

Ethnic Differences in Temporomandibular Disorders Between Jewish and Arab Populations in Israel According to RDC/TMD Evaluation

Shoshana Reiter, DMD
Instructor

Ilana Eli, DMD
Professor

Anat Gavish, DMD
Lecturer

Ephraim Winocur, DMD
Lecturer

Department of Oral Rehabilitation
The Maurice and Gabriela Goldschleger
School of Dental Medicine
Tel Aviv University
Tel Aviv, Israel

Correspondence to:

Dr Shoshana Reiter
The Maurice and Gabriela Goldschleger
School of Dental Medicine
Tel Aviv University, Tel Aviv, Israel.
E-mail: shosh5@bezeqint.net

***Aims:** To use the Axis I and Axis II test items of the Research Diagnostic Criteria for Temporomandibular Disorders (RDC/TMD) to study the differences in temporomandibular disorders (TMD) between Israeli Arabs and Israeli Jews. **Methods:** Sixty-five Israeli Jews and 50 Israeli Arabs who were referred with a proposed diagnosis of TMD participated in the study. **Results:** The overall male:female ratio was 1:7.3 in the Israeli Arab group compared with 1:2.4 in the Israeli Jewish group, with a significant difference in gender between groups ($P < .05$). A comparison of women only in both groups (44 Israeli Arab women and 46 Israeli Jewish women) revealed no statistically significant differences in Axis I diagnoses, disability days, pain duration, and Characteristic Pain Intensity scores. The Israeli Arab women scored higher in Axis II parameters: Differences between the 2 groups were statistically significant with respect to depression scores ($P < .001$), anxiety scores ($P < .001$), somatization scores (pain items excluded) ($P < .001$), somatization scores (pain items included) ($P < .05$), average disability scores ($P < .01$), and chronic pain grade ($P < .05$). **Conclusion:** The results highlight the social component of the biopsychosocial model in sculpturing chronic pain behavior. Our research suggests the possible need for cross-cultural calibration of the Axis II assessment tools of the RDC/TMD. J OROFAC PAIN 2006;20:36–42*

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Race and ethnicity are 2 terms which bear distinct meanings.¹ While race distinguishes people according to biological and physical characteristics, ethnicity is based on common language, social background, and traditions and beliefs, which are distinctive and maintained from 1 generation to another.² Therefore, ethnicity not only includes race, but also refers to characteristics that are of a social, psychological, cultural, and political nature.¹

Today, chronic pain is usually studied within the framework of the biopsychosocial model. According to this model, the pain experience is influenced by biological, psychological, and social factors, ie, the same factors that comprise “ethnicity.”¹ Therefore, ethnicity has a role in sculpturing chronic pain behavior, beliefs, and attitudes.^{3–12}

The Research Diagnostic Criteria for Temporomandibular Disorders (RDC/TMD)¹³ were developed for research use and allow for consistent measurements and comparisons between clini-

cians worldwide. This is necessary to identify the etiology, risk factors, and other characteristics of the disorder; allow prospective studies; and assist in treatment modality research.

The RDC/TMD do not focus on etiologic mechanisms, but enables the most common TMD presentations to be described after less common disorders, such as myospasm, neoplasm, ankylosis, and hyperplasia, have been excluded. The dual-axis system provides standardized diagnostic criteria for physical and psychological findings in patients suffering from TMD.¹⁴ Thus, the “bio” and “psycho” aspects of the biopsychosocial model can be assessed.

Diagnostic tools such as the RDC/TMD are based on Western society and cannot necessarily be applied to ethnic minorities or other cultures. The basic assumption as expressed in the review and commentary section of the RDC/TMD publication¹³ is that “the Axis II test items are easily understood and short. This would imply that they can be used worldwide without difficulty as they are adapted to different cultures...” The RDC/TMD has been translated into numerous languages, and research using these criteria has been conducted worldwide.^{15,16} However, assessing Axis II items in a language and culture other than those for which they were developed has sometimes been problematic, as in the Far East.¹⁶ Kinzie and Manson¹⁷ pointed out that the use of a self-rating scale which was developed in 1 culture may be problematic in cross-cultural settings. In their opinion, proved back-translations do not necessarily indicate that the concepts of the scales are the same. Ghubash et al¹⁸ tested the Arabic version of the Center for Epidemiologic Studies Depression Scale (CES-D) and showed that the cutoff score used in Western countries to determine whether a person has symptoms of depression should be raised by several points in an Arab population.

In northern Israel, 2 distinct populations, Israeli Jews and Israeli Arabs, can be found. These Israeli populations offer the rare opportunity to examine the association between ethnicity and orofacial pain. Although both populations belong to the same race (Caucasians), they differ significantly in their ethnicity. Within both populations there are variations of acculturation. Basically, the 2 cultures are separate as to education and preservation of their own culture and language.

The purpose of this study was to use the Axis I and Axis II test items of the RDC/TMD to study the differences in TMD between Israeli Arabs and Israeli Jews.

Materials and Methods

The study consisted of 197 consecutive Israeli Arab and Israeli Jewish patients who arrived for the first time at a clinic located in the northern part of Israel that specializes in orofacial pain. All patients reside in the north of Israel and belong to one of the Israeli health insurance companies (financed under a national health law). One clinician (SR) examined all patients, applied the RDC/TMD criteria, and assigned an Axis I and Axis II assessment to each patient.

Each patient provided information regarding age, gender, ethnicity (Jewish or Arab), and period of pain (Table 1). A full clinical examination according to the RDC/TMD protocol was made. Each patient received an appropriate RDC/TMD Axis I and Axis II assessment, including calculations of disability score, disability points and chronic pain grade, depression scale, somatization score, and anxiety score. The self-report sections of the RDC/TMD were completed by patients in either Hebrew or Arabic. Both versions were translated from the original English version and then translated back to English.

Study Population

Israeli Jewish Patients. The Israeli Jewish (IJ) population consisted of 125 consecutive patients referred to the clinic for the first time with a proposed diagnosis of TMD. Patients younger than 18 years old ($n = 16$), patients who had no pain but were referred for bruxism ($n = 18$), those who refused to fill out the questionnaires or could not because of language difficulties (eg, immigrants not fluent in Hebrew) ($n = 12$), and those referred because of major trauma ($n = 1$) were excluded. Thirteen patients did not meet the criteria to receive a diagnosis of TMD according to the RDC/TMD. The study included 65 IJ patients who met the criteria.

Israeli Arab Patients. The Israeli Arab (IA) population consisted of 72 consecutive patients referred to the clinic for the first time with a proposed diagnosis of TMD. Patients younger than 18 years old ($n = 7$), patients who had no pain but were referred because of bruxism ($n = 2$), those who refused to fill out the questionnaires or could not because of language difficulties ($n = 3$), and those referred because of major trauma ($n = 7$) were excluded. There were 3 patients who did not meet the criteria to receive a diagnosis of TMD according to the RDC/TMD. The study included 50 IA patients who met the criteria.

Table 1 Pain Duration According to Patients' Age

Age (y)	Israeli Arabs			Israeli Jews		
	Male	Female	Total	Male	Female	Total
18–29	(0)	21.2 ± 21.8 (20)	21.3 ± 21.8 (20)	35.0 ± 57.2 (4)	20.9 ± 30.9 (17)	23.6 ± 35.9 (21)
30–39	68.0 ± 48.5 (3)	17.5 ± 22.7 (11)	28.3 ± 34.9 (14)	32.9 ± 72.1 (6)	12.5 ± 15.2 (13)	18.9 ± 41.2 (19)
40–49	6.0 (1)	44.5 ± 63.9 (9)	40.6 ± 61.5 (10)	17.9 ± 22.1 (6)	3.3 ± 2.5 (3)	13.1 ± 18.9 (9)
50–59	36.0 (1)	10.0 ± 9.2 (4)	15.2 ± 14.1 (5)	0.5 (1)	37.0 ± 54.0 (9)	33.3 ± 52.2 (10)
60+	240.0 (1)	(0)	240.0 (1)	1.6 ± 1.2 (2)	2.2 ± 2.1 (4)	2.0 ± 1.7 (6)
Total	81.0 ± 87.3 (6)	24.0 ± 34.9 (44)	30.9 ± 46.8 (50)	23.6 ± 47.7 (19)	18.9 ± 32.3 (46)	20.3 ± 37.1 (65)

Values represent mean pain duration (\pm SD, in months).

Values in parentheses indicate number of patients in each group.

Data Analysis

Initially, general demographic characteristics of the 2 populations (65 IJ and 50 IA patients) were analyzed. At a second stage, an attempt was made to compare the RDC/TMD characteristics of the IA and IJ groups. However, as most of the Israeli Arabs were female (44 of 50), in consideration of the influence of gender on chronic pain,³ male patients were omitted from the analysis. Only findings regarding the female patients (44 IA and 46 IJ women) were compared.

Statistical Analysis

SPSS 11.0 statistical software was used to analyze the data. Pearson's chi-square test and an independent *t* test were used to establish the association between ethnicity and RDC/TMD parameters. Association between age and RDC/TMD parameters was analyzed by the Pearson correlation test for the quantitative variables, Spearman correlation test for the ordinary variables, and independent *t* test for the dichotomous variables. The Mann-Whitney test was used to establish the association between chronic pain grade and ethnicity. Level of significance was set at 5% ($P < .05$).

Results

General Characteristics

The overall male:female ratio was 1:7.3 in the IA group compared with 1:2.4 in the IJ group, with a significant difference in gender between groups ($P < .05$). Mean age (\pm SD) was 34.1 \pm 11.3 years and 38.9 \pm 13.4 years in the IA and IJ groups, respectively ($P < .05$). Most patients (62% IA and 58.5% IJ) were between 25 and 44 years old; the male:female ratio in this age range was 1:6.8 in the IA group and 1:1.7 in the IJ group.

Mean age in the female patient groups was 32.9 \pm 10.7 years in the IA group compared with 38.4 \pm 14.0 years in the IJ group ($P < .05$). Due to the significant age difference between these 2 groups, correlation tests and an independent *t* test between age and all other parameters (pain duration, characteristic pain intensity [CPI], disability days, disability score, chronic pain grade, depression, anxiety, and somatization) were performed. All of these analyses were found to be nonsignificant.

IA women showed average pain duration of 24.0 \pm 34.9 months versus 18.9 \pm 32.3 months for IJ women (Table 1). This difference was not statistically significant.

Axis I Diagnoses

The Axis I diagnoses are presented in Table 2. No statistically significant differences were found between the 2 groups regarding Axis I diagnoses.

Axis II Assessment

Depression Scores. On the depression scale, the scores for 37% of the IJ women were within the "normal" range, compared with the scores of 9.1% of the IA women (chi-square test; $P = .001$) (Fig 1). The scores of 41.3% of IJ women were within the range for "moderate depression," compared with 27.3% of the IA women (chi-square test; $P = .114$). The scores of the remaining 21.7% of IJ women and 63.6% of IA women were within the range for "severe depression" (chi-square test; $P < .001$).

Anxiety Scores. The scores for 43.2% of the IJ women and 15.9% of the IA women were within the normal range (chi-square test; $P = .014$); 31.8% of IJ women and 13.6% of IA women were found to have moderate anxiety (chi-square test; $P = .053$), and 25% of IJ women compared with 70.5% of the IA women were found to have severe anxiety (chi-square test; $P < .001$) (Fig 1).

Table 2 Distribution of Subjects According to Axis I Diagnosis

Axis I diagnosis	Israeli Arabs			Israeli Jews		
	Male	Female	Total	Male	Female	Total
Myofascial pain	3	22	25	8	22	30
Myofascial pain with limited opening	2	14	16	3	12	15
Disc displacement with reduction	1	9	10	4	17	21
Disc displacement without reduction, with limited opening	0	1	1	1	0	1
Disc displacement without reduction, without limited opening	0	0	0	0	0	0
Arthralgia	4	25	29	10	25	35
Osteoarthritis	0	6	6	1	5	6
Osteoarthrosis	1	3	4	2	7	9

Somatization Scores (Pain Items Excluded). Of the scores for the IJ women, 34.1% were within the “normal” range on the somatization scale compared with 4.8% for the IA women (chi-square test; $P < .01$); 29.5% and 11.9% were in the “moderate” range, respectively (chi-square test; $P = .024$), and 36.4% and 83.3% were within the “severe” range, respectively (chi-square test; $P < .001$) (Fig 1).

Somatization Scores (Pain Items Included). On the somatization scale, the scores for 15.2% of the IJ women and 4.5% of the IA women were within the “normal” range; 34.8% and 16% were in the “moderate” range, respectively; and 50% and 79.5% were in the “severe” range, respectively. Differences were statistically significant (chi-square test; $P < .05$).

CPI. There was no statistically significant difference between the CPI scores of the IJ women (54.1 ± 27.2) and those of the IA women (58.6 ± 29.5). The same was true for the mean current pain intensity scores (51.5 ± 29.2 for IJ women versus 53.4 ± 36.8 for IA women), mean average pain intensity scores (48.9 ± 27.6 for IJ women versus 57.6 ± 31.3 for IA women), and mean worst pain intensity scores (62.0 ± 32.5 for IJ women versus 64.7 ± 33.9 for IA women).

Disability Days. No statistically significant differences were apparent between IA and IJ women for average days off work (6.4 ± 16.4 days for IJ women versus 8.6 ± 20.8 days for IA women) (Fig 2).

Disability Score. The average disability score was 51.9 ± 32.1 in IA women compared with 33.3 ± 30.9 (IJ women) (Fig 2). This difference was statistically significant ($P < .01$). The same was true for the 3 questions which are components of the disability score, ie, interference with daily activities ($P = .05$), interference in recreational, social, and family activities ($P < .01$), and interference in ability to work ($P < .01$).

Chronic Pain Grade. A chronic pain grade of 0 was found for 6.5% of IJ women and 4.5% of IA women. Chronic pain grades of 1, 2, and 3 were given to 34.8% of IJ women and 25% of IA women, 43.5% of IJ women and 27.3% of IA women, and 6.5% of IJ women and 31.8% of IA women, respectively (Fig 3). Only 8.7% of IJ women received an assessment of chronic pain grade 4, compared with 11.4% of the IA women. The difference between IA women and IJ women was only statistically significant for chronic pain grade 3 (chi-square test; $P < .01$). When the Mann-Whitney test was applied to the variable of chronic pain grade, there was a statistically significant difference between groups ($P < .05$); IA women showed significantly higher chronic pain grade levels.

Discussion

In the present study, an initial difference between the IA and IJ groups was found with respect to the male:female ratio, which was 1:7.3 in the IA group, compared with 1:2.4 in the IJ group. In previous studies, the male:female ratio was reported to be 1:3.6 in a study of Swedish patients,¹⁵ 1:3.1 in a study of Asian patients,¹⁶ and 1:5.0 in a study of American patients.¹⁹ In addition, pain duration of both groups in the present study was substantially lower than the average pain duration of 8.3 years reported for the US group and 5.7 years for the Swedish group.¹⁵

To appreciate these results it is important to consider the context of the clinics in which the surveys were conducted. Stohler and Zarb²⁰ referred to the differences between primary and tertiary care clinics and claimed that the proportion of women increases from community-based observations to primary and tertiary care settings, with

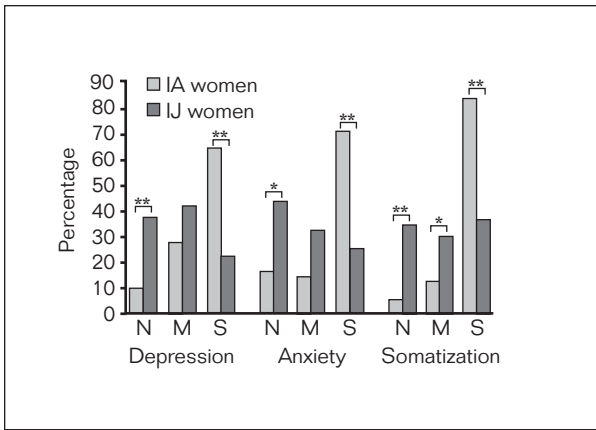


Fig 1 Depression, anxiety, and somatization (pain items excluded) scores among IA and IJ women. Percentages of women from each group who scored in the normal, moderate, and severe ranges for each condition are shown. N = normal; M = moderate; S = severe. * $P < .05$; ** $P < .01$.

women comprising 90% or more of the patient population in academic research centers. In addition, they contended that most people with TMD have relatively mild forms, while in tertiary care settings, such as academic research centers, patient pools include an overwhelming number of patients who exhibit a persistent condition.

The present study was conducted in a community-based primary care clinic. However, while the IJ women presented with typical results of Axis II and pain duration, the Axis II characteristics of the IA women resembled the population of a tertiary pain clinic. Although both populations were similar with regard to Axis I, they were distinct with regard to Axis II assessment. Both groups reported similar pain intensities, pain duration, and disability days but differed significantly in their chronic pain behavior, as expressed by their disability scores. This was the only factor that dictated the significant differences between the 2 groups in regard to chronic pain grade results. These results highlight the importance of the social aspect of the biopsychosocial model of chronic pain in sculpting chronic pain behavior.

Pronounced differences were also found when the results from the IJ and IA groups were compared to those of the Asian, American, and Swedish groups of patients.^{15,16} Only 4.2% of the Asian patients¹⁶ received a chronic pain grade of 3, and none received a chronic pain grade of 4. Approximately 20% of the American patients received a chronic pain grade of 3 or 4, while the same was true for only 13% of the Swedish patients.¹⁵ While the US, Swedish, and IJ patients

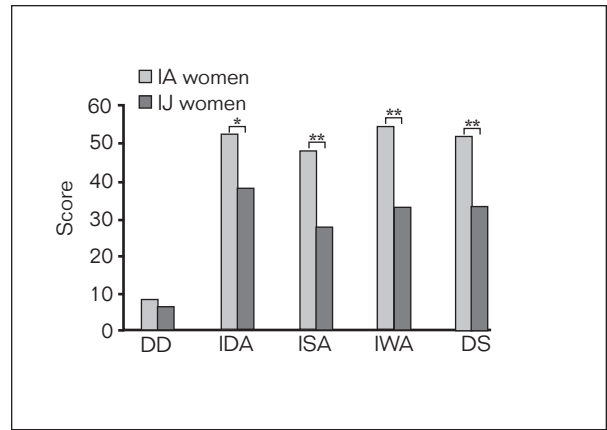


Fig 2 Disability days (DD), disability scores (DS) and scores for each component of disability—interference with daily activities (IDA); interference in recreation, social, and family activities (ISA), and interference with work ability for IA and IJ women (IWA). * $P = .05$; ** $P < .01$.

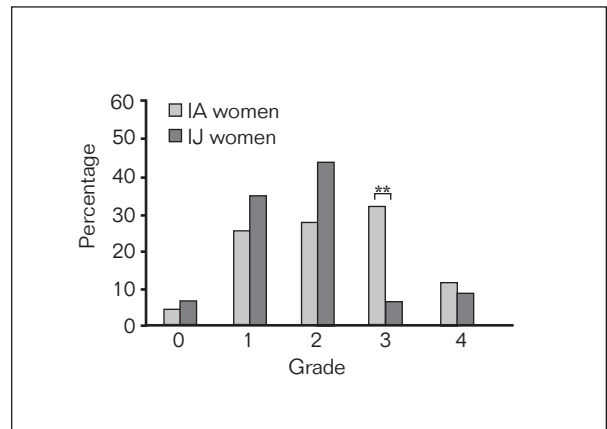


Fig 3 Distribution of chronic pain grade among IA and IJ women. ** $P < .01$.

followed more or less the same curve, the Asian curve shifts toward less dysfunctional chronic pain grade scores, and the Arab curve shifts toward more dysfunctional chronic pain grade scores.

Depression, somatization, and anxiety were significantly elevated in IA women compared with IJ women. Comparison of the IA and IJ data to results reported for American, Swedish, and Asian groups showed that the IJ group was similar to the US and Swedish groups with respect to percentage of patients with severe depression (18.4% in the IJ group).¹⁵ The prevalence of severe depression among the IA patients was markedly higher (62%). Interestingly, Asian and IA patients presented almost mirror-image results.

We must consider whether the difference in Axis II results reflects a true difference in the prevalence of certain psychological conditions or whether the

difference merely reflects ethnicity bias. Both greater prevalence and ethnicity bias may have affected the results. High rates of medically unexplained symptoms have been reported in Eastern cultures and in ethnic minorities²¹ compared to Western societies.²² Ghubash et al¹⁸ reported that less traditional people (ie, more westernized) had a significant increased rate of psychiatric disorders and higher scores on psychopathology measures, especially among females. To support this, Pollara and Meleis²³ found that Arab Americans are at risk of developing psychological problems, possibly due to acculturative stress, discrimination, or prejudice. With regard to TMD among female university students in Saudi Arabia, more than 30% reported weekly headaches. More than 40% reported sleep dysfunction because of the pain, 42% reported that the pain or discomfort interfered with daily routine, and 36% reported suffering from back or neck pain.²⁴ These results may reflect dysfunctional chronic pain grade, depression, and somatization among young Arab women who report TMD symptoms.

On the other hand, several reports indicate the problems that may exist in using contemporary diagnostic criteria to assess Axis II depression in the Arab culture. Kinzie and Manson¹⁷ pointed out that it may be incorrect to assume that psychological disturbances are constant between cultures, since different cultures may have specific methods of experimenting and reporting psychiatric disturbances. For example, El-Islam et al²⁵ described a unique symptom in depressed Moslem—the experience of chest tightness and inability to take a deep breath. El Rufaie et al²¹ commented on another unique aspect of the population of Arab TMD patients: headaches have been found to be the most common somatization symptom in this population. As to language influence, Nobles and Sciarra²⁶ noted that Arabs may use exaggerated reports and extreme descriptors, such as “excellent” and “terrible,” to stress the importance of what is being said. This could influence Axis II scores of depression, somatization, and anxiety. Hamdi et al²⁷ discussed the frequent use of somatic metaphors to describe the feeling state of depression. This is in contrast to the tendency to answer negatively to questions that describe standard descriptions of mood and depression. This may explain the high rate of somatization found in the present study, which could be secondary to depression.

Religion could also influence Axis II scores. For example, El-Islam et al²⁵ reported that a feeling of hopelessness would contradict the Islamic faith, which forbids losing hope in God’s capabilities to

cure the patient. Hamdi et al²⁷ referred to the influence of religion on Axis II expression by indicating that in the Islamic faith suicide is strongly forbidden. Therefore, the tendency would be to answer negatively to questions about thoughts of suicide.

The present study did not assess socioeconomic and educational factors, which could possibly affect the results. Riley et al²⁸ reported that patients with lower socioeconomic status are at increased risk for orofacial pain and pain-related behavioral impact. Ernst²⁹ argued that immigrants from the Middle East do not perceive pain differently from natives of their adopted countries and that their pain behavior is influenced by social components, such as lower class, thus creating “ethnization of the social bias.” Neumann and Buskila³⁰ claimed that education, not ethnicity, is an important factor in clinical features of fibromyalgia. However, Plesh et al³¹ showed higher somatization levels in an African American group as compared to a Caucasian group with similar socioeconomic diversity. Their study indicated that differences in facial pain and symptoms related to TMD between African American and Caucasian young women were not influenced by socioeconomic status.⁸ However, both studies examined racial differences, not ethnicity. Defining an ethnic group might also pose obstacles.³² Wealth, social status, intermarriage, and acculturation may change the degree of identification with a particular ethnic group. Undoubtedly, future research should strive to include socioeconomic and educational factors.

The finding of no Axis I differences co-occurring with significant Axis II differences indicates the need to conduct broad cross-cultural research into the expression of TMD and pain. Such research may elucidate the factors that cause differences in TMD patient behavior around the world and even shed some light on the different etiologies of TMD. In the present study, the norms for the Axis II cut-off scale scores for Axis II parameters provided in the RDC/TMD publication were used.¹³ While these norms enable comparisons between different populations, such norms can also be affected by culture, a fact which might have influenced the results. Furthermore, as no assessment of the cultural sensitivity of the used translations was performed, further studies regarding reliability and validity of the Hebrew and Arabic questionnaires are essential. Additionally, in future studies, common core symptoms that are more universal cross-culturally could be used or the use of cross-cultural scales should be considered.²⁵ Having said this, it is

important that care be taken to avoid stereotyping and to be aware of differences within ethnic groups, ie, "intra-ethnic variations."^{5,26} It should always be remembered that Axis II results could be etiologically unrelated to the chronic pain condition.

Today, gender differences in pain are undisputable.³ Factors such as culture and ethnicity should also be referred to when using the RDC/TMD to evaluate Axis II. Perhaps the creation of a third axis, Axis III, to represent the social component of the biopsychosocial model of pain should be considered. This would include gender, socioeconomic status, educational level and ethnicity, and which may affect the Axis II presentation in a way that is unique for each culture. The effect of such factors should be acknowledged if one is to fully understand the meaning of the patient's Axis II profile.

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