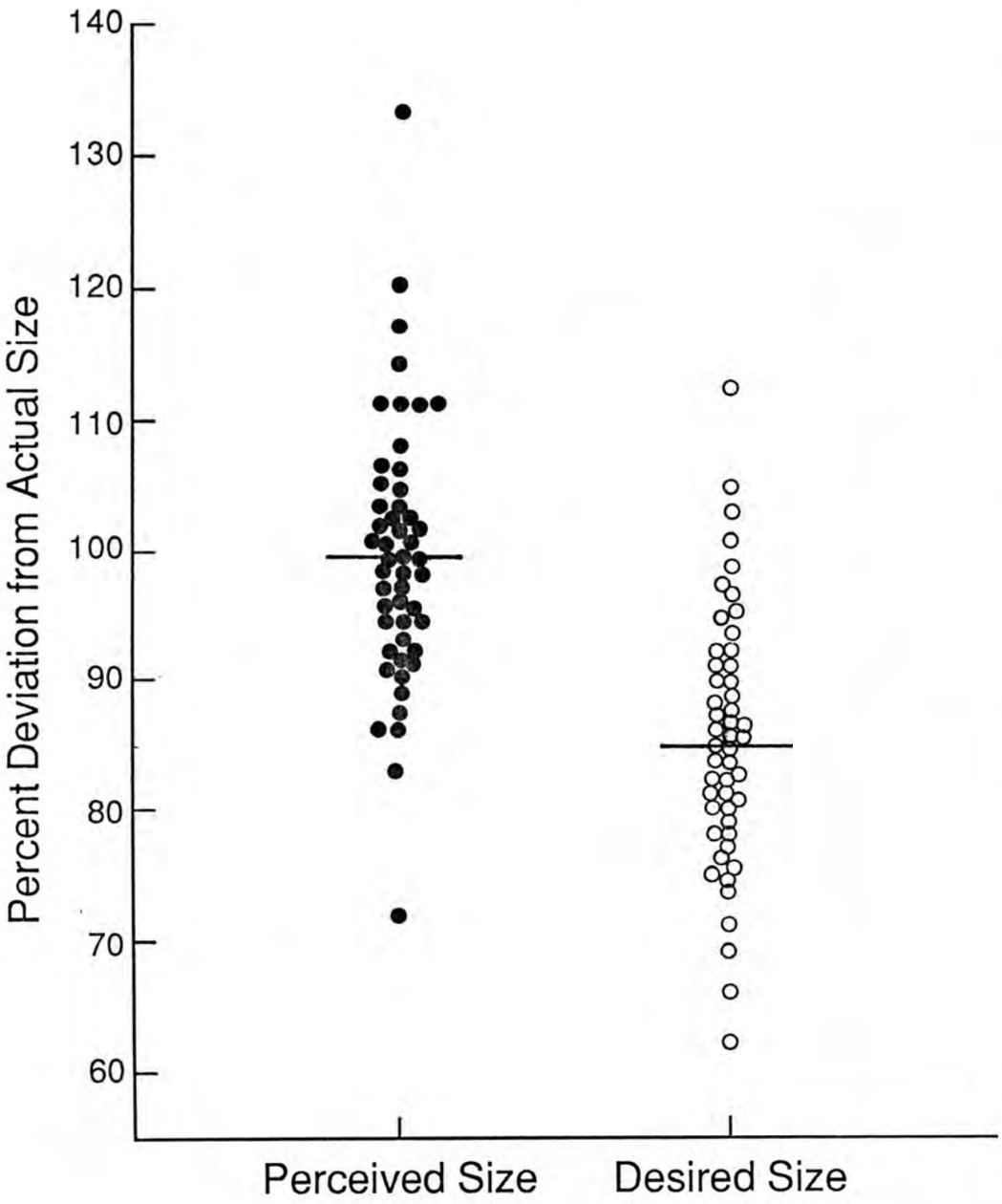
	Mean	sd	Range
Age	20.1	1.2	18 - 24
MPMW	101.4	5.3	91.0 - 109.8
EAT	9.0	5.2	2 - 24
BDI	6.0	4.8	0 - 18

Estimations of body size

For perceived size a mean estimation was derived from the two trials; and similarly for desired size. There was a considerable range in estimations of both perceived size and desired size, as shown in Figure 4.1.1. Desired size was significantly smaller than perceived size (99.5%, sd=10.2 versus 84.9%, sd=10.6; t=9.84, df=49, P<.001). An index of body size dissatisfaction was derived for each subject by subtracting desired size from perceived size. The mean body size

Figure 4.1.1

Variability in body size perception: fifty normal young women



dissatisfaction score was 14.5 percent (sd=10.5), with 90 percent of subjects wishing to be smaller than they perceived themselves to be.

Thus, among this sample of 50 normal young women, there was a considerable range in estimations of perceived body size, desired size and body size dissatisfaction; but most of the women wished to be thinner than their perceived size.

Relationships between body size perception and mood

Depressed mood as measured by the BDI was found to be associated with body size overestimation (r=.36, P<.01); and tended to be associated with body size dissatisfaction (r=.20, P<.08), but was unrelated to desired size (r=.15, P>.05).

These relationships were examined further. First, estimations of perceived size were divided using a median split and BDI scores examined. Compared with low estimators, high estimators had significantly higher scores on the BDI (BDI=4.2, sd=3.8 versus 7.9, sd=5.1; t=2.94, df=48, P<.01). Next, dividing scores for body size dissatisfaction using a median split, subjects with low and high levels of dissatisfaction showed similar levels of mood (BDI=5.3, sd=4.5 versus 6.7, sd=5.1, respectively; t=1.03, df=48, P>.05). Last, BDI scores were divided using a median split. Compared with subjects with low BDI scores, those with higher scores overestimated their size significantly more (95.9%, sd=9.6 versus 103.7%, sd=9.5; t=2.87, df=48, P<.01), and tended to be more dissatisfied with their size (12.0%, sd=7.7 versus 17.6%, sd=12.4; t=1.86, df=35.7, P<.07). Figure 4.1.2 illustrates body size perception in relation to mood.

Discussion

This study shows that in a group of normal weight young women with no history of an eating disorder there was considerable variability in estimations of body size, desired size and body size dissatisfaction. As predicted, depressed mood was associated with body size overestimation, and to a lesser degree it tended to be associated with body size dissatisfaction, but was unrelated to desired size. These findings are consistent with other reports based on samples of patients with eating disorders where marked overestimation and dissatisfaction have been associated with depressed mood (Freeman et al,1983; Garfinkel and Garner,1984). Since patients with eating disorders are often characterised by a high level of depression (Eckert et al,1982; Fairburn and Cooper,1984a), the association between depressed mood and disturbances in body size perception found in this study may help to explain why many patients with eating disorders show disturbances in body size perception but why some women with no eating disorder show similar disturbances.

The relationships described were correlational and do not indicate whether depressed mood may lead to body size overestimation and body size dissatisfaction; whether overestimation and dissatisfaction may lead to depressed mood; or indeed whether overestimation, dissatisfaction and depression may be products of another factor. In order to determine direction of causality it

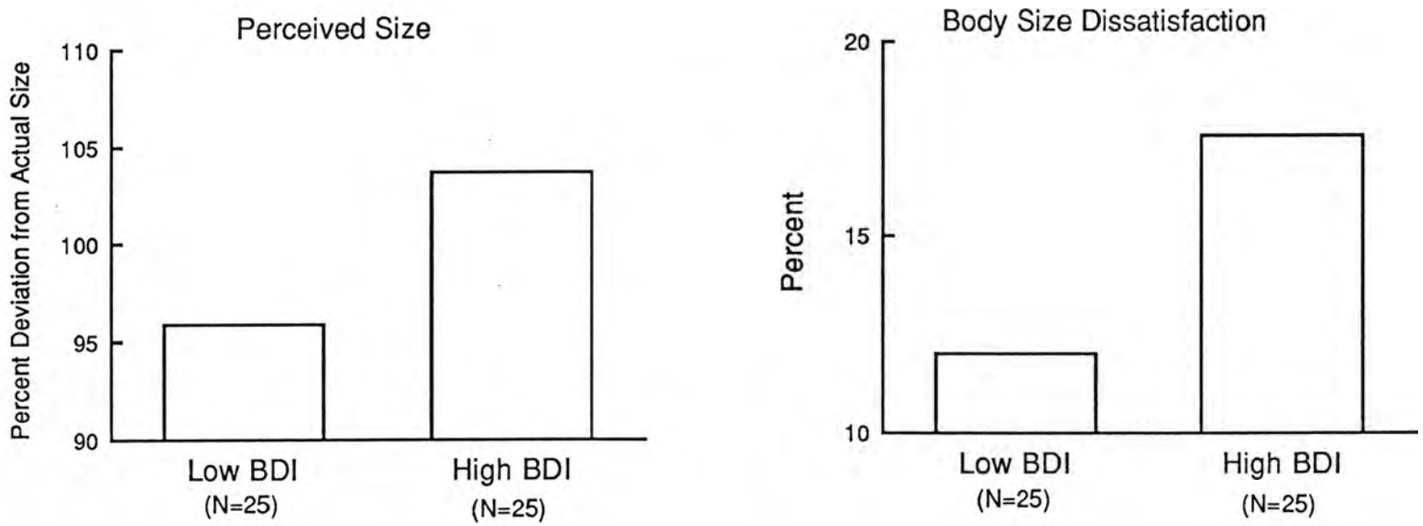


Figure 4.1.2

The relationship between body size perception and mood

would be necessary to measure one factor before and after change on the other; for example, by assessing body size perception before and after a change in mood.

Section 2

Perception of body size, concern with shape and depressed mood

Some patients with eating disorders have been reported to show a disturbance in body image in that they overestimate their body size (eg. Garner et al,1976; Whitehouse et al,1986), prefer a very small body size (eg. Freeman et al,1985a), are markedly dissatisfied with a normal body size (Freeman et al,1985a), and show a high level of concern with their shape (Fairburn and Cooper,1984a), as was reviewed in Chapter 1. However, these disturbances are not confined to women with eating disorders but have also been found among some women in the community. For example, Garfinkel and his colleagues (Garfinkel et al,1978) illustrated a considerable overlap in estimations of body size between patients with an eating disorder and normal young women; and in Chapter 2 it was found that some women in the community show a high level of concern with their shape similar to the high level found among most patients with bulimia nervosa. Thus, disturbances in body size perception and a high level of concern with shape appear to be characteristic of but are not exclusive to the eating disorders.

There have been surprisingly few reports on the relationship between perception of body size and concern with body shape, probably because there has been no satisfactory measure of concern with shape. Given that these two aspects of body image are conceptually related, it is to be expected that a disturbance on one factor would be associated with a disturbance on the other. Body size overestimation has been associated with dissatisfaction with specific body parts as measured by questionnaires (eg. the Body Image Questionnaire, Berscheid et al,1972; and the *Body Dissatisfaction* subscale of the Eating Disorder Inventory, Garner et al,1983) in patients with anorexia nervosa (Garfinkel and Garner,1984) and in patients with bulimia (Whitehouse et al,1986), but no study has investigated a similar relationship among women in the community. There has also been no study of a relationship between aspects of body size perception aside from overestimation (eg. desired size, and body size dissatisfaction in terms of the discrepancy between perceived and desired size) and aspects of concern with shape aside from dissatisfaction with specific body parts (eg. the phenomenal experience of concern with shape with its antecedents and behavioural consequences). An association between concern with shape and disturbances in body size perception among women in general may help to explain why disturbances in body size perception are common among patients with eating disorders but are also found among women in the community.

In Section 1 of this Chapter depressed mood was found to be associated with body size overestimation and tended to be associated with body size dissatisfaction. These findings are consistent with ideas in Beck's cognitive model of depression (Beck,1973), that the self-depreciatory feelings which typically accompany depressed mood may focus on body size and shape. In Chapter 1 it was suggested that depressed mood may be associated with disturbances in

body size perception and concern with shape particularly among women who place high importance on a slim shape.

The general aim of the present study was to investigate further the relationship between body size perception, depressed mood and concern with shape. In Section 1 of this Chapter an image distortion method was used to measure body size perception which showed a satisfactory degree of test re-test reliability. However, there were two problems associated with this method. First, the image displayed on the monitor was not of a high quality. Despite efforts to minimize blurred image edges at wide levels of distortion, the image was nevertheless much less sharply defined when widely distorted compared with when narrowly distorted. Touyz and his colleagues (Touyz et al,1984) used a similar method and illustrated similar problems with a poorly defined and blurred image. Second, projecting an enlarged photograph onto a screen introduced blur and shadow to the image, whereas subsequent pilot studies revealed that reducing a life-size image onto a screen produces a clearer image. Due to the limitations of the image distortion method reported in Section 1 of this Chapter, in the following study body size perception was assessed using a live image of the subject.

The specific aims of this study were:

(1) To examine whether a high level of concern with shape is associated with disturbances in body size perception among women in general;

(2) To test the hypothesis that depressed mood will be associated with body size overestimation and body size dissatisfaction particularly among women who show a high level of concern with their shape.

Subjects

Approximately 300 female undergraduate students, the total number attending two medical science lectures, were asked to complete the Body Shape Questionnaire or BSQ (see Chapter 2). They were also asked to indicate their age, height and weight. The responses of those who weighed within the normal range (±15% MPMW) were examined. Nineteen women scored one standard deviation above the BSQ general population mean reported in Chapter 2 (ie. a BSQ score above 110); and 15 women scored one standard deviation below the general population mean (ie. a BSQ score below 53). These high and low scorers were asked to participate in a *psychoperceptual* experiment. All agreed.

Method used to measure body size perception

The same modified Panasonic video camera described in Section 1 of this Chapter was fitted with an automatic 8mm Iris Lens WVLA8A which maintained a constant level of illumination across all levels of distortion. Voltmeter readings were converted to percentages expressing degree of distortion using the same method described in Section 1. The relationship between image width and voltmeter reading was linear across all levels of distortion and it was therefore unnecessary to

adjust percentages. Image width varied between 50 percent and 220 percent of correct width.

Procedure

Subjects visited the laboratory between two and five weeks after completing the BSQ. They were asked to repeat this questionnaire and to complete the Beck Depression Inventory or BDI (Beck et al,1961). Subjects then estimated their body size and indicated their desired size using the following procedure.

Subjects wore a black leotard and stood in a standardised frontal posture against a white background and were filmed by the video camera from a distance of 4.5m. Their image was displayed on an 18 inch monitor positioned directly above the camera. Image width was placed on its widest or narrowest setting and subjects were asked to:

"Adjust the image so that it corresponds to your actual size"

for estimations of perceived size, and:

"Adjust the image to the size that you would most like to be"

for desired size.[1] Subjects were urged to be as accurate as possible and told that they might move the image width in and out as many times as necessary. There were four trials for each estimation; two with the image initially distorted from wide, and two with the image initially distorted from narrow, in counterbalanced order.

The experimenter and voltmeter were concealed behind a curtain, and the experimenter recorded estimations from the voltmeter. Since the experimenter could not directly see the subject, it was ensured that the subject obeyed the instructions by the experimenter viewing the subject on a second monitor also concealed behind the curtain. Subjects were unaware that they were being watched, and therefore estimations were made in private.[2]

After completing the assessment of body size perception subjects were weighed and their height measured. The entire assessment procedure was designed so that all data were anonymous to preserve confidentiality. Subjects sealed their responses in an unmarked envelope and placed the envelope in a box containing the data of other subjects. Standardised instructions were used throughout.

Results

Subjects

Thirty-four subjects completed the assessment. Two were excluded from data analyses; one because she weighed more than 115 percent MPMW; and one because her BSQ score decreased from one standard deviation above the population mean at the time of the initial screening to an

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1 Full instructions are given in Appendix 22.

2 The reliability of this method of measuring body size perception is reported in Appendix 23.

average score of 83 (see Chapter 2) at the time of visiting the laboratory.

At the time of the testing there was no overlap between the two groups on the BSQ. All subjects in the low BSQ group scored one standard deviation below the general population mean. However, not all subjects in the high BSQ group scored one standard deviation above the mean since several showed a small decrease in their score between the time of the initial screening on the questionnaire and the assessment of body size perception. Nevertheless, all 17 high BSQ scorers included in data analyses showed at least *Mild* concern with their shape (ie. BSQ > 80, see Chapter 2). As expected, the two groups differed markedly on the BSQ (43.1, sd=5.2 versus 119.7, sd=19.6; t=15.5, df=18.5, P<.001).

Relationships between concern with shape and body size perception

For perceived body size the two trials made from a widely distorted image and the two trials made from a narrowly distorted image were combined to produce a mean estimation; and similarly for desired size.

Table 4.2.1 shows that the two groups of women who showed very high or very low levels of concern with their shape also differed in their perception of their body size. The high concern group tended to overestimate their size more, showed a significantly smaller desired size, and were significantly more dissatisfied with their size. These group differences are illustrated in Figure 4.2.1 a and b.

Table 4.2.1
Group differences in perception of body size

	Low BSQ (N=15) $\bar{X}$/sd	High BSQ (N=17) $\bar{X}$/sd	t	df	P
Perceived Size	113.8 14.1	121.8 11.2	1.78	30	.09
Desired Size	104.0 14.2	88.6 8.7	3.75	30	.001
Body Size Dissatisfaction	9.9 12.5	33.2 11.7	5.44	30	.001

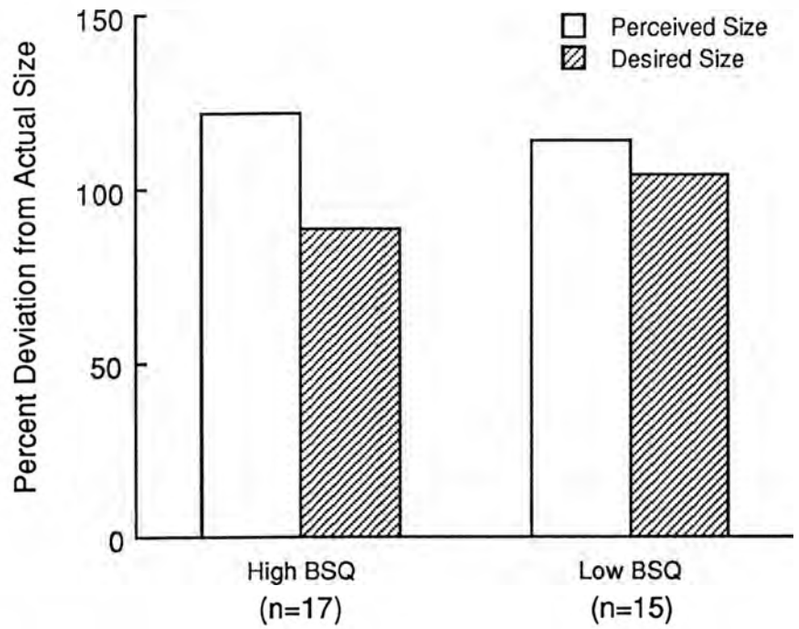

Figure 4.2.1a

The relationship between body size perception and concern with shape: perceived size and desired size

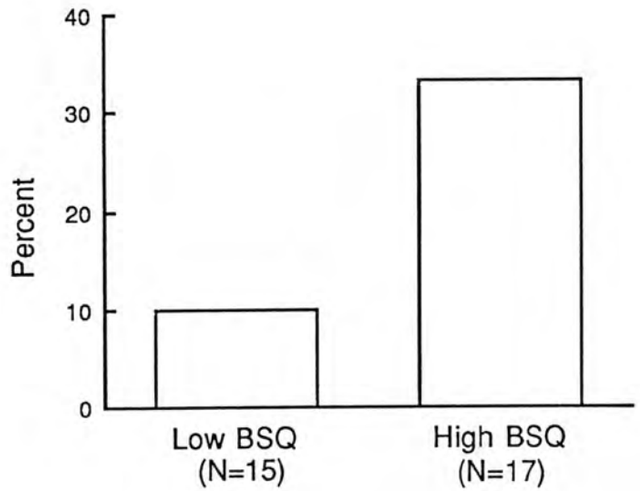

Figure 4.2.1b

The relationship between body size perception and concern with shape:
body size dissatisfaction

Relationships between body size perception and concern with shape were also examined using Spearman's rank correlation coefficient.[3] The results were consistent with group differences in body size perception. For the complete sample of 32 women their score on the BSQ was significantly associated with overestimating body size ($r=.43$, $P<.01$), a small desired size ($r=-.49$, $P<.01$), and a high level of dissatisfaction with body size ($r=.69$, $P<.001$). Examining these relationships for each group separately, Table 4.2.2 shows that the BSQ was more highly related to body size overestimation and body size dissatisfaction for the high BSQ group than for the low BSQ group; but desired size was unrelated to the BSQ for each group separately.

Table 4.2.2
Correlations (Spearman's r) between the BSQ and body size perception

	High BSQ (N=17)		Low BSQ (N=15)	
	r	P	r	P
Perceived size	.33	.10	.27	>.05
Desired size	-.17	>.05	-.07	>.05
Body size dissatisfaction	.36	.08	.16	>.05

Thus, a high level of concern with shape was associated with body size overestimation, body size dissatisfaction and a small desired size.

Sections 1 and 5 of Chapter 3 reported significant associations between a high score on the BSQ and young age, a high weight and depressed mood. Table 4.2.3 shows that in the present study, although the low and high BSQ groups were of similar age, the high BSQ group was significantly more depressed; and despite attempting initially to match the two groups on weight by selecting only subjects who weighed within 15 percent of average weight, the high BSQ group weighed significantly more.

[3] Chosen in preference to Pearson's coefficient since the BSQ scores were bi-modally distributed.

Table 4.2.3
Group comparisons on age, weight and depression

	Low BSQ (N=15) $\bar{X}$ sd	High BSQ (N=17) $\bar{X}$ sd	t	df	P
Age	19.2 1.9	19.5 1.2	0.60	30	>.05
MPMW	94.7 6.4	101.8 7.3	2.94	30	.006
BDI	2.1 1.9	9.4 8.6	3.43	18	.003

Table 4.2.4 shows that depressed mood and weight in turn were associated with body size perception.

Table 4.2.4
Relationships between mood, weight and body size perception

	BDI		MPMW	
	r	P	r	P
Perceived size	.40	.01	.25	.09
Desired size	-.17	>.05	-.29	.06
Dissatis-faction	.43	.01	.44	.01

It was therefore possible that the relationships between concern with shape and body size perception may have been mediated by the relationships between depression and weight with body size perception. Further analyses were therefore conducted to examine the relationship

between body size perception and concern with shape controlling for weight and level of depression.

In the first analysis, subjects with different levels of concern with shape were matched on level of depression. The eight subjects in the low BSQ group who scored the highest on the BDI were compared with the eight subjects in the high BSQ group who scored the lowest on the BDI. Using the Mann-Whitney U-test, Table 4.2.5 shows that the two groups showed a similar level of depression and continued to show very different levels of concern with their shape, as was required for the analysis. (The two groups were still significantly different in terms of weight.) Similar to results based on the complete samples, compared with the low concern group, the high concern group continued to show a smaller desired size and were more dissatisfied with their size, although they no longer overestimated their size more.

Table 4.2.5
Group comparisons between subjects matched on level of depression

	Low BSQ (N=8) $\bar{X}$/sd $\bar{X}$Ranks	High BSQ (N=8) $\bar{X}$/sd $\bar{X}$Ranks	Z	P
BDI	3.5	3.0		
	1.5	2.2		
	9.25	7.75	0.64	>.05
BSQ	42.4	108.9		
	4.9	12.4		
	4.50	12.50	3.37	.001
MPMW	90.9	102.2		
	3.8	5.5		
	4.75	12.25	3.15	.01
Perceived	111.6	116.3		
Size	11.4	9.0		
	7.56	9.44	0.79	>.05
Desired	105.1	86.3		
Size	15.6	8.3		
	11.25	5.75	2.31	.02
Body size	6.5	29.9		
Dissatisfaction	10.5	9.2		
	5.00	12.00	2.94	.01

In the second analysis subjects with different levels of concern with their shape were matched on weight. The eight subjects in the low BSQ group who weighed the most were compared with the eight subjects in the high BSQ group who weighed the least. Table 4.2.6 shows that using the Mann-Whitney U-test, the two groups were similar in terms of weight and continued to show different levels of concern with their shape, as was required for the analysis. (The two groups still differed on level of depression.) Similar to comparisons based on the complete samples, compared with the low concern group, the high concern group showed a significantly smaller desired size and were significantly more dissatisfied with their size, although they did not overestimate their size more.

Table 4.2.6
Group comparisons between subjects matched on weight

	Low BSQ (N=8) Mean Ranks $\bar{X}$/sd	High BSQ (N=8) Mean Ranks $\bar{X}$/sd	Z	P
MPMW	9.88 99.4 4.8	7.13 96.0 5.3	1.16	>.05
BSQ	4.50 44.3 5.6	12.50 115.0 14.2	3.36	.001
BDI	5.81 1.4 2.1	11.19 9.4 8.3	2.30	.03
Perceived Size	7.88 118.2 15.6	9.13 119.5 11.6	0.53	>.05
Desired Size	11.75 106.1 13.5	5.25 88.8 7.3	2.73	.01
Dissatis-faction	6.00 12.1 14.5	11.00 30.7 12.6	2.10	.04

It was not possible to match subjects on both weight and level of depression. However, weight and BDI scores were unrelated (Spearman's r=.08, P>.05).

In the third analysis the two groups with different levels of concern with shape were compared on measures of body size perception using analysis of covariance to control for differences in weight and mood. Table 4.2.7 shows that allowing for weight and level of depression, the two groups estimated their size similarly, but the high concern group showed a significantly smaller desired size and were significantly more dissatisfied with their size.

Table 4.2.7
Body size perception in relation to concern with shape, controlling for Weight and level of depression

	Low BSQ Group (N=15) Adjusted $\bar{x}$	High BSQ Group (N=17) Adjusted $\bar{x}$	F	df	P
Perceived Size	118.1	117.6	0.01	1,28	>.05
Desired Size	104.7	87.9	9.11	1,28	<.01
Body size Dissatisfaction	13.4	29.7	8.25	1,28	<.01

Together, these results suggest that a high level of concern with shape is associated with disturbances in body size perception, in particular with a small desired size and dissatisfaction with body size; and that findings for desired size and dissatisfaction with body size are independent of mood and weight.

The relationship between depressed mood and body size perception
In the context of concern with shape

The hypothesis that depressed mood will be associated with body size overestimation and body size dissatisfaction particularly among women who show a high level of concern with their shape, was tested by examining the relationship between depressed mood and body size perception for the high and low BSQ groups separately. Results using Spearman's Rank correlation coefficient are shown in Table 4.2.8. For the high BSQ group there was a significant association between depressed mood and body size overestimation; and there tended to be an association between depressed mood and body size dissatisfaction. For the low BSQ group there was no association between body size overestimation and body size dissatisfaction with depressed mood. As in Section 1 of this Chapter, there was no association between depressed mood and desired size for either group.

Table 4.2.8
Relationships between depressed mood and body size perception in
The context of concern with shape

	Low BSQ Group (N=15)		High BSQ Group (N=17)	
	r	P	r	P
Perceived Size	-.10	>.05	.48	.03
Desired Size	.18	>.05	.24	>.05
Dissatis-faction	-.24	>.05	.31	>.05

Thus, prediction 2 was supported: compared with women who showed little concern with their shape, among those who showed a high level of concern depressed mood was more highly associated with body size overestimation and body size dissatisfaction.

Discussion

This study investigated relationships between concern with shape and perception of body size, and tested the hypothesis that depressed mood may be associated with disturbances in body size perception particularly among women who show a high level of concern with their shape. Young women who showed a very high or very low level of such concern estimated their body size and indicated their desired size. A limitation of the study was that findings were based on two small samples of women, and probably for this reason some of the trends did not reach statistical significance and should be interpreted with caution.

A high level of concern with shape was associated with disturbances in body size perception. For desired size and body size dissatisfaction these associations appeared to be independent of body weight and level of depression; although the relationship between concern with shape and body size overestimation appeared to be mediated by level of depression and weight.

Findings regarding the association between depressed mood, body size overestimation and body size dissatisfaction replicated the associations reported in Section 1 of this Chapter and supported the hypothesis that the relationship between depressed mood and disturbances in body

size perception may be mediated by a high level of concern with shape. On a more cautious note, although the association between level of depression and body size dissatisfaction was much stronger in the high BSQ group, this relationship was not statistically significant, probably due to the small sample size and the range of estimations of body size.

To conclude, both concern with shape and mood appear to be important factors predicting perception of body size among women in the community. One could predict from the associations reported that patients with bulimia nervosa, who have both marked concerns about body shape and depressed mood, would show disturbances in body size perception. Indeed, there is some preliminary evidence to support such a prediction, but it is difficult to interpret the findings because of methodological problems of the research.

Section 3

Changes in body size perception and mood: a mood induction study

Introduction

In Sections 1 and 2 of this Chapter body size overestimation and body size dissatisfaction were found to be associated with low mood. These findings are consistent with studies of body size perception in patients with eating disorders. Using similar methods of measuring perception of body size, body size overestimation has been associated with depression in patients with anorexia nervosa (Garfinkel and Garner,1984), and body size dissatisfaction has been associated with depression in patients with bulimia (Freeman et al,1983). There has been no published report on the relationship between mood and desired size, but earlier in this Chapter desired size was found to unrelated to mood.

The observed relationships between body size perception and mood reported in Sections 1 and 2 of this Chapter were correlational and did not indicate direction of causality. It is possible that if shape is important, as it appears to be to most women (Rodin et al,1984), but particularly to patients with eating disorders (Fairburn,1985), then overestimating body size and dissatisfaction with body size may exacerbate a low mood. Rodin et al (1984) suggested that dissatisfaction with body shape may cause depression among women, but provided no empirical evidence to support this contention. It is equally conceivable that if a slim shape is important, then the self-depreciatory cognitions which typically accompany depressed mood may focus on body size and shape and may lead to overestimating body size and dissatisfaction with body size. The latter hypothesis is consistent with ideas in Beck's cognitive model of depression. Beck (1973) observed that the distorted thinking which characterises depression commonly extends to concern with physical appearance, particularly among women. Beck stated that a depressed patient often becomes preoccupied with the thought of getting fat and may even believe that they have grown fat.

One way of testing the hypothesis that depressed mood may exacerbate disturbances in body size perception is to assess body size perception before and after the onset of low mood. Such a study would be difficult to conduct naturalistically since it would necessitate identifying and testing women before the onset of depression and then re-testing them after they became depressed. Therefore, a mood induction study was conducted in the laboratory as a very stringent test of the hypothesis that low mood may lead to disturbances in body size perception. Four predictions were made:

(1) Inducing low mood will lead to an increase in perceived body size;

(2) Inducing low mood will lead to an increase in body size dissatisfaction;

(3) Compared with women who show little concern with their body shape, among women who show higher concern, the induction of low mood will exert a greater effect on body size overestimation and body size dissatisfaction;

(4) Desired size will be unaffected by a change in mood.

Method

Subjects

Eighty-five female undergraduate students from two undergraduate colleges were approached and asked to participate in a study *of particular relevance to women.* The women were given no further details about the study until after completing the assessments. All agreed.[1]

Cards used for the mood induction procedure

Two sets of 25 cards were assembled, and each card displayed a self-referent statement. One set had statements with miserable connotations, eg. *I feel ashamed of things I've done;* and the other set had pleasant connotations, eg. *I feel that I am a nice person.* The miserable statements were adapted from a selection of published phrases (Williams,1984); and the statements with pleasant connotations were invented by the author. All 50 statements are presented in Appendix 24.

Procedure

The initial assessment

First, subjects completed the BDI, which indicated level of mood over the previous month. Next, subjects estimated their body size and indicated their desired size using the image distortion method described in Section 2 of this Chapter. The subjects then experienced a mood induction procedure.

The mood induction procedure

The mood induction procedure (MIP) began with subjects indicating their current level of mood on a visual analogue scale (Appendix 25). Following this, subjects were told that they were to view a series of cards displaying written statements and that they were to try very hard to capture the mood of the statements. The difficult nature of the task was emphasised and subjects were encouraged to try hard to succeed.

Subjects were then unknowingly assigned to a low mood or control group (in counterbalanced order). The experimenter presented 25 cards individually for the duration of 10 seconds each. Subjects in the low mood group viewed the cards with miserable connotations; and subjects in the

[1] These women are also reported in Chapter 2.

control group viewed cards with pleasant connotations. After trying to capture the mood of the statements subjects completed five open-ended self-referent statements. The low mood group completed statements with negative connotations, eg. *I feel a failure because....;* and the control group completed statements with positive connotations, eg. *I feel a success because....* The complete sets of open-ended statements are presented in Appendix 26. This additional method of mood induction was devised specifically for this study.[2]

Immediately following the MIP, subjects completed a second visual analogue scale identical to the first, indicating their current level of mood.

The second assessment

After the MIP subjects again estimated their body size and indicated their desired size, and the height and weight of subjects were recorded. Finally, subjects completed two assessments of concern with body shape:

(1) A four-point rating scale measuring the importance of being slim (Appendix 7);

(2) The Body Shape Questionnaire or BSQ (see Chapter 2).

Confidentiality was stressed throughout the experiment, and responses were anonymous. Standardised instructions were used.

Results

Subjects

Eighty-two students from the total sample of 85 successfully completed the experiment. Three were excluded from data analyses: one because of a technical problem with the body size estimation apparatus; one subject was unable to complete the procedure due to a broken arm; and one subject refused to wear a leotard in order to estimate her body size. Forty-one subjects remained in the low mood group, and 41 in the control group.

Changes in mood

Table 4.2.1 shows that the MIP had the desired effect on mood, as measured by the visual analogue scales. At the first assessment the two groups showed similar levels of mood. The low mood group was significantly more depressed after the MIP compared with before; and after the MIP was significantly more depressed than the control group. The control group also showed a significant change in mood and was less depressed after the MIP compared with before.

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[2] Emphasising negative self-depreciatory statements seemed particularly relevant, given the self-depreciatory thoughts which typically accompany depressed mood (Beck,1973).

Table 4.3.1
Changes in mood

	Before the MIP $\bar{X}$/sd	After the MIP $\bar{X}$/sd	t	df	P
Low mood group (N=41)	2.35 2.13	4.59 2.43	6.75	40	.001
Control group (N=41)	2.73 2.51	1.88 2.34	4.39	40	.001

	Low mood Group (N=41) $\bar{X}$/sd	Control Group (N=41) $\bar{X}$/sd	t	df	P
Before MIP	2.35 2.13	2.73 2.51	0.75	80	>.05
After MIP	4.59 2.43	1.88 2.34	5.14	80	.001

Despite significant changes in mood, the MIP was not successful for all subjects. Four women in the low mood group did not report feeling more depressed following the MIP compared with before; and five women in the control group reported a slightly lower mood following the MIP. These subjects were excluded from subsequent analyses. Mood changes based on the remaining subjects are shown in Table 4.3.2, and are illustrated in Figure 4.3.1.

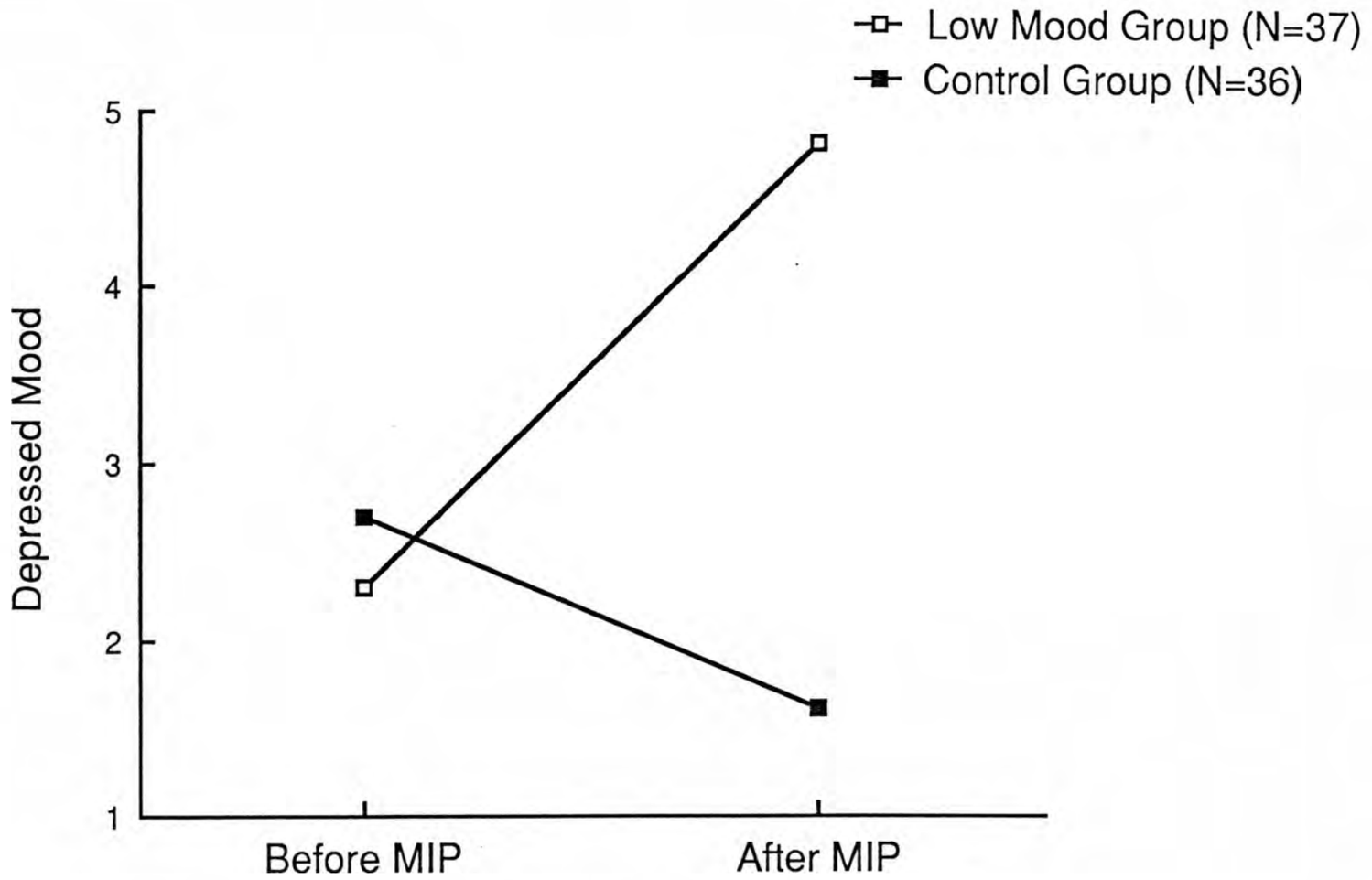

Figure 4.3.1

Changes in mood following the mood induction procedure (MIP)

Table 4.3.2
Change in mood: subjects for whom the MIP was successful

	Before MIP $\bar{X}$/sd	After MIP $\bar{X}$/sd	t	df	P
Low mood group (N=37)	2.29 2.16	4.79 2.41	7.32	36	.001
Control group (N=36)	2.71 2.47	1.64 2.06	5.65	35	.001
	Low mood Group (N=37)	Control Group (N=36)	t	df	P
Before MIP	2.29 2.16	2.71 2.47	0.78	71	>.05
After MIP	4.79 2.41	1.64 2.06	5.98	71	.001

Thus, the MIP successfully induced a low mood state among subjects in the low mood condition.

Group comparisons at the initial assessment

Table 4.3.3 shows that at the initial assessment the groups did not differ on demographic variables, mood and perception of body size, although the low mood group tended to overestimate their size somewhat more. All subjects rated being slim as at least *Slightly Important;* and the two groups considered being slim to be equally important (χ^2=2.33, df=2, P>.05).

Table 4.3.3
Group differences before the mood induction procedure

	Low mood Group (N=37) $\bar{X}$/sd sd	Control Group (N=36) $\bar{X}$/sd sd	t	df	P
Age	19.9 1.1	20.0 1.1	0.32	71	>.05
MPMW	100.3 10.2	99.8 11.5	0.18	71	>.05
BDI	6.9 5.4	8.1 5.9	0.88	71	>.05
Perceived Size	107.1 16.5	103.2 12.1	1.13	71	>.05
Desired Size	91.2 10.8	90.7 12.4	0.19	71	>.05
Body size Dissatisfaction	15.9 13.4	12.6 14.6	1.01	71	>.05

Thus, before the MIP the two groups were similar on the measures taken.

Body size perception after the MIP

For the low mood group, perceived body size significantly increased following the induction of low mood (t=3.43, df=36, P<.002). For the control group body size perception also increased somewhat following the MIP (t=2.08, df=35, P<.05). Table 4.3.4 shows that, contrary to expectation, after the MIP the low mood group did not overestimate their size significantly more compared with the control group. A measure of change in perceived size was derived by subtracting perceived size before the MIP from perceived size after the MIP. Table 4.3.4 shows that, although the low mood group showed a greater increase in perceived size compared with the control group, the size of the increase was not significantly different between the two groups. Changes in perceived size for the two groups are illustrated in Figure 4.3.2.

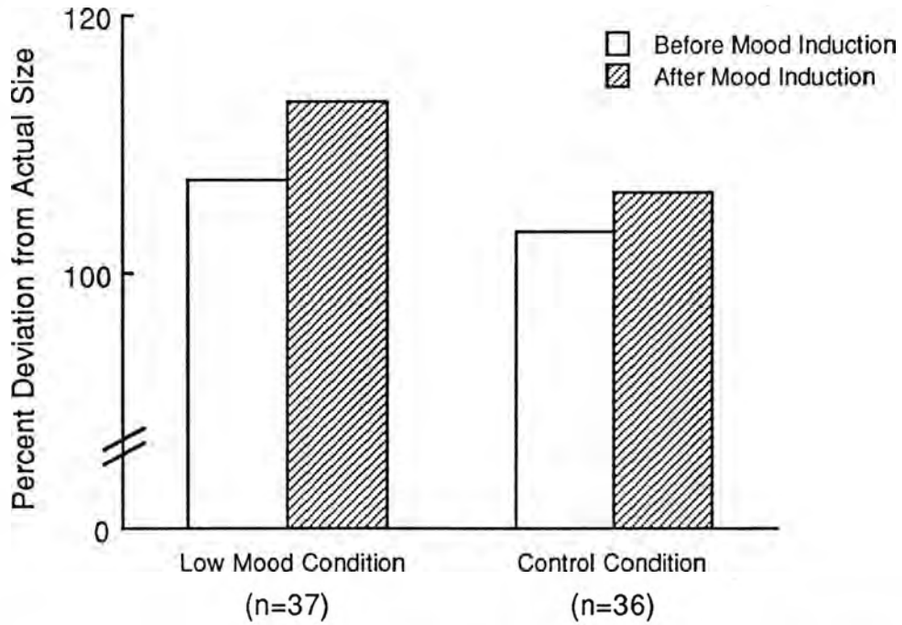

Figure 4.3.2

Change in perceived size following the mood induction procedure

For body size dissatisfaction the results were as predicted. Subjects in the low mood group were more dissatisfied with their body size after the MIP compared with before (t=3.19, df=36, P<.003); and subjects in the control group were equally dissatisfied before and after the MIP (t=0.08, df=35, P>.05). Table 4.3.4 shows that following the MIP the low mood group was significantly more dissatisfied with their body size compared with the control group. A measure of change in body size dissatisfaction was derived by subtracting dissatisfaction before the MIP from dissatisfaction after the MIP. Table 4.3.4 shows that body size dissatisfaction increased significantly more for the low mood group compared with the control group. Changes in body size dissatisfaction for the two groups are illustrated in Figure 4.3.3.

The desired size of the low mood group was unaffected by the MIP (t=0.26, df=36, P>.05), as predicted. In contrast, the desired size of the control group significantly increased following mood elevation (t=2.60, df=35, P<.02). Table 4.3.4 shows that although the desired size of the two groups was not significantly different after the MIP, the control group showed a significantly greater increase in their desired size. Changes in desired size are illustrated in figure 4.3.4.

Table 4.3.4
Group differences after the mood induction procedure

	Low mood Group (N=37) $\bar{X}$/sd	Control Group (N=36) $\bar{X}$/sd	t	df	P
Perceived Size	113.3 22.7	106.2 15.0	1.58	62.6	>.05
Change in Perceived size	6.2 11.0	3.0 8.5	1.41	71	>.05
Desired size	90.9 12.0	93.5 14.1	0.83	71	>.05
Change in Desired Size	-.26 6.14	2.82 6.50	2.08	71	.05
Body size Dissatisfaction	22.36 20.12	12.70 16.31	2.25	71	.03
Change in Dissatisfaction	6.48 12.37	0.14 10.03	2.40	71	.02

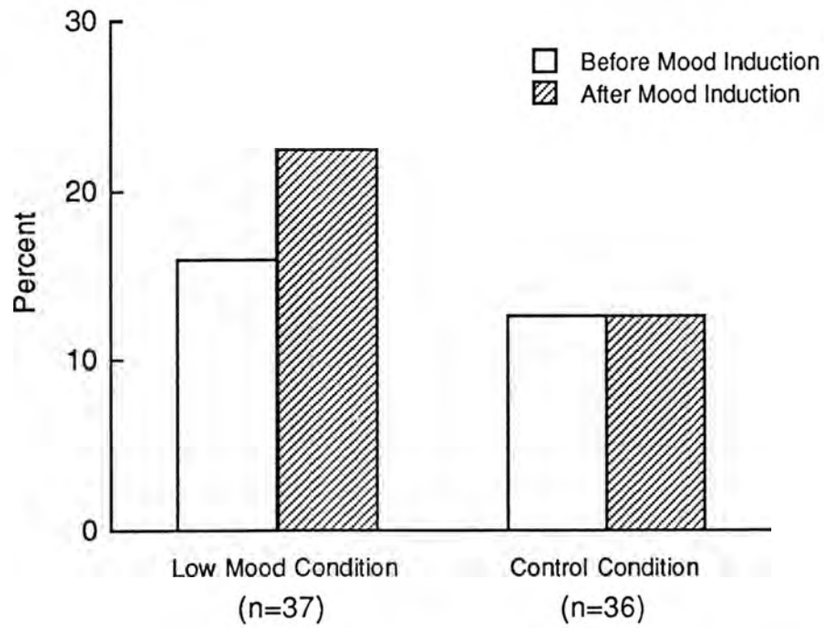

Figure 4.3.3

Change in body size dissatisfaction following the mood induction procedure

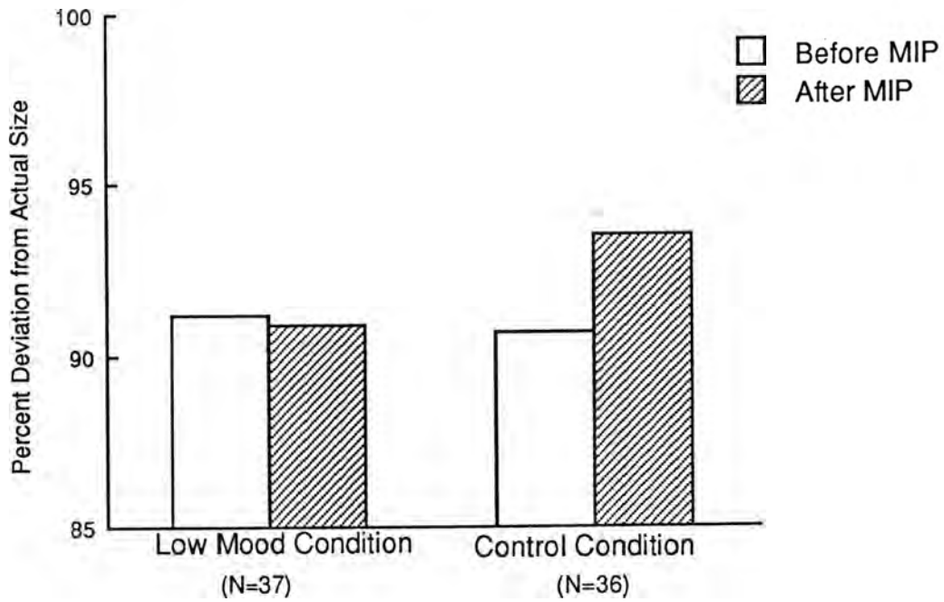

Figure 4.3.4

Change in desired size following the mood induction procedure

Thus, compared with the control group, after the MIP the low mood group tended to overestimate their size more and tended to show a greater increase in body size overestimation; and were significantly more dissatisfied with their body size and showed a significantly greater increase in body size dissatisfaction.

Concern with body shape

The data were then examined in relation to concern with shape as measured by the BSQ. Subjects in the low mood group were divided into those who showed *No Concern* (ie. BSQ $\leq$80; N=19), and those who showed at least *Mild Concern* (ie. BSQ >80; N=18), based on the categorisation described in Chapter 2. Table 4.3.5 shows that these two groups which differed in their level of concern with their shape showed similar estimations of perceived size, desired size and body size dissatisfaction before and after the MIP. However, the group with higher concern with their shape showed a significantly greater increase in perceived size, tended to show a greater increase in desired size, and showed a non-significantly greater increase in body size dissatisfaction. Changes in perceived size and body size dissatisfaction are illustrated in Figures 4.3.5 and 4.3.6.

Table 4.3.5
Body size perception in relation to concern with body shape

	No Concern (N=19)	≥Mild Concern (N=18)	t	df	P
Age	19.9 1.2	19.9 1.0	0.16	35	>.05
MPMW	96.7 11.4	104.1 7.2	2.33	35	.03
BSQ	62.9 14.3	106.8 19.0	7.96	35	.001
BDI	6.3 6.3	7.6 4.4	0.72	35	>.05
Perceived Size Before MIP	106.2 16.5	108.0 16.9	0.33	35	>.05
Perceived Size After MIP	108.2 22.3	118.7 22.3	1.43	35	>.05
Change in Perceived size	2.0 10.4	10.7 10.1	2.59	35	.014
Desired Size Before MIP	92.9 9.3	89.4 12.2	0.96	35	>.05
Desired Size After MIP	90.9 12.3	90.9 12.0	0.001	35	>.05
Change in Desired Size	-1.9 5.8	1.5 6.2	1.76	35	<.09
Dissatisfaction Before MIP	13.3 14.5	18.6 11.9	1.20	35	>.05
Dissatisfaction After MIP	17.3 21.4	27.8 17.6	1.62	35	>.05
Change in Dissatisfaction	3.9 13.1	9.2 11.3	1.30	35	>.05

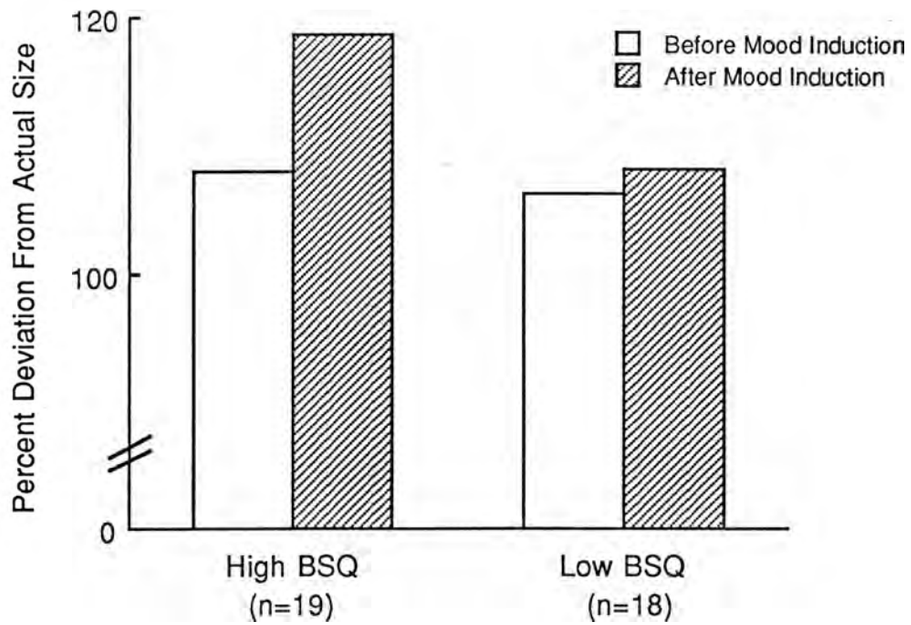

Figure 4.3.5
Change in perceived size in relation to concern with shape following the induction of low mood

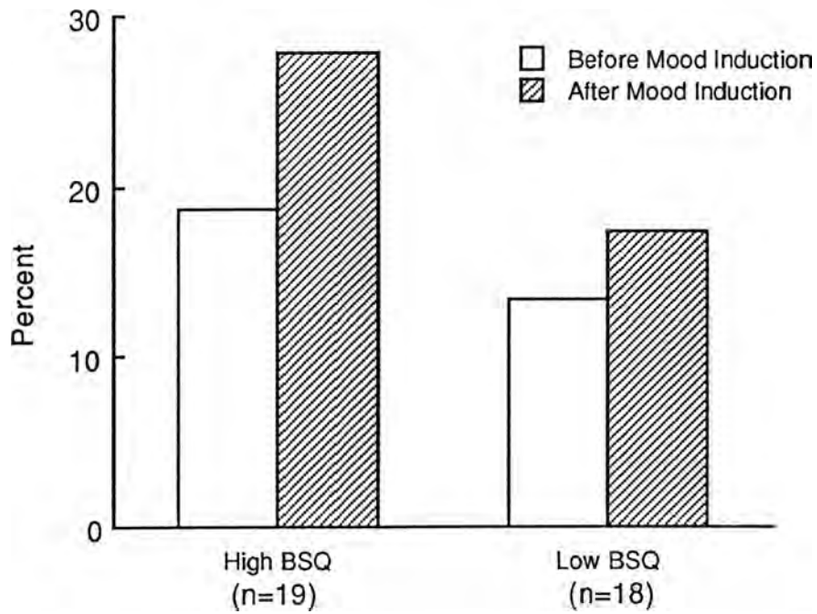

Figure 4.3.6

Change in body size dissatisfaction in relation to concern with shape following the induction of low mood

Thus, compared with subjects with no concern with their shape, among subjects who were concerned, the induction of low mood had a greater effect on body size perception. However, Table 4.3.5 shows that the high BSQ group weighed significantly more than the low BSQ group. This was because weight was significantly related to the BSQ ($r=.37$, $P<.001$). Weight was also related to perceived size ($r=.25$, $P<.02$) and body size dissatisfaction ($r=.33$, $P<.001$), but was unrelated to desired size ($r=-.09$, $P>.05$). It was therefore possible that subjects in the high BSQ group showed a greater increase in body size overestimation and tended to show a greater increase in body size dissatisfaction because they weighed more and not because they showed greater concern with their shape. Two further analyses showed that this was not the case. First, weight was unrelated to changes in perceived size ($r=.07$, $P>.05$) and body size dissatisfaction ($r=.09$, $P>.05$). Second, Table 4.3.6 shows that controlling for differences in weight using analysis of covariance, subjects in the high BSQ group still showed a significantly greater increase in perceived size, and still tended to show a greater increase in body size dissatisfaction.

Table 4.3.6
Changes in body size perception in relation to concern with shape, Controlling for weight

	No Concern Adjusted $\bar{X}$ (N=19)	≥Mild Concern Adjusted $\bar{X}$ (N=18)	F	df	P
Change in Perceived size	2.1	10.5	5.24	1,34	<.03
Change in Body size Dissatisfaction	5.0	8.1	0.53	1,34	>.05

Thus, compared with subjects who showed no concern with their shape, for subjects who showed at least mild concern, low mood led to a significantly greater increase in body size overestimation and tended to lead to a greater increase in body size dissatisfaction.

Discussion

This study tested the hypothesis that negative self-evaluation as a symptom of depressed mood may lead to body size overestimation and body size dissatisfaction. A group of normal young women estimated their body size before and after a mood induction procedure (MIP). The MIP was effective in that mood was lowered or elevated for the majority of subjects. Subjects in the

low mood condition reported feeling more despondent after the MIP compared with before; and after the MIP felt significantly more despondent than subjects in the control condition. Subjects in the control group reported a more positive mood after the MIP compared with before, which was unexpected since the procedure was not designed to change their mood. Pleasant cards and statements were used in preference to neutral ones to minimize the possibility of subjects in the control condition growing bored during the MIP, which in turn may have induced a negative mood.

As predicted, perceived body size increased following the induction of low mood. This finding was not simply a function of response expectation ie. for subjects in the low mood group perceived body size did not increase simply because these subjects expected to see themselves as larger, since perceived size also increased for subjects in the control group. The latter finding was unexpected, and suggests that estimations increased to some extent simply as a function of re-testing. Compared with the control group, subjects in the low mood group tended to show a greater increase in perceived size, which was consistent with the hypothesis that body size overestimation may arise as one manifestation of general self-depreciation. However, compared with the control group, the low mood group did not show a significantly greater increase in perceived size, and this lack of statistical significance may have been because the low mood group overestimated their size more before the MIP. This greater overestimation meant that there was less potential within the constraints of the level of distortion produced by the equipment for their estimations to increase. Alternatively, the lack of statistical significance may have been due to the large range in estimations which was at least partly attributable to problems with the method used to measure body size perception (discussed in Appendix 23).

The prediction that body size dissatisfaction would increase with depressed mood was supported. Dissatisfaction significantly increased following the induction of low mood, but was unchanged by the induction of a positive mood. These findings supported the hypothesis that the feelings of self-depreciation which typically accompany depressed mood may focus on perception of body size and exacerbate body size dissatisfaction.

Desired size was unaffected by the induction of low mood, as was predicted; but inducing a positive mood unexpectedly led to an increase in desired size. This suggests that desired size may increase but not decrease in relation to base-line level of mood. Before the MIP 78 percent of the women wished to be slimmer that their perceived size. Feeling miserable did not change this desire, but did not create a desire to be even thinner. The increase in desired size which accompanied the positive mood state suggests that when a woman feels happy a slim shape may be less important than during a neutral or negative mood state.

Changes in body size perception in relation to concern with shape provided partial support for the prediction that the extent of change in body size perception following low mood would be related to the level of concern with shape. Following the induction of low mood, compared with women who showed no concern with their shape, those who showed at least mild concern

showed a greater increase in perceived size and tended to show a greater increase in body size dissatisfaction, as predicted. However, contrary to prediction, compared with the group with no concern with their shape, after the MIP the mild concern group did not overestimate their body size more and were not more dissatisfied with their size. It is possible that the level of concern with shape shown by the mild concern group was insufficient to significantly affect body size perception during a low mood. It had been hoped to induce a negative mood state among subjects with very high or very low levels of concern with their shape and compare changes in body size perception. However, it was not possible to match subjects who showed markedly different levels of concern with shape on initial level of mood, perceived size and body size dissatisfaction. This was due to the association between concern with shape and these factors as described in Section 2 of this Chapter. Therefore, in view of initial group differences in mood and body size perception, it would be difficult to interpret the effect of mood on body size perception in relation to differences in concern with shape. Although one weakness of the present study was that the high and low concern groups did not markedly differ on the level of concern, one strength of the study was that the two groups were similar in level of depression and body size perception before the MIP.

The associations between change in mood and change in body size perception were studied under artificial conditions and conclusions based on the findings must therefore be regarded as tentative. The changes in mood were not great. Nevertheless, since changes in body size perception were observed in relation to small changes in mood it would appear that the association between body size perception and mood is quite robust.

To conclude, findings from this study provided partial support for the hypothesis that depressed mood may exacerbate disturbances in body size perception, particularly among women for whom shape is important. Compared with a positive mood state, low mood tended to lead to greater body size overestimation and led to greater body size dissatisfaction; and compared with subjects who showed no concern with their shape, low mood had a greater effect on body size perception among subjects who were concerned with their shape. The findings from this mood induction study based on women in the community have important implications for disturbances in body size perception found among patients with eating disorders. It is possible that the depressive symptoms which characterise these patients (Eckert et al,1982; Cooper and Fairburn,1986) may exacerbate the disturbances in body size perception which have been reported among these patients. Furthermore, the improvement in mood which has been found to accompany an improvement in disturbed eating behaviour during treatment for an eating disorder (Eckert et al,1982; Fairburn et al,1985) may be associated with an improvement in disturbances in body size perception. The suggestion that changes in mood and changes in body size perception may be associated among patients with eating disorders must be regarded as tentative, since it is possible that the mechanisms which give rise to disturbances in body size perception may be different for women in the community and women with eating disorders.