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Mental Illness in Greek and Turkish Adolescents

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Summary. Samples of 867 Greek adolescents in Munich, 2,702 Greek adolescents in Greece and 2,780 Turkish adolescents in Turkey were assessed concerning mental health in a two-stage procedure. In the first stage the General Health Questionnaire (GHQ) was used for screening. Significant age differences in the GHQ 28-item scale and most of its subscales were observed mainly for the samples in the homeland. Male adolescents had lower scores than female adolescents in the GHQ 28-item scale and its sub-scales while social class appeared to be of little influence. Significantly higher GHQ-28 scores were obtained for Greeks and Turks in their homeland as compared to Greeks in Munich. The GHQ-28 correlations with the Anorexia Nervosa Inventory for Self-Rating were fairly high. A principal component analysis with Varimax rotation showed fairly consistent results for this age group when compared with the results of Goldberg and Hillier (1979). With the exception of the GHQ factor social dysfunction Greek adolescents in their homeland had significantly higher scores in the total GHQ-28 and its sub-scales than Greeks in Germany. Thus, our data do not confirm the acculturation-stress hypothesis. The data would be consistent with the hypothesis of selective migration which states that Greek adolescents in Germany constitute a positive selection with respect to risk for mental illness.

Key words: Prevalence of mental illness – Transcultural psychiatry – General Health Questionnaire (GHQ)

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Introduction

Large populations of guest workers mainly from Mediterranean countries migrated to West Germany in the 1960s and 1970s to get jobs mainly as unskilled workers. From 1955 to 1980 there was an increase in the number of foreign workers in the Federal Republic of Germany from 79,000 to 4,453,300. While several studies exist on issues of mental health of adult foreign workers (Pflanz et al. 1967; Häfner et al. 1977; Häfner 1981), little is known about the families of these foreign guest workers. Meanwhile the next generation, which to a larger extent was born in Germany, has been raised. Concerning the mental health of the offspring of foreign guest workers, Steinhausen and Remschmidt (1982) and Steinhausen (1985) have assessed Greeks as compared to Germans in Germany and Poustka (1984) assessed Italian and Turkish adolescents. Guest workers and their families have been exposed to considerable changes in their social and cultural environment. Although they tend to live close to other guest worker families, they have to learn a new language, conform to new standards and accept attitudes and moral values, which differed from those in their home country.

In our present cross-cultural study we were concerned with adolescent samples in the Federal Republic of Germany, Greece and Turkey. The morbidity risk for mental disorders with respect to varying degrees of acculturation stress was analysed in a two-stage procedure for one Turkish and two Greek samples.

Materials and Methods

Design: According to the original design the following samples were planned to be assessed concerning mental health:

1. Greek adolescents in their homeland (Greece)
2. Greek adolescents in the Federal Republic of Germany
3. Turkish adolescents in their homeland (Turkey)
4. Turkish adolescents in the Federal Republic of Germany and
5. German adolescents in the Federal Republic of Germany.

We obtained permission from the Greek Department of Education and the Turkish Department of Education to study samples 1, 2 and 3, but were not able to get permission from the Bavarian Department of Education (Kultusministerium) to study samples 4 and 5. Since we have assessed large Greek samples in the home country and in Germany and a Turkish comparison group those results are presented and discussed.

Samples

1. Greek adolescents in Munich: altogether 867 Greek adolescent pupils were assessed in Munich (453 girls and 414 boys). The students attended one of two "Gymnasien" in Munich or a "Gymnasium" or "Lyzeum" (high school) in the suburban town of Dachau close to Munich. These were all the Greek schools for that age level in Munich/Dachau which existed at the time of assessment. The screening of the sample took place in July 1979. According to the statistical department of the Town Hall of Munich, there were 1202 Greek adolescents aged 14 to 18 years in Munich and Dachau in the year 1979. When we consider that 9 years of school are obligatory, our sample was practically complete for the 14- to 15-year-old adolescents. For the older age group (16 to 19 years) selection factors favouring middle and higher classes may have been present, since quite a few Greek adolescents do not proceed from "Gymnasium" to "Lyzeum" (high school) but go to "Berufsschulen" (technical colleges) or are without work.

2. Greek adolescents in Veria, Greece: 2,702 Greek pupils age 13 to 19 years were screened in the provincial town of Veria in Northern Greece (1,445 girls and 1,255 boys). The screening took place from September 1980 to November 1980. The pupils attended one of five "Gymnasien" or one of four "Lyzeen" in Veria. Our sample in Veria was complete and constituted almost the total school population aged 13 to 19 years of this town. Altogether 94.8% of all pupils in the "Gymnasium" or "Lyzeum" (high school) 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 being absent due to the schools generous handling of the post-vacation time, an estimated 40 pupils (1.4%) were absent because of illness.

3. A total of 2,780 Turkish pupils were assessed in Istanbul (1,584 girls and 1,196 boys). The screening took place in spring 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 schools) and two private schools (Sisli Terraki Lisesi, Robert Kolegi, upper class schools) in Istanbul. The schools were selected so that they were representative for Istanbul, however with a slight over-representation of upper class pupils. The screening was performed with the assistance of the Cerrahphasa University Hospital in Istanbul (G.K.-I.). The schools differed widely with respect to the percentage of pupils accepted at University; for the government schools percentages were 9%, 28% and 35%, for the private schools 79% and 85%.

Table 1. Screening and interview samples of Greeks in Munich, Germany (GM), Greeks in Greece (GG) and Turks in Turkey (TT) by age and sex (number of subjects in brackets = N with complete Genereal Health Questionnaire (GHQ) data

	Screening			Interview		
	Total	Average age		High risk (HR)	Low risk (LR)	Total N
		$\bar{x}$	SD			
GM						
Girls	453 (435)	15.1	(1.5)	32	10	42
Boys	414 (405)	15.2	(1.7)	11	16	27
Total	867 (840)	14.5 1.5		43/47	26/28	69/75
GG						
Girls	1420 (1269)	14.6	(1.5)	38	18	56
Boys	1280 (1121)	14.4	(1.4)	27	14	41
Total	2700 (2390)	14.5	(1.4)	65/67	32/33	97/100[a]
TT						
Girls	1588 (1376)	15.4	(1.5)	–	–	–
Boys	1196 (1027)	15.4	(1.6)	–	–	–
Total	2784 (2397)	15.4	(1.6)	–	–	–

[a] Sample = 302, every third person was drawn randomly – n = 100

Procedure

Stages of Assessment and Instruments: In stage 1, three samples of adolescent pupils age 13 to 19 years were assessed in a two-stage procedure under which they were screened using the General Health Questionnaire (GHQ) developed by Goldberg et al. (1970). Results are mainly presented for the 28-item form, which was factor analysed by Goldberg and Hillier (1979). The following four factors have been found for this 28-item form: (A) somatic symptoms, (B) anxiety and sleeping disturbances, (C) social dysfunctions and (D) severe depression. Social class was defined according to Moore and Kleining (1960) based on the occupation of the father, social prestige being assessed according to Treimann (1975). The subject's weight and height were measured and in addition to the GHQ the Anorexia Nervosa Inventory for Self-Rating (ANIS) developed by Fichter and Keeser (1980) was filled out by the pupils in the classroom (Fichter et al., in press, a).

However little is known about the reliability of self-rating scales such as the GHQ and the ANIS in juvenile populations and according to our experience, 13 year olds appear to have difficulty in filling in such scales without special help. Furthermore differences in experiences in filling in questionnaires and trans-cultural differences in the meaning of symptoms may be

present (Kortman 1987). Both scales which we used were translated by Greeks and Turks fluent both in English and German and the translation was re-translated into the original language of the questionnaire, compared and corrected.

In stage 2, subjects above a certain threshold in the GHQ (high risk group) were interviewed by our Greek co-worker (M.D.). For reasons of practicality in the field setting the threshold was defined as 101 points or more in the 45-item GHQ (combination of 28-item and 30-item form[1]). In addition, a control group of adolescents with GHQ-45 values below 60 points as interviewed (low risk group – LR). In the smaller sample in Munich all and in the large sample in Veria randomly 1 out of 3 adolescents above the upper threshold or below the lower threshold were interviewed. No interview data was analysed for the Turkish sample. In Munich, 75 subjects were selected for interview in the second stage. From the high risk group 4 had returned to Greece and 2 refused to participate in the interview. From the low risk group 2 refused to participate, so in total 69 subjects were interviewed (26 from the low risk and 43 from the high risk group).

In Veria 302 subjects were above the upper and below the lower threshold; 97 of 100 subjects were planned to be interviewed and 97 were actually interviewed (65 in the high risk group and 32 in the low risk group). For practical reasons there was a delay of 6 months between screening and interview in the Munich sample. This is one of the reasons why 4 subjects were lost. In Veria the interviews were conducted a few days after the screening.

The interview consisted of the semi-standardized clinical psychiatric interview by Goldberg et al. (1970), a scale about a family climate (Schneewind et al. 1985), questions concerning socio-cultural influences were asked and socio-demographic variables were assessed.

Results

1. General Results

Table 1 shows the size of the samples and shows that the average age of the Greek sample in Munich (15.1 ± 1.7) was slightly older than the age of Greek pupils in Veria (14.5 ± 1.5 years); the average age of the Turkish sample in Turkey was 15.4 ± 1.6 years.

The age structure within the three populations was compared using Kendall's tau c, and significant differences were obtained (tau c = 0.25, $P \leq 0.001$). These differences were examined closer using one-way analysis of variance and the a posteriori Scheffe test for specific group comparisons. As expected, overall group differences were significant ($F = 252.75$, $P \leq 0.001$). The Scheffe test revealed that each group was significantly different to both of the others ($P \leq 0.01$ in every case).

Using analyses of variance (ANOVA) we tested hypotheses about differences within each sample concerning age, sex and their interaction effects. These analyses were performed separately for the GHQ-28, the GHQ-30, the GHQ-45 and the factors A–D of the GHQ-28. The data were split up for the age groups 13 to 19 years. The following presentation of the data was mainly based on the GHQ 28-item version and its factors[2].

2. Differences between Age Groups

For the 28-item GHQ statistically significant age differences were observed for the Greek sample in Greece ($F = 24.6$; $P < 0.001$) and the Turkish sample in Turkey ($F = 11.2$; $P < 0.001$) but not for the Greek sample in Munich. This was true for the total samples and for separate analysis of male and female pupils. Both the 30-item and 45-item GHQ produced significant differences for analyses of the sexes separately and combined in the samples of Greeks in Greece and Turks in Turkey, but a significant difference across age for the sexes combined was obtained by the 30-item version for the Greeks in Munich sample ($F = 3.1$; $P < 0.01$) no age differences were obtained for the 45-item version in this sample.

For the GHQ-28 *factor A* (somatic complaints) in the Greek sample in Munich no significant age differences were observed for male or female pupils or for the total sample. Again, age-specific effects in the GHQ factor A were more pronounced within the samples in their homeland (Greeks in Greece ($F = 27.1$; $P < 0.001$) and Turks in Turkey ($F = 12.6$; $P < 0.001$)). There were highly significant age differences within the total samples for female and male pupils. The older age groups reported more *somatic complaints* than the younger pupils.

For the GHQ *factor B* (anxiety) no significant age effects were observed in the Greek sample in Munich (total sample, female sub-sample and male sub-sample). Again however, Greeks ($F = 39.1$; $P < 0.001$) and Turks ($F = 12.8$; $P < 0.001$) in their homeland showed significant age effects in this factor for the total sample and the male and female sub-samples (in all instances $P < 0.001$); the older age groups reported significantly more *anxiety* than the younger age groups.

The GHQ *factor C* (social dysfunction) showed a similar age trend as the factors A and B; for factor C, significant age differences were observed for the total sample and the female sub-sample in Greek pupils in Munich ($F = 3.0$; $P < 0.01$) as well as for all the analyses of Greek pupils in Greece (in all instances $P <$

[1] The 45-item form of the GHQ contained the complete 30-item form GHQ-30 (Goldberg et al. 1972) the complete 28-item form of the GHQ-28 and 2 additional items from the 60-item form (Goldberg et al. 1972) ("been feeling too tired and exhausted even to eat"; and "been feeling full of energy")

[2] Detailed tables of results concerning these ANOVA's as well as means and SD for each age group, for males and for females for each of the samples and further detailed data may be obtained from the senior author

0.001). Age differences were obtained for the total sample ($F = 4.6$; $P < 0.001$) and for boys in Turkey ($F = 4.4$; $P < 0.001$) but not for girls. Except for the oldest age group (19 years, with a low number) older age groups achieved higher scores for *social dysfunction* than younger age groups.

For the GHQ *factor D* (depression) no age differences at all were observed for Greeks in Munich and Turks in Turkey, while Greeks in Veria showed significantly higher *depression* scores in the older age groups for the total sample ($F = 13.9$; $P < 0.001$) as well as the male and the female sub-sample (in both $P < 0.001$).

3. Differences in GHQ Scores According to Sex (ANOVA)

The 28-item GHQ showed significant sex differences for Greeks in Munich ($F = 4.2$; $P < 0.01$) and for Greeks in Greece ($F = 42.5$; $P < 0.001$) and Turks in Turkey ($F = 45.5$; $P < 0.001$). With respect to the sub-scales of the 28-item GHQ significant sex differences were seen in all three samples in factor A, factor B and factor D. Factor C showed no sex differences in the Greek sample in Munich. In general male pupils had lower scores on the GHQ-28 and its sub-scales.

4. Differences in GHQ Scores According to Social Class (ANOVA)

With the exception of the GHQ factor A ($F = 3.68$; $P < 0.01$) and the GHQ factor D ($F = 4.60$; $P < 0.001$) in male pupils in Turkey, no significant differences for GHQ factors and the total scale were found for the male and female samples.

5. Differences between Samples

Results of the one-way analyses of variance (ANOVA) for differences in the GHQ scales between samples are shown in Table 2. The GHQ-28 total score was significantly higher for Greeks in Greece than for Greeks in Munich; for Turks in Turkey it was also significantly higher than for Greeks in Munich. Thus, Greeks in Munich had the lowest GHQ-28 scores.

Among female pupils, Greeks in Greece had significantly higher GHQ-28 scores than Greeks in Munich. Female Greeks in Munich also had significantly lower scores than Turks in Turkey. Male Greeks in Greece had higher GHQ-28 scores than Greek males in Munich. Turkish males had significantly higher GHQ-28 scores than Greek males in Munich. There was also a significant difference between Greek males in Greece and Turkish males in Turkey, whereby the latter had higher GHQ-28 scores than Greek males in Greece. Thus, in general Greek males and females in Munich had the lowest GHQ-28 scores. For the GHQ factor A the highest scores were seen for Turks in Turkey followed by Greeks in Greece. For the GHQ factor B all possible comparisons were statistically significant except the comparison of Greek males in Greece and Turkish males in Turkey and Greek females in Munich. Greeks in Greece had the highest score followed by Turks in Turkey and Greeks in Munich. For the GHQ factor C differences between samples were significant except for the comparison of Greeks in Greece with male Turks in Turkey, female Greeks in Munich and Greece and between female Greeks in Greece and Turks in Turkey. The absence of significant differences for the 7 separate items was reflected in the results obtained for the comparison of all Greeks in Greece with Turks in Turkey. The highest scores were seen for Greeks in Munich followed by Greeks in Greece. The GHQ factor D was significant for all comparisons of samples except that of female Greeks in Munich with female Turks in Turkey and that of male Greeks in Greece with male Turks in Turkey. The highest depression scores were seen in Greeks in Greece followed by Turks in Turkey. Notable differences were seen between the Greek sample in Munich and the remaining two samples (Greeks in Greece and Turks in Turkey).

6. Correlations between Variables and Factor Analysis

All Pearson correlation coefficients between the psychological scales and sub-scales used (GHQ and ANIS) were highly significant in all three samples. Although we must take the large sample size into account, correlations were high and always in the same (positive) direction (e.g. in the direction of the hypotheses). Social class showed practically zero correlations with all GHQ scales and the ANIS total score. The correlation coefficients between age and the GHQ scales were low ranging between 0.02 and 0.29; relatively high correlations were seen for the Greek sample in Veria in comparison to the other samples.

A principal component analysis with Varimax rotation was carried out for the 28-item version of the GHQ separately for both the individual population and both sexes (Weyerer et al. 1986; Elton et al. (in press). Considering the fact that the Greek and Turkish population studied not only differed in ethnic background but also in age, the factor solution obtained for the 28-item GHQ version was remarkably similar on visual inspection to that reported by Goldberg and Hillier (1979). Thus, in the analysis of the whole sample 72 items from a possible 84 were al-

Table 2. Means and SDs for the whole samples, separately for males and females and the results (F values) of one way analysis of variance (ANOVA). The Scheffe a posteriori test for specific group differences is also shown: all results marked × met the criterion of $P < 0.01$

	GHQ-28		GHQ-30		GHQ A (somat.)		GHQ B (anxiety)		GHQ C (soc. dys.)		GHQ D (depress.)		GHQ-45	
	$\bar{x}$	SD	$\bar{x}$	SD	$\bar{x}$	SD	$\bar{x}$	SD	$\bar{x}$	SD	$\bar{x}$	SD	$\bar{x}$	SD
All														
GG2	1.62	0.40	1.76	0.39	1.54	0.50	1.77	0.59	1.79	0.39	1.37	0.53	1.70	0.38
GM	1.54	0.42	1.72	0.43	1.41	0.45	1.62	0.59	1.85	0.45	1.28	0.53	1.64	0.41
TT	1.62	0.37	1.69	0.35	1.68	0.47	1.71	0.55	1.78	0.37	1.33	0.45	1.67	0.34
F value	17.13**		23.84**		119.65**		24.15**		10.74**		13.83**		11.24**	
Scheffe Test	GG2 GM TT		GG2 GM TT		GG2 GM TT		GG2 GM TT		GG2 GM TT		GG2 GM TT		GG2 GM TT	
GG		×		×		×		×				×	×		×	×
GM	×	×							×	×						
TT					×	×	×	×								
Male														
GG2	1.52	0.32	1.66	0.32	1.43	0.41	1.62	0.49	1.74	0.37	1.28	0.44	1.60	0.31
GM	1.48	0.36	1.67	0.37	1.36	0.40	1.54	0.51	1.83	0.40	1.22	0.43	1.59	0.35
TT	1.57	0.35	1.65	0.36	1.60	0.43	1.64	0.53	1.74	0.38	1.29	0.44	1.62	0.33
F value	11.08**		0.72		70.51**		5.98*		9.02*		4.27*		1.55	
Scheffe test	GG2 GM TT		GG2 GM TT		GG2 GM TT		GG2 GM TT		GG2 GM TT		GG2 GM TT		GG2 GM TT	
GG2						×								
GM									×	×				
TT	×	×			×	×		×						
Female														
GG2	1.71	0.44	1.84	0.42	1.64	0.55	1.90	0.64	1.84	0.40	1.46	0.59	1.79	0.42
GM	1.59	0.47	1.77	0.48	1.45	0.49	1.69	0.65	1.87	0.48	1.34	0.60	1.69	0.46
TT	1.67	0.37	1.72	0.34	1.74	0.49	1.76	0.55	1.81	0.36	1.36	0.46	1.71	0.34
F value	15.50**		39.01**		55.49**		30.17**		5.69*		16.60**		21.60**	
Scheffe test	GG2 GM TT		GG2 GM TT		GG2 GM TT		GG2 GM TT		GG2 GM TT		GG2 GM TT		GG2 GM TT	
GG2		×		×	×		×		×	×					×	×
GM						×										
TT		×			×					×						

* $P < 0.01$
** $P < 0.001$

Table 3. Cell mean factor scores for age, sex and population across the six principle components obtained for the whole sample

Component		Age							Sex		Population		
		13	14	15	16	17	18	19	Male	Female	GG	GM	TT
Depression	I	−0.02	0.04	0.03	−0.03	−0.01	0.00	−0.11	−0.06	0.05	0.08	−0.01	−0.09
Anxiety	II	−0.22	−0.12	0.02	0.15	0.24	0.20	0.16	−0.08	0.06	0.03	−0.23	0.05
Somatic symptoms	III	−0.09	−0.05	0.01	0.08	0.05	0.04	0.25	−0.20	0.17	0.12	−0.14	−0.08
Somatic symptoms	IV	−0.31	−0.12	−0.02	0.19	0.20	0.31	0.20	−0.10	0.03	−0.30	−0.34	0.42
Social dysfunction	V	−0.04	−0.06	0.05	0.08	0.17	0.21	−0.03	0.01	0.05	0.19	0.36	−0.29
Social dysfunction	VI	−0.02	0.04	0.00	−0.06	−0.07	−0.10	−0.03	−0.10	0.05	−0.22	0.10	0.16

located to components agreeing with those of Goldberg and Hillier and, for the sexes 141 from 184. However, the order of components after rotation was different to that reported by Goldberg and Hillier and also between our samples and certain systematic differences were observed: Thus, the item "couldn't do anything because of bad nerves" was allocated either entirely to a different principal component, or to more than one, in five of the sub-analyses and each of the analyses for both sexes combined. This suggests that some items may not have equivalent meanings in different cultural settings or with younger samples, and agrees with the finding of Parkes (1972) concerning this item. The coefficient of factor similarity calculated between matrices, suggested a highly similar principle component structure between the population samples as a whole and separately for boys and girls living in their own country but not for those living in Germany. Highly similar component matrices were obtained for Greek males living in Greece as compared to those living in Germany, but not for females in general. Our results on school pupils support Goldberg's statement (1983) that there exists a common language of psychological stress which cuts across cultural variance. The high coefficients of factor similarity support this notion. Our analysis, however, was based on the assumption that four orthogonal components exist in the 28-item GHQ. An anomalous result for Greek female pupils living in Germany indicated that there were exceptions and suggested the investigation of other rotational methods which permit components to correlate.

The principle component solution across all subjects was determined along with the factor scores for each subject on the components obtained. In this analysis we accepted the Guttmann criteria, producing six components as it produced a clearer allocation of items than that obtained when restricting the number of factors to four. One component for the sub-scale depression and one for anxiety and insomnia were obtained together with two for each of somatic symptoms and social dysfunction. The factor scores were evaluated using the regression approach to analysis of variance in which each variable is considered as an independent contribution to variance. Population, age and sex were considered as independent variables and social class and prestige as covariates. Cell means are presented for age, sex and population in Table 3 and the F values obtained by ANOVA in Table 4. As may be seen in Table 4 the largest contribution to variance came from the main effects for each of the six components with both covariates and two-way interaction proving significance on only certain components. The main effect of population explained the largest part of the variance.

Significant differences were obtained for age on all components except that of depression indicating generally increasing scores with age to a maximum aged 18/19, or 15 as with component six. Population differences were obtained for all components except that of depression which just failed to reach significance. Turks in Turkey obtained the highest scores for anxiety and insomnia, and one component for each of social dysfunction and somatic symptoms. Greeks in Greece scored highest with one component of somatic symptoms. With the exception of the two components for social dysfunction Greeks in Munich scored lower on all components than Greeks in Greece. Significant differences were obtained for sex on all components with females scoring higher than males. These results contributed to the interpretation of results presented in Table 2 although the components obtained are not identified with the factors presented. Although clear support was obtained for the sex differences obtained in the analysis of the raw data care is necessary in the interpretation of sample differences (Table 2) in which differences between sub-samples are confounded by such sex differences. Thus, the sample differences obtained for depression in the analysis of the raw data just failed to reach significance with that of the factor scores.

Table 4. *F* values obtained by the regression approach of the analysis of variance (ANOVA) of the standardized factor scores for the whole sample. In addition the mean squared explained and residual variances are shown. All values are rounded to one decimal place

	Depression	Anxiety	Somatic complaints		Social dysfunction	
	Component I	Component II	Component III	Component IV	Component V	Component VI
Co-variates	6.2*	2.2	2.1	0.5	17.5**	1.4
Prestige	0.0	0.5	0.0	0.9	6.6*	0.2
Social class	2.9	0.1	1.2	0.9	0.2	0.1
Main effects	3.7**	15.3**	17.6**	43.6**	35.3**	11.1*
Population	3.5	15.1**	19.9**	122.9**	126.3**	44.2**
Age	1.3	14.6**	4.2**	9.5**	12.6**	3.0**
Sex	10.2**	8.3*	76.6**	0.3	2.5	5.4
Two-way interactions	2.0*	1.8	1.3	1.4	2.0*	2.6**
Population × age	1.8	1.5	0.9	1.2	2.0	3.3**
Pupulation × sex	2.6	2.0	2.6	2.0	3.9	1.6
Age × sex	1.9	1.9	1.4	1.4	0.7	1.1
Three-way interaction	1.9	2.0	0.9	1.2	0.7	1.4
Mean squared explained variance	3.3	6.6	8.1	8.4	12.4	7.0
Mean squared residual variance	1.0	0.9	0.9	0.9	0.9	0.9

* = $P < 0.01$
** = $P < 0.001$

7. Results of Second (Interview) Stage

The results of interviews in the second stage in the Greek sample showed no significant differences in the morbidity of neurosis when Greeks with high GHQ-45 scores (high risk) in Munich and in Veria were compared. There was only a tendency for the higher prevalence of depressive syndromes (27% vs 23%) and neurasthenic syndromes in the Greeks in Munich, while diagnoses with predominantly anxiety and phobic symptoms were more frequent in the Greeks in Greece (6.9% vs 26.0). Our results do not support the hypothesis that Greeks in the guest country show more disturbances in social behaviour; in our study there was no significant difference in this variable between high risk Greeks in Munich and in Veria.

In general there was a high concordance between the results of the GHQ screening and the interview. Among the Greeks interviewed in Munich there were only 2 of 43 pupils above the GHQ threshold, who received no psychiatric diagnosis (95.3% correct) and 1 case in the low risk group, who did need psychiatric help (96.1% correct).

Among the Greeks in Germany the interviewed high risk group had less frequently been raised by the parents (as compared to the low risk group, 24% vs 63%); they therefore had experienced separation from the parents more frequently (8% vs 24%) and developed a feeling of strangeness towards the parents (56% vs 7%), complained more frequently about feelings of alienation (60% vs 9.5%), felt homeless more frequently (45% vs 10%), complained that they were not feeling well anywhere (60% vs 10%), felt that they belonged to another world than their parents (75% vs 14%) and had fewer contacts with Germans. Greeks in the high risk group in Munich showed more disturbances in family climate and they had been raised by their parents more often in the traditional patriarchal style.

Discussion

In interpreting our results we must consider two different hypotheses. 1. The *hypothesis of selective migration* which states that Greek, Turkish and other Mediterranean guest workers are selected by the imigration authorities on the basis of their physical and mental health before getting a work permit in West Germany. Severely disturbed or physically ill persons are hardly accepted in the guest country. Häfner et al. (1977) and Häfner (1980, 1981) report-

ed representative data of psychiatric in- and outpatient treatment of guest workers. The 1-year treatment prevalence of mental disorders (especially with a chronic course) was low for Turks (3.0%) and Italians (3.4%), somewhat higher for Yugoslavs (5.3%), while imigrants from other nationalities (11.5%) almost reached the level of the German control group (13.0%). According to Häfner, these differences are probably due to motivational and administrative selection factors. Based on these facts it would be plausible to assume that mentally and physically healthy parents also have more healthy offspring. The hypothesis would predict that Greek and Turkish adolescents should be mentally more healthy than a random sample of adolescents in their homeland. On the other hand, Häfner (1980) found that the prevalence pattern of juveniles of guest workers was more similar to German adolescents. 2. The Migration stress hypothesis *(acculturation-stress hypothesis)* states that acculturation may lead to crises of identity, feelings of strangeness and as a result to more mental disturbances (Florou 1975; Frießem 1975; Erikson 1975; Oppler 1956; Müller 1975; Madianos 1980; Korte and Schmidt 1983). According to this hypothesis migrants are exposed to various kinds of stress by being at times separated from their families, having to change schools, having to live in a country where another language is used and being confronted with a different value system. If our data and the data of others showed that children and juveniles of guest workers in the guest country are more ill mentally than their age-mates in their home country, this would have supported the migration stress hypothesis. Our data, however, do not support this hypothesis but our results are in accordance with recent data presented by Poustka (1984) on Italian and Turkish adolescents in Germany and the data presented by Steinhausen and Remschmidt (1982) on Greek children in Germany.

Poustka (1984a, b) assessed 13- and 14-year-old Italian and Turkish adolescents who had lived in the Federal Republic of Germany for at least 5 years and a German control group. The prevalence rate of mental disorders was 18% for Turkish and 22% for Italian juveniles. Italian girls tended to show disturbances in their social behaviour more often than Turkish girls who had more emotional/neurotic disturbances. Turkish juveniles showed a relatively high frequency of enuresis. Socio-economic and socio-demographic characteristics of the families showed no significant effects. However, family characteristics (illness in Turkish families, problems with the partner and disturbances in the parent/child relationship in the Italian families) correlated with a higher prevalence of mental disorders in the juveniles. The study showed that migration- and assimilation-specific characteristics were of lesser influence than has been claimed previously in the literature. The author concludes that neither specific schools nor specific health care institutions are recommendable but the information about present school and health facilities could be augmented among the guest worker families.

Steinhausen and Remschmidt (1982) assessed 238 Greek and 105 German children aged 8 to 11 years in an epidemiological field study in West Berlin. While the two groups differed considerably in socio-economic and financial status, there were no substantial differences in the school situation and the psychiatric morbidity was lower in the Greek than in the German sample. In both groups boys showed higher symptom scores than girls. The Greek families showed comparatively few disturbances in family climate and family functioning, which was interpreted by the authors as the main determinant of the lower psychiatric morbidity among the Greek children. On the other hand, factors related to migration were found to be relatively unimportant (see also Steinhausen 1982, 1985). Further results about the mental health of the children of foreign guest workers have been presented by Klitzing (1983).

It is likely that the selective migration effect overrides a possible migration stress effect, resulting in the finding that generally, Greek adolescents in Germany are more healthy than their age-mates in their home country and probably their German age-mates. Selective migration of more flexible, mobile and possibly genetically more healthy Greeks and Turks to Germany (who were screened for health before being let into Germany) may be a major cause for our findings and those of others (Poustka 1984; Steinhausen and Remschmidt 1982) that children and adolescents of foreign guest workers in West Germany are more healthy than their age-mates in the home country (and their German age-mates). This finding, however, does not necessarily rule out that the acculturation stress hypothesis (which would counteract the apparently strong selective migration effect) also has an impact on children and adolescents of foreign guest workers in West Germany. It is at least plausible that the attitude of Germans towards guest workers families, changes in the family structure and relationships, uncertainty concerning personal future, separation from relevant family member and changes in moral and ethnic values and standards may have a negative impact on a young child or adolescent. Neither of the studies cited nor our data can falsify the acculturation stress hypothesis, because we do not know what the mental status of those adolescents who stayed in their home country would be, if they had been exposed to the same experiences as their

Greek or Turkish age-mates in Germany. Our results do, however, give further evidence that the selective migration hypothesis is effective in these samples. Contrary to Steinhausen and Remschmidt our data show that adolescent girls report more complaints and thus have higher scores in self-rating scales such as the GHQ than boys. It is an open question, to what extent this is a reflection of sex-specific differences in illness behaviour (frankness in reporting symptoms) as has been reported in adults (Jenkins 1985). According to recent community studies on adults this sex difference in symptom reporting seems to diminish (Fichter et al., in press, b). In this context it would be of interest to pursue this issue trans-culturally and to see whether the sex difference in the GHQ results will change over time in Greek or Turkish adolescents.

Our original design comparing Greek and Turkish adolescents in their homeland and in Germany with one another and with Germans in Germany could not be carried out completely (see Materials and methods). Therefore two important comparison groups are missing, limiting the interpretation of the findings with Turks in Turkey. Two important comparison are, however, possible with our data: (1) Greeks in Greece vs Greeks in Germany, and (2) the trans-cultural comparison of Turks in Turkey vs Greeks in Greece.

Another interpretation of the data could be that Greeks and Turks in their home country expressed their symptoms and discontent more openly in a self-rating questionnaire (and interview) than Greeks did as guests in a foreign country. A short-coming of our study is also that we present data of a self-rating questionnaire filled out in a formal school setting. It is possible that an interview in a relaxed, therapeutic setting would have revealed more personal problems and symptoms. Our descriptive data on Greeks in Germany and Greeks and Turks in their home country could also form the basis of a longitudinal comparison with other samples cross-culturally using the GHQ.

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References

Elton M, Patton G, Weyerer S, Diallina M, Fichter M (in press) A comparative investigation of the principal component-structure of the 28-Item Version of the general health questionnaire in adolescent schoolgirls in England and abroad. Acta Psychiatr Scand

Erikson E (1950) Childhood and society. Norton, New York, pp 426–442

Fichter MM, Elton M, Sourdi L, Weyerer S, Koptagel-Ilal G (in press, a) Anorexia nervosa in Greek and Turkish adolescents. Eur Arch Psychiatr Neurol Sci

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

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

Florou 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

Goldberg DP (1983) The use of screening questionnaires by family doctors. Paper presented at the VII. World Congress of Psychiatry, Vienna, 11–16/7/1983

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

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

Häfner H (1980) Psychiatrische Morbidität von Gastarbeitern in Mannheim. Nervenarzt 51:672–683

Häfner H (1981) Depressive Syndrome bei Gastarbeitern in Mannheim. Ergebnisse einer Inanspruchnahme-Untersuchung auf epidemiologischer Basis. Schweiz Arch Neurol Neurochir Psychiatr 128:53–73

Häfner H, Moschel G, Özek M (1977) Psychische Störungen bei türkischen Gastarbeitern. Eine prospektiv-epidemiologische Studie zur Untersuchung der Reaktion auf Einwanderung und partielle Anpassung. Nervenarzt 48:268–275

Jenkins R (1985) Sex differences in minor psychiatric morbidity. Psychol Medicine. Monograph Supplement 7. University Press, Cambridge

Klitzing Kv (1983) Risiken und Formen psychischer Störungen bei ausländischen Arbeiterkindern. Beltz Verlag Weinheim

Korte H, Schmidt A (1983) Migration und ihre Folgen: Vandenhoeck & Suprecht, Göttingen

Kortman F (1987) Problems in communication in transcultural psychiatry. Acta Psychiatr Scand 75:563–570

Madianos MG (1980) Die Akulturation und die Psychische Gesundheit der Emigranten in USA. Doctoral Dissertation, Athens

Moore H, Kleining G (1960) Das soziale Selbstbild der Gesellschaftsschichten in Deutschland. Kölner Z Soziol Sozialpsychol 12:86–119

Müller R-H M (1975) „Gastarbeiter"-Fremdarbeitsmigration und gesundheitliche Probleme: Eine Übersicht. Ther Umschau Rev 32:542–546

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

Parkes KE (1982) Field dependence and the factor structure of the general health questionnaire in normal subjects. Br J Psychiat 140:392–400

Pflanz M, Hasenknopf O, Costas P (1967) Blutdruck und funktionelle Beschwerden bei Gastarbeitern – ein transkultureller Vergleich. Arbeitsmed Sozialmed Arbeitshyg 5:181–185

Poustka F (1984a) Psychiatrische Störungen bei Kindern ausländischer Arbeitnehmer. Eine epidemiologische Untersuchung. Enke Verlag, Stuttgart

Poustka F (1984b) Familiäre Situation von Kindern ausländischer Arbeitnehmer. In: Remschmidt H (Hrsg) Psychotherapie mit Kindern, Jugendlichen und Familien, Bd 1. Enke Verlag, Stuttgart

Schneewind KA, Beckmann M, Hecht-Jackl A (1985) Das Familienklima aus der Sichtweise der Eltern und der Kinder. Forschungsbericht aus dem Institutsbereich Persönlichkeitspsychologie und Psychodiagnostik. Ludwig Maximilians Universität, München

Steinhausen H-Ch (1982) Psychische Störungen bei Gastarbeiterkindern im Rahmen einer kinder- und jugendpsychiatrischen Poliklinik. Z Kinder Jugendpsychiat 10: 32–49

Steinhausen H-Ch (1985) Psychiatric disorders in children and family dysfunction. A study of migrant workers' families. Soc Psychiatr 20:11–16

Steinhausen H-Ch, Remschmidt H (1982) Migration und psychische Störungen. Ein Vergleich von Kindern griechischer „Gastarbeiter" und deutschen Kindern in West-Berlin. Z Kinder Jugendpsychiatr 10:344–364

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

Weyerer S, Elton M, Diallina M & Fichter MM (1980) The principal component structure of the general health questionnaire among greek and turkish adolescents. Eur Arch Psychiatr Neurol Sci 236:75–82

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