Eur Arch Psychiatr Neurol Sci (1988) 237:200–208

European Archives of Psychiatry and Neurological Sciences

© Springer-Verlag 1988

Anorexia Nervosa in Greek and Turkish Adolescents

M. M. Fichter, M. Elton, L. Sourdi, S. Weyerer, and G. Koptagel-Ilal

Psychiatrische Klinik der Universität München, Psychiatrische Klinik und Poliklinik, Nussbaumstrasse 7, D-8000 München 2, und Psychosomatische Klinik Roseneck, D-8210 Prien, Federal Republic of Germany

Summary. Five samples of adolescents were assessed in three countries: (1) 867 Greek pupils in Munich (Germany), (2) 2,700 Greek pupils in Veria (Greece), (3) 567 girls in Ioannina (Greece), (4) 2,783 adolescents in Istanbul (Turkey), and (5) 157 adolescents in Upper Bavaria (Germany). A two-stage procedure was used for samples one, two and four using the Anorexia Nervosa Inventory for Self-rating (ANIS) for screening and a standardized interview (Structured Interview for Anorexia Nervosa and Bulimia) for personal exploration of possible cases and final case identification. Results of all samples were compared. Greek girls in Germany scored higher than Greek boys in Germany and Greek boys and girls in Germany scored lower than Greek girls in Veria in the ANIS factors figure consciousness, insufficiency, anancasm, negative effect of meals and bulimia in practically all age groups. The frequency distribution of the ANIS main factor figure consciousness was the same for both Greek samples in Greece, while the Turkish sample and the Greek sample in Munich had significantly lower scores. In the second stage the prevalence rates for anorexia nervosa according to Feighner criteria (modified for the purpose of a field study) were: 1.10% for Greek girls in Munich, 0.41% for Greek girls in Veria and 0.35% for Greeks in Ioannina. Thus, while Greek girls in Germany had lower scores in ANIS factors and other self-ratings (General Health Questionnaire) the actual rate of anorexic syndromes was highest among Greek girls in Munich. Socio-cultural influences and selection factors are discussed.

Key words: Anorexia nervosa – Epidemiology

Introduction

Large Turkish and Greek populations of guest workers, mainly from Mediterranean countries, migrated to West Germany in the 1960s and 1970s to get jobs predominantly as unskilled workers. Now the next generation has been partially raised; it was born to a large extent in Germany and is now mainly in childhood or adolescence. These guest workers and their families were exposed to considerable changes in their social and cultural environment. Although they tended to live close to other guest worker families, they had to learn a new language, conform to new standards and accept attitudes and cultural and moral values which differed from those in their home country. In Germany they may have been exposed to the Western ideals of body slimness and figure consciousness more than they would have been in their home country. This can influence the prevalence of eating disorders such as anorexia nervosa.

The hypothesis has been advanced that acculturation may lead to crises of identify and feelings of strangeness (Floru 1975; Frießem 1975, 1978; Oppler 1956; Müller 1975; Medianos et al. 1981). The present study was concerned with samples of the offspring of guest workers of Mediterranean countries in Germany which have been exposed to this process of acculturation. General mental disturbances, as measured in the General Health Questionnaire by Goldberg (1972), for Turkish and Greek adolescents with a varying degree of acculturation stress have been published elsewhere (Fichter et al. 1988). Attitudes towards physical appearance, figure consciousness, body weight and disturbances in eating behaviour in these adolescent samples are considered in the present work.

Offprint requests to: M. M. Fichter

Method

Samples. 1. Greek adolescents in Munich: almost all Greek pupils in and around Munich attended special Greek schools at the time of the study. This facilitated the sampling procedure. In total 867 Greek adolescent pupils were assessed in Munich (453 girls and 414 boys). The pupils attended one of two Gym-

nasium in Munich or a Gymnasium or Lyzeum (high school) in the suburban town of Dachau close to Munich. The screening of the sample took place in July 1979. According to the statistical department of the Town Hall, there were 1,202 Greek adolescents aged 14 to 18 years in Munich and Dachau in 1979. Considering that 9 years of school were obligatory, the sample was practically complete for the 14- to 15-year-old adolescents. For the older age group (16 to 19 years) this was not the case since quite a few Greek adolescents did not proceed from Gymnasium to Lyzeum but went to technical colleges or were not working at all.

2. Greek adolescents in Veria (Greece): 2,700 Greek pupils were screened in the provincial town of Veria in Northern Greece (1,420 girls and 1,280 boys). The screening took place from September to November 1980. The pupils attended one of five Gymnasium or one of four Lyzeum in the provincial town of Veria. This constituted practically the total school population aged 13–18 years of this provincial town. In total 94.8% of all pupils in the Gymnasium or Lyzeum in Veria were screened. The total number of pupils in the year 1981/82 was 2,851; 151 pupils were not screened; most of them were absent due to the school's generous handling of the post-vacation time. Only an estimated 40 pupils (1.4%) were absent because of illness of which none was known by the teachers to be caused by anorexia nervosa.

3. A sample of 567 self-selected girls attending Gymnasium or Lyzeum in the provincial Greek town of Ioannina was assessed in 1979. The sample was not representative for the total school population of this town. However, it supplied additional data concerning Greek pupils in Greece.

The study in the Greek samples was conducted with permission from the Greek Department of Education[1]. Female pupils in Munich were interviewed either in school or at their parent's home, and in Veria they were all interviewed in school. Interviews in Munich were conducted in July 1979, in Ioannina in October 1979 and in Veria in October 1980. For practical reasons there was a delay of 6 months between screening and interview stage in the Munich sample. In Veria the interviews were conducted a few days after the screening.

4. In Istanbul, Turkey, 2,783 pupils were assessed (1,588 girls and 1,195 boys) in 1980. After obtaining permission from the Turkish Department of Education, pupils were screened in three government sponsored schools (Davutpasa Lisesi, Rüstu Uzel meslekkiz Lisesi, Levent Lisesi) lower and middle social class) and two private schools (Sisli Terraki Lisesi, Robertkolegi upper class) in Istanbul. The screening was performed with the assistance of the Cerrahpasa-University Hospital Istanbul (G. K.-I.). The screening was conducted within each class, where instructions concerning the questionnaire were given. The school types differed widely with respect to the percentage of students accepted at University which in the government schools was 9%, 28% and 35%, and in the private schools 79% and 85%.

5. Since permission could not be obtained to study German pupils in schools in Bavaria data from the Upper Bavarian study (Fichter et al., in press), which had reassessed a random community sample of 15- to 19-year-old boys and girls, originally drawn and assessed by Castell et al. (1980) were used. Data on 157 boys and girls in that age was obtained for the current study.

Procedure. In stage 1, four samples of adolescent pupils age 13 to 19 years were assessed in a two-stage procedure. Adolescents were screened using the GHQ (Goldberg and Hillier 1979). Social class was defined according to Moore and Kleining (1960) based on the occupation of the father, and social prestige was assessed according to Treiman (1975). In a screening for eating disturbances the subjects' weight and height was measured[2] and in addition the Anorexia Nervosa Inventory for Self-Rating (ANIS) developed by Fichter and Keeser (1980) was filled out by the pupils in the classroom.

Stage 2: A personal semi-standardized psychiatric interview with special focus on eating disturbances was conducted using the Structured Interview for Anorexia Nervosa and Bulimia, developed by Fichter (1985). The percentage of ideal body weight was calculated according to the tables of the Metropolitan Life Insurance Co. (1959); for age levels below 15 years the tables by Kunze (1977) were used. For selecting pupils for the interview the following threshold criteria were employed: either (a) body weight 17% or more below ideal body weight, or (b) body weight 10% or more below ideal body weight and an ANIS total score above 65 points (average score 2.10) or (c) body weight below ideal body weight (10% or more) and ANIS total score above 35 points and secondary amenorrhoea. In Munich 6 pupils fulfilled at least one of the criteria (a, b or c) and in Veria 36 pupils fulfilled at least one of the three criteria. Only females were assessed at the second stage.

Results

1. General Results

Table 1 shows the size of the samples and the average age. The Greek sample in Veria (14.5 ± 1.5 years) was slightly younger than the other three samples (Greeks in Munich = 15.1 ± 1.6 years, Turks in Turkey = 15.4 ± 1.6 years and Greeks in Ioannina 15.9 ± 1.1 years.

Means and SDs for the factors of the ANIS were calculated separately for the age groups 13 to 19 years. These detailed data can be obtained directly from the senior author. They contain the standard values for this scale for the four different samples (Greeks in Greece, Greeks in Germany, Turks in Turkey and Germans in Germany).

2. Differences between Age Groups for the Main Three Samples

2.1 All Pupils in Three Samples: For male and female pupils together age differences were observed for all three main samples for the following ANIS factors:

[1]We thank the Greek Department of Education (Athens) Dr. Dr. Fthenakis (Munich) and Mr. Variangin (Munich) for their support of this study and Dipl. Psych. R. Koloska for some statistical analyses. We also thank Dipl. Psych. Kurt Heilbronn, Dr. G. Saltukóglu, Dipl. Psych. N. Uctum-Muhtar, Dipl. Psych. Z. Karaturcak, Dipl. Psych. S. Tümerkan and Dipl. Psych A. R. Isil for helping to screen the Turkish sample and the Turkish Department of Education for their support on the assessments in Istanbul

[2]In the sample in Ioannina body weight and height was not measured but assessed based on self-report

Table 1. Screening and interview sample of Greeks in Munich, Germany, Greeks in Greece and Turks in Turkey by age and sex. Interviews were also conducted with a Turkish subsample but results will not be published

	Screening					Interview				
	Total *N*	Average age		Above threshold[a]		Uncertain *N*	Dieters *N*	Atypical *N*	Cases of anorexia nervosa (modified Feighner criteria)	
		$\bar{x}$	(SD)	*N*	%				*N*	%
Greeks in Munich										
Girls	453	15.1	(1.5)	6 (6)	1.32	1	0	0	5	1.10
Boys	414	15.2	(1.7)	–	–				–	–
Total	867	15.1	(1.6)							
Greeks in Veria, Greece										
Girls	1420	14.6	(1.5)	36 (27)	2.53	1	11	18	6	0.41
Boys	1280	14.4	(1.4)	–	–				–	–
Total	2700	14.5	(1.5)							
Greeks in Ioannina, Greece										
Girls	567	15.9	(1.1)	7 (5)	1.23				2	0.35
Boys	–			–	–				–	–
Total	567	15.9	(1.1)							
Turks in Istanbul, Turkey										
Girls	1588	15.4	(1.5)							
Boys	1195	15.4	(1.6)							
Total	2783	15.4	(1.6)							

[a] Body weight 17% or more below ideal body weight (IBW) or body weight 10% or more below IBW and Anorexia Nervosa Inventory for Self-Rating (ANIS) total score above 65 points
– = not assessed

ANIS total score, obsessive compulsiveness (anancasm) and the variable height in centimetres and weight in kilograms. Significant differences across age groups were also obtained for figure consciousness in the sample Greeks in Munich, and for insufficiency and bulimia in the sample Greeks in Veria and Turks in Turkey.

2.2 Greeks in Munich: For the male Greek pupils in Munich significant age differences were seen for the variables ANIS total score (age 13, 14, 15 years differed from age 18 and 19 years), ANIS insufficiency (age 13 and 14 differed from age 17, 18 and 19 years), ANIS obsessiveness (ANIS age 14 and 15 differed from age 18 and 19), height (age 15 to 19 differed from age 13 to 14) and weight in kilograms (age 15 to 19 differed from age 13 to 14). For the female Greek pupils in Munich age differences for the ANIS factor figure consciousness and for weight in percent of ideal body weight just failed to reach significance ($P < 0.02$).

2.3 Greeks in Veria, Greece: For the male Greek sample in Veria, pupils showed highly significant differences ($P < 0.001$) for ANIS insufficiency (age 16 and 17 differed significantly from age 13 and 14), ANIS obsessive compulsiveness (age 16 and 17 differed significantly from age 13), ANIS bulimia (age 13 differed from age 16), height (age 15 to 17 differed from age 13 to 14), weight in kilograms (age 15 to 18 differed significantly from age 13 to 14). The female Greek pupils in Veria, showed highly significant age differences ($P < 0.001$) for the variables ANIS total score (age 14 to 17 differed significantly from age 13), ANIS figure consciousness (age 13 differed significantly from age 15), ANIS insufficiency (age 14 to 17 differed significantly from age 13), ANIS obsessiveness (age 14 to 17 differed significantly from age 13), ANIS bulimia (age 15 differed from age 13) and weight in kilograms (age 15 differed from age 13).

2.4 Turks in Turkey: Male Turkish pupils in Turkey showed no significant age differences for ANIS factors and significant differences for height (age 14 to 19 differed significantly from age 13 (14–15) and weight in kilograms (age 14 to 19) differed significantly from age 13 (to 14–15)). Female Turkish pupils in Turkey showed significant age differences for the

Table 2. Comparison between samples (Results of analysis of variance, F values) $^{*}P<0.01$, $^{**}P<0.001$

Sample		Variable								
		Total	Figure consciousness	Insufficiency	Anancasm	Negative effect of meals	Bulimia	Height	Weight (kg)	% IBW
GM vs GG[a]	All	301.29**	182.32**	137.07**	263.47**	99.32**	95.44**	12.64**	1.08	15.37**
GM vs TT	All	13.16**	32.56**	114.39**	302.0**	3.15	57.37**	1.63	2.63	33.22**
GG vs TT	All	476.30**	165.18**	1067.84**	30.01**	307.05**	620.30**	46.83**	0.84	1.18
GM vs GG	Female	146.21**	98.39**	69.69**	110.06**	47.56**	48.50**	31.31**	0.96	3.37
GM vs TT	Female	0.95	1.24	132.19**	122.24**	6.59*	65.96**	0.12	0.95	1.21
GG vs TT	Female	420.15**	191.16**	845.16**	11.80**	200.34**	481.06**	62.46**	6.16*	1.23
GM vs GG	Male	187.48**	109.50**	71.44**	153.48**	57.97**	46.74**	0.10	5.13	13.57**
GM vs TT	Male	39.01	56.93**	12.97**	178.21**	0.00	7.39*	0.61	1.34	137.68**
GG vs TT	Male	119.31**	24.08**	293.64**	17.85**	129.35**	172.76**	1.40	6.34*	16.57**

[a] GM = Greeks in Munich, GG = Greeks in Greece, TT = Turks in Turkey

ANIS total score, the ANIS factor insufficiency, obsessive compulsiveness (anancasm), height and weight. It is interesting to note that both female Greek samples in Greece and the male sample in Munich showed age-specific changes in the ANIS main factor figure consciousness with the highest scores in the age groups 14/15/16 years; in the Turkish sample age-specific differences for the ANIS factor figure consciousness were not seen for male or female pupils. Further, with the exception of the female Turks in Turkey sample, no differences across age were obtained for the ANIS factor negative effect of meals.

3. Sex Differences

These differences were most pronounced for all three main samples. Significant sex differences ($P<0.001$) were observed for the ANIS variables total score, figure consciousness, negative effect of meals and for height and weight. For the ANIS factor insufficiency significant sex differences were seen in both Greek samples but not in the Turkish sample, and for obsessiveness it was insignificant in the Greeks in Munich sample. The percentage of ideal body weight differed significantly between sexes in both samples in their homeland (Greeks in Greece and Turks in Turkey) but not for Greeks in Germany. Males in the country of origin were very close to ideal body weight according to the tables used, while male Greeks in Germany and females in all three samples were well above 100% of ideal body weight.

4. Differences According to Social Class

In general, very few differences were observed between social classes in any of the three main samples. For the Greek sample in Veria, the analyses of variances according to social class for male and female pupils separately were all non-significant. For the Greek sample in Munich significant social class differences ($P<0.01$) were observed for male pupils for both sexes and males in ANIS factors anancasm and negative effect of meals, for males in ANIS factor unsufficiency and for females in ANIS factor bulimia. For the Turkish sample significant social class differences were seen for females in ANIS factor figure consciousness, both sexes and males in ANIS factor insufficiency and ANIS factor bulimia. Only in the Turkish sample and not in the Greek samples were there significant social class differences in height and body weight for both sexes; boys and girls of higher social classes were taller; while boys of higher social classes tended to be heavier, girls of higher social classes were slimmer (lower percentage of ideal body weight) than those of lower social classes. In general, when social class differences were observed at all, the differences were mainly between the lowest social class and higher social classes (Scheffé Test).

5. Differences between Samples

5.1 Body Weight and Height. Greeks in Munich and Greeks in Greece differed in height and percentage of ideal body weight; the difference in height was seen mainly in females and the difference in percentage of ideal body weight was mainly seen in males. Greeks in Munich and Turks in Turkey (all) differed in the percentage of ideal body weight. Greeks in Greece and Turks in Turkey (all) showed differences in height, which was mainly due to female pupils. Greek males in Munich and Greek males in Greece differed significantly from Turkish males in Turkey in

percentage of ideal body weight, and differed significantly from each other. Table 2 shows the results of the analysis of variance for the main samples concerning ANIS factors, height and weight.

5.2 ANIS Factors: Differences between the samples were observed for almost all ANIS factors; the only non-significant differences were seen for ANIS total score and ANIS figure consciousness comparing female Greeks in Munich and female Turks in Turkey and the ANIS factor negative effect of meals comparing Greeks in Munich with Turks in Turkey and male Greeks in Munich with male Turks in Turkey. Since the number of persons by sex in each age group was much smaller in the Upper Bavarian sample of German adolescents no statistical comparisons were made with the other sample. Pure descriptive data concerning the ANIS factors for this sample is shown in Table 2d. It shows that German girls scored higher than German boys and German boys and girls scored lower than Greek girls in Veria in figure consciousness, insufficiency, anancasm, negative effects of meals and bulimia in practically all age groups.

Figure 1 shows the frequency distribution of the ANIS main factor figure consciousness graphically for the four female samples. Both Greek samples in Greece had practically the same distribution. On the other hand, the Turkish sample and the Greek sample in Munich had much the same distribution with significant lower scores in figure consciousness.

5.3 General Health Questionnaire. The 28-item form of the General Health Questionnaire showed significant differences between all three groups. Greek girls in Munich had the lowest average scores (1.59 ± 0.47), followed by Turkish girls in Turkey (1.67 ± 0.37) and Greek girls in Veria had the highest score (1.71 ± 0.44); in Ioannina the General Health Questionnaire was not used (for more data see Fichter et al. 1988).

5.4 Correlation Coefficients. In the three samples the ANIS total score correlated 0.41 to 0.51 with the 28-item General Health Questionnaire, 0.15 to 0.26 with the percentage of ideal body weight, 0.2 to 0.15 with age (partially significant) and showed zero correlations with social class. The ANIS factor figure consciousness correlated 0.34 to 0.43 with the ANIS factor insufficiancy, 0.27 to 0.38 with anancasm, 0.40 to 0.49 with negative effect of meals and 0.35 to 0.38 with bulimia. All these correlations were positive and statistically significant ($P < 0.001$) and showed that the ANIS factors were not obligue and independent of each other[3].

[3]Detailed data of correlations for all samples may be obtained from the senior author

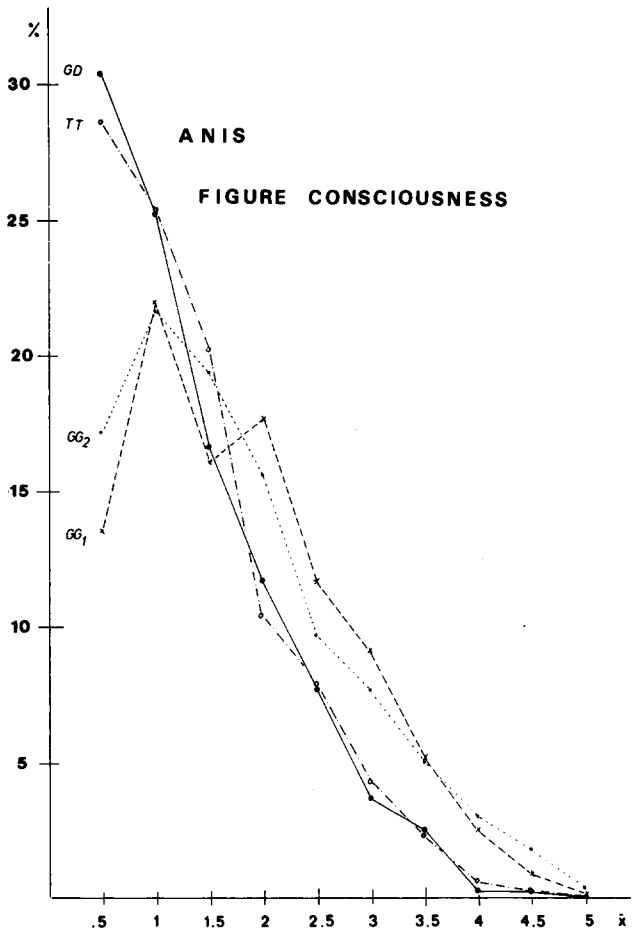

Fig. 1. ●——● ♀ Greeks in Munich (Germany) GD; ×---× ♀ Greeks in Ioannina (Greece) GG_1; ○-·-·-○ Turks in Istanbul (Turkey) TT; ●----● ♀ Greeks in Veria (Greece) GG_2

6. Previous Anorexic Symptoms

In addition to the 32-items of the ANIS the following 8 additional items were used (maximal disturbance for each item in previous adolescent years; the scaling was the same as in ANIS from 0 = no disturbance to 5 = very severe disturbance); girls in all samples scored higher than boys: (1) desire to be slim, (2) thoughts centred around calories and eating, (3) self-induced vomiting after eating, (4) unusual eating habits, (5) binge eating, (6) obstipation, (7) amenorrhoea over 3 or more months in previous years was admitted by 5.1% of Greek girls in Munich, in 7.7% of Greek girls in Veria and in 4.4% of Greek girls in Ioannina (8) amenorrhoea of more than 3 months duration at time of assessment was reported by 4.9% of all Greek girls in Munich, 15.4% of Greek girls in Veria and 3.5% of Greek girls in Ioannina. The high percentage of amenorrhoea at time of assessment in Veria was mainly due to the inclusion of young girls before menarche since the assessment was earlier in

Table 3. Retrospective report of symptoms in previous adolescent years (defining symptoms as present when score at least 2)

	Greek females in Vernia (GG_2) $N = 1{,}445$		Greek females in Munich (GM) $N = 453$	
	N	%	*N*	%
Amenorrhoea more than 3 months in previous years	219	15.16	19	4.19
Amenorrhoea and bulimia	31	2.14	2	0.44
Amenorrhoea, bulimia and vomiting	5	0.35	0	0.00
Amenorrhoea, wish to be slim and thoughts centred around eating	12	0.83	1	0.22
Amenorrhoea, wish to be slim, thoughts centred around eating and bulimia	2	0.14	0	0.00
Amenorrhoea, wish to be slim, thoughts centred around eating and weight below 100%	11	0.76	1	0.22
% of girls with amenorrhoea and total score more than 4 points in 6 symptoms (see text)		10.2		3.3
% of girls with amenorrhoea and total score more than 8 points in 6 symptoms (see text)		5.1		1.3

the school year than in the Munich and Ioannina sample. Table 3 shows some of these previous symptoms for the Greek sample in Munich and in Veria. The results indicate that pre-anorectic or pre-bulimic disturbances as defined in Table 3 and assessed retrospectively by self-report were higher for Greek girls in Veria than in Munich. This findings is in accordance with the results shown in Fig. 1. The number of persons who reported binge eating in addition to amenorrhoea, a desire to be slim, and thoughts centred around food and eating while having normal weight, was very low, when compared to recent surveys on binge eating behaviour in North America and England. If the scores (0–5) of items 1–6 for those girls who reported a previous episode of amenorrhoea were added, 10.17% of all subjects in Veria as compared to 3.31% of Greek girls in Munich had at least a score of 4; 5.05% of all girls in Veria as compared to 1.32% of Greek girls in Munich had previous amenorrhoea and scored 8 and more points in the 6 items. This was additional evidence of a higher frequency of pre-anorectic syndromes in the Greek population in Veria as compared to Greek girls in Munich. However, since we have analysed the data for girls with primary and secondary amenorrhoea and since the girls of the Greek sample in Veria were younger than the girls of the Greek sample in Munich age may have contributed to this finding.

7. Results of Second (Interview) Stage

As shown in Table 1 6 Greek girls in Munich (1.32%) and 36 Greek girls in Veria (2.49%) met the threshold criteria for the second stage. All these subjects were interviewed. Because weight loss was not severely pronounced, none of the girls in Munich and 1 girl in Veria fulfilled the criteria for anorexia nervosa described by Feighner et al. (1972). Therefore the criteria of Feighner et al. were modified slightly to gain sensitivity for this epidemiological study. The rational for this modification was that 25% weight loss is an arbitrary cut-off not suitable for a sample of untreated cases in the community. This re-definition appears justified since in contrast to clinical studies we were mainly dealing with healthy students or mild cases in this epidemiological community study. In addition it was necessary to emphasize the importance of anorectic attitudes and behaviour and to put less emphasis on weight loss and its concomitants. Since two of the six facultative symptoms of the Feighner criteria could not be assessed in our study (bradycardia and lanugo hair, both symptoms resulting from low body weight), it appears reasonable to change the criteria to 'at least one out of four' instead of 'at least two out of six' symptoms. The true prevalence rates for anorexia nervosa according to these modified Feighner criteria were highest for Greek girls in Munich (1.10%), and lower for Greek girls in Veria (0.41%) and Ioannina (0.35%).

Discussion

Adolescent boys and girls age 13 to 19 in Greece, Germany and Turkey were assessed using the ANIS and the General Health Questionnaire for screening in the first stage. Significant age effects were seen for the ANIS subscales figure consciousness, anancasm and the total scale but not for the subscales insufficiency, negative effects of meals and bulimia for boys and for girls. These age differences are in accordance with findings reported by Halmi et al. (1977) who reported changes in body perception in adolescence. Most ANIS factors and the total ANIS score showed significant age differences but the pattern of significances was not totally consistent across samples e.g. factors like figure consciousness, insufficiency, negative effect of meals and bulimia showed significant age differences in some but not all samples. Since our sample in Veria was slightly younger than the other three samples, age can be seen as one factor con-

tributing to the results discussed in the following paragraphs.

Significant sex differences were seen in all three samples for the ANIS total score, the ANIS factor figure consciousness and negative effect of meals. This demonstrates that differences between males and females are most pronounced in areas related to eating, ideals of slimness, dieting, food centred thinking and subjective distress following food consumption while there were less sex differences in personality factors such as insufficiency and anancasm.

Fewer differences were seen concerning social class effects on eating attitudes and behaviour. However, in the upper classes we found a significantly larger height in both sexes, a higher weight in boys and a lower percentage of ideal body weight in girls as compared to the lower classes in Turkey. This could be the result of a qualitatively better supply of nourishment in higher as compared to lower classes in Turkey.

There were considerable differences between samples concerning the ANIS factors. The two Greek samples in Greece showed very similar results. Except for the factor anancasm Greek girls and Greek boys in Veria had higher (more pathological scores) in the ANIS factors. In interpreting this finding the slightly younger age of the Greek sample in Veria and the fact that the scores in the ANIS factors showed changes over the years of adolescence must be taken into account. The scores in the ANIS factors for Greek boys and girls in Veria were also higher than for German adolescents of the Upper Bavarian study. Greek boys in Greece and in Germany showed a decline in the figure consciousness score with increasing age; Greek females on the other hand showed an increase in the figure consciousness score especially until age 16. The General Health Questionnaire 28-score showed a clear increase with increasing age.

One explanation of the finding of lower (more healthy) ANIS scores in Greek pupils in Germany is that selection factors might be present. It is well-known that guest workers from Mediterranean countries have been screened for their health before obtaining permission to enter West Germany. It would therefore be plausible that by this procedure a genetically mentally healthier sample of foreign guest workers has been selected and that the better health condition is also reflected in the next generation. In accordance with this selection hypothesis is the lower score in the Greek sample in Germany as compared to the Greek sample in Greece and the Turkish sample in Turkey in the General Health Questionnaire. However, the Turkish sample in Turkey also showed low scores in the ANIS factor figure consciousness (as did the Greek sample in Germany). Unfortunately, we have no comparison data of Turks in West Germany to give additional evidence to this selection hypothesis. On the other hand, the low score in the factor figure consciousness in the Turkish sample is in accordance with out hypothesis that Turkish adolescents have been exposed to the Western ideals of body slimness to a lesser degree than Greeks in Greece and Greeks in Germany (and Germans in Germany which could not be assessed).

Another hypothesis would be the acculturation stress hypothesis, which would predict that leaving the home country and being exposed to a new environment, language and other cultural and moral values may pose additional stress on a young person so that the risk of mental illness increases. In our present study there was not much evidence for this hypothesis.

In the past decade a number of studies concerning the true prevalence of anorexic and bulimic eating disorders in more or less unselected samples in North America and Western Europe have been published (Nylander 1971; Morgan and Sylvester 1974; Hill 1977; Crisp et al. 1976; Button and Whitehouse 1981; Halmi et al. 1981; Clarke and Palmer 1983; Johnson et al. 1983, 1984; Mann et al. 1983; Pyle et al. 1983; Schleimer 1983, Szmukler 1983; Carter and Moss 1984; Pope et al. 1984; Crowther et al. 1985; Eisler and Szmukler 1985; Gray and Ford 1985; Hart and Ollendick 1985; Healy et al. 1985; Rathner 1986; Greenfeld et al. 1987). In particular, there are very few studies concerning trans-cultural issues of eating disorders. Buhrich (1981) found anorexia nervosa to be extremely rare in Malaysia and it was over-represented in families of Chinese and of Indian origin, who were also living in more affluent conditions. Hooper and Garner (1986) applied the Eating Disorders Inventory to a sample of black, white and mixed race school girls in Zimbabwe; the authors found anorexic and anorexic-like behaviour to be more prevalent in white school girls. Hsu (1987) has summarized the limited data on the low prevalence of eating disorders in North American blacks, and Nero (1985) found a higher prevalence of bulimic problem eating in Caucasian than in Asian-American women. These findings point to the importance of ethnic socio-cultural influences in the genesis of eating disorders although they might also be interpreted as genetic differences. Bulik (1987) illustrated the influence of immigration and acculturation on two cases of adolescents developing an eating disorder. Our main hypothesis was more specific than the acculturation stress hypothesis and we predicted that anorexia nervosa and related disorders are more prevalent in girls exposed to the Western ideals of body slimness,

and we tested this hypothesis on larger samples of adolescents. Indeed we found a prevalence of anorexia nervosa according to modified Feighner criteria of anorexia nervosa, which was twice as high in Greek girls in Munich who had been exposed to these ideals to a high degree. Prevalence rates were 1.10 for Greek girls in Munich, 0.41 for Greek girls in Veria and 0.35 for Greek girls in Ioannina. Our hypothesis was thus confirmed in the second stage. The first stage (screening) results were less clear since Greeks in Germany had fairly low scores on the ANIS subscales such as figure consciousness. Apparently there must not necessarily be a linear relationship between the amount of figure consciousness in the ANIS and the prevalence of anorexia nervosa. Recently Nasser (1986) reported data on the prevalence of abnormal eating attitudes among Arab female students of both London and Cairo Universities. Six cases among the London sample fulfilled diagnostic criteria for bulimia nervosa, but no cases of either anorexia or bulimia were identified in the sample in Egypt. These data confirm our interview data.

In addition to data presented previously by Fichter and Keeser (1980) the present study gives cross-validation data concerning the ANIS. In our present study we have presented average scores for the ANIS for Greek and Turkish samples and for various age groups of both sexes. This descriptive data could form the basis of a longitudinal comparison over time and for comparisons with other samples cross-culturally using the ANIS. This could help to identify differences in eating attitudes and behavior between cultures and across time. Since some time has elapsed since the study was carried out the prevalence of anorexic and bulimic eating disorders may already have increased.

References

Buhrich N (1981) Frequency of presentation of anorexia nervosa in Malaysia. Aust N Z J Psychiatry 15:153–155

Bulik CM (1987) Eating disorders in immigrants: two case reports. Int J Eating Disorders 6:133–141

Button EJ, Whitehouse A (1981) Subclinical anorexia nervosa. Psychol Med 11:509–516

Carter PI, Moss RA (1984) Screening for anorexia and bulimia nervosa in a college population: Problems and limitations. Addict Behav 9:417–419

Castell R, Biener A, Artner K, Beck C (1980) Artikulation und Sprachleistung bei drei- bis siebenjährigen Kindern – Ergebnisse einer Zufallsstichprobe aus der Bevölkerung. Z Kinderpsychol Kinderpsychiatr 29:203–213

Clarke MG, Palmer RL (1983) Eating attitudes and neurotic symptoms in university students. Br J Psychiatr 142:299–304

Crisp AH, Palmer RL, Kalucy RS (1976) In how common is anorexia nervosa? A prevalence study. Br J Psychiatr 128: 549–554

Crowther JH, Post G, Zaynor L (1985) The prevalence of bulimia and binge eating in adolescent girls. Int J Eating Disorders, 4:29–42

Eisler I, Szmukler GI (1985) Social class as a confounding variable in the eating attitude test. J Psychiatr Res 19:171–176

Feighner JP, Robins E, Guze SB, Woodruff RA, Winokur G, Munoz R (1972) Diagnostic criteria for use in psychiatric research. Arch Gen Psychiatry 26:57–63

Fichter MM (1985) Magersucht und Bulimia. Springer, Heidelberg Berlin New York

Fichter MM, Keeser W (1980) Das Anorexia Nervosa Inventar zur Selbstbeurteilung (ANIS) Eur Arch Psychiatr Neurol Sci 228:67–89

Fichter MM, Elton M, Diallina M, Koptagel-Ilal G, Fthenakis WE, Weyerer S (1988) Mental illness in Greek and Turkish adolescents. Eur Arch Psychiatr Neurol Sci 237:125–134

Fichter M, Weyerer S, Meller I, Eiberger T, Witzke W, Rehm J, Dilling H, Hippius H (in press) Ergebnisse der Oberbayerischen Verlaufsuntersuchung. In: Schmidt MH (ed) Psychiatrische Epidemiologie. VHC Verlag, Weinheim

Floru L (1975) Transkulturelle Aspekte der klinisch-psychiatrischen Bilder fremdsprachiger Arbeitnehmer und deren Bedeutung für die nervenärztliche Praxis. Confin Psychiatr 18:193–206

Frießem DH (1975) Jugendliche aus „Gastarbeiter"-Familien. Prax Kinderpsychol Kinderpsychiatr 24:7–10

Frießem DH (1978) Psychiatrische und psychosomatische Erkrankungen ausländischer Arbeiter in der BRD. Ein Beitrag zur Psychiatrie der Migration. Psychiatr Neurol Med Psychol (Leipz) 26:78

Goldberg DP (1972) The detection of psychiatric illness by questionnaire. Oxford Univ Press, London

Goldberg DP, Hillier VF (1979) A scaled version of the General Health Questionnaire. Psychol Med 9:139–145

Gray JJ, Ford K (1985) The incidence of bulimia in a college sample. Int J Eating Disorders 4:201–210

Greenfeld D, Quinlan DM, Harding P, Glass E, Bliss A (1987) Eating behavior in an adolescent population. Intern J Eating Disorders 6:99–111

Halmi KA, Falk JR, Schwartz E (1981) Binge eating and vomiting: a survey of a college population. Psychol Med 11: 697–706

Hart KJ, Ollendick TH (1985) Prevalence of bulimia in working and University Women. Am J Psychiatry 142:851–854

Healy K, Conroy RM, Walsh N (1985) The prevalence of binge eating and bulimia in 1,063 college students. J Psychiatr Res 19:161–166

Hill OW (1977) Epidemiologic aspects of anorexia nervosa. Adv Psychosom Med 9:48–62

Hooper MSH, Garner DM (1986) Application of the eating disorders inventory to a sample of black, white and mixed race school girls in Zimbabwe. Int J Eating Disorders 5: 161–168

Hsu LKG (1987) Are the eating disorders becoming more common in blacks. Inter J Eating Disorders 6:113–124

Johnson CL, Lewis C, Love S, Stuckey M, Lewis L (1983) Understanding anorexia nervosa and bulimia. Report of the Fourth Ross Conference on Medical Research. Ross Laboratories, Columbus, Ohio, pp 14–20

Johnson C, Lewis C, Love S, Lewis L, Stuckey M (1984) Incidence and correlates of bulimic behavior in a female high school population. J Youth Adol 13:15–26

Kunze D (1977) Somatogramm. Alters-Größen-Gewichts-Beziehung. Fortschr Med 95:548–549

Mann AH, Wakeling A, Wood K, Monck E, Dobbs R, Szmukler G (1983) Screening for abnormal eating attitudes and psychaitric morbidity in an unselected population of 15-year-old school-girls. Psychol Med 13:573–580

Medianos MG, Madianu DC, Stefanis CN (1981) A cross-cultural study on immigration and mental health implications for prevention. Neurol Psychiatr (Bucur) 4:71–79

Metropolitan Life Insurance Co (1959) New weight standards for men and women. Stat Bull Metrop Insur Co 40:1–4

Moore H, Kleinig G (1960) Das soziale Selbstbild der Gesellschaftsschichten in Deutschland. Kölner Soziol und Soz Psychol 12:86–119

Morgan HG, Sylvester DHG (1974) Epidemiologic aspects of anorexia nervosa. Adv Psychosom Med 9:48–62

Müller R-HM (1975) "Gastarbeiter"-Fremdarbeitsmigration und gesundheitliche Probleme: Eine Übersicht. Ther Umschau Revue 32:542–546

Nasser M (1986) Comparative study of the prevalence of abnormal eating attitudes among Arab female students of both London and Cairo Universities. Psychol Med 16: 621–625

Nero S (1985) Bulimic Symptoms: Prevalence and Ethnic Differences among College Women. Int J Eating Disorders 4: 151–168

Nylander I (1971) The feeling of being fat and dieting in a school population. An epidemiologic interview investigation. Acta Socio-med Scand 1:17–26

Oppler M (1956) Culture psychiatry and human values. C. Thomas, Springfield, Ill

Pope HG Jr, Hudson JI, Yurgelun-Todd D, Hudson MS (1984) Prevalence of anorexia nervosa and bulimia in three student populations. Int J Eating Disorders 3:45–51

Pyle RL, Mitchell JE, Eckert ED, Halvorson PA, Neuman PA, Goff GM (1983) The incidence of bulimia in freshman College students. Int J Eating Disorders 2:75–85

Rathner G (1986) Anorexia nervosa – Erste Ergebnisse einer epidemiologischen Untersuchung bei 11–20jährigen Schülerinnen in Südtirol. Paper presented at the 10th Annual Meeting of the Austrian Child Psychiatrists, 17.–19.1.1986, Vienna

Schleimer K (1983) Dieting in teenage schoolgirls. A longitudinal prospective study. Acta Paediatr Scand 312:102–111

Szmukler GI (1983) Weight and food preoccupation in population of english schoolgirls. In: Understanding anorexia nervosa and bulimia. Reprint of the 4th Ross Conference on Medical Research. Ross Laboratories, Columbus, Ohio

Treiman DJ (1975) Problems of concept and measurement in the comparative study of occupational mobility. Soc Sci Res 4:183–230

Received February 17, 1987