a) *Results of the parents' group*

Table 5.1.

From Table A-8 of Appendix A, the sample means are arranged according to magnitude (in the parents' group)

Fig. No.	8	2	1	9	6	4	5	3	10	11	7	12
Mean Scores	+1.24	+0.74	+0.50	+0.38	+0.05	+0.03	-0.01	-0.05	-0.35	-0.52	-0.88	-1.33
Rank No.	1	2	3	4	5	6	7	8	9	10	11	12

Table 5.2.

ANALYSIS OF VARIANCE RESULTS, JUDGED BY TOTAL PARENTS

SOURCE OF VARIATION	DF	SS	MS	F
SAMPLES	11	511.56	46.51	102.41
JUDGES	103	.00	.00	.00
ERROR	1133	514.53	.45	
TOTAL	1247	1026.08		

CORRECTION FACTOR(CF) = .00

STANDARD ERROR OF THE SAMPLE MEAN = .07

NUMBER OF OF JUDGES =104 JUDGES

NUMBER OF SAMPLE = 12 SAMPLES(FIGURES)

(From computer printout)

From Table 5.1, it is apparent that profile silhouette no. 8 is ranked no. 1 and, therefore, preferred by the majority of parents, whereas profiles nos. 7 and 12 are least favoured.

The analysis of variance indicated that there were no significant differences between observers in their assessment of the set of test facial profiles. Also it was indicated from F-ratio table (Appendix A, Table A-3) that the observers found significant differences ($p = 0.01$) between each of the profiles from most preference (no. 8) to least preference (no. 12).

From Table 5.2, the standard error of the sample mean is 0.07. The degrees of freedom for variance (DFE) is 1,133 for the 104 observers and 12 sample profiles. The least different value at the 5% level of significance for these degrees of freedom is 4.62 which is obtained from Table A-4 of Appendix A. According to Tukey's test, the least significant difference is calculated by multiplying 4.62 by the standard error of the mean (Larmond, 1977).

"Therefore, least significant difference = 0.32".

It is shown that any two samples that differ by 0.32 or more are significantly different at 5% level.

Table 5.3.

The differences between the sample means calculated for each profile according to their general rank ordering by parents

Rank No.	1	2	3	4	5	6	7	8	9	10	11	12
1	-	.50	.74	.86	1.19	1.21	1.25	1.29	1.59	1.76	2.12	2.57
2			.24	.36	.69	.71	.75	.79	1.09	1.26	1.62	2.07
3				.12	.45	.47	.51	.55	.85	1.02	1.38	1.85
4				.33	.35	.39	.43	.73	.90	1.26	1.71	
5				.02	.06	.10	.40	.57	.93	1.38		
6					.04	.08	.38	.55	.91	1.36		
7						.04	.34	.51	.87	1.32		
8							.30	.47	.83	1.28		
9								.17	.53	.98		
10									.36	.81		
11										.45		
12												

- = comparisons of ranking which are not significantly different according to Tukey's test.

Table 5.3 indicates that the parents clearly agreed in their distinguishing between nos. 1 and 2, and 11 and 12 rankings. Tukey's test indicated that there was some disagreement in successive steps of ranking between 2 and 11. Thus, for example, there was some difference of the rankings 2 and 3, 3 and 4, 5 and 6, etc. But larger step of rankings more towards agreement, such as between 2 and 4, 3 and 5, 4 and 6, 5 and 7, etc.

b) *Results of the patients' group*

From Table A-12 of Appendix A, which records observation of the total patient group, the sample means are arranged according to magnitude in order of preference, as shown in Table 5.4.

The analysis of variance by Larmond (1977) can be carried out on such data (in Table A-12) by the computer program (1). The variance ratio (F value) is shown in Table 5.5, and can be used to determine the significance of differences between samples.

The analysis of variance indicated that there were no significant differences between observers in their assessment of the set of test facial profiles. Also, it was indicated from the F-ratio table (Appendix A - Table A-3) that the observers found significant differences ($p = 0.01$) between each of the profiles from most preference (no. 8) to least preference (no. 7).

Table 5.4.

From Table A-12 of Appendix A, the sample means are arranged according to magnitude (in the patients' group)

Fig. No.	8	2	1	9	4	5	3	6	10	11	12	7
Mean Scores	+1.18	+0.79	+0.63	+0.12	+0.11	+0.03	0.00	-0.07	-0.34	-0.53	-0.96	-0.97
Rank No.	1	2	3	4	5	6	7	8	9	10	11	12

Table 5.5.

ANALYSIS OF VARIANCE RESULTS,JUDGED BY TOTAL PATIENTS

SOURCE OF VARIATION	DF	SS	MS	F
SAMPLES	11	561.06	51.01	107.19
JUDGES	119	.00	.00	.00
ERROR	1309	622.89	.48	
TOTAL	1439	1183.94		

CORRECTION FACTOR(CF) = .00

STANDARD ERROR OF THE SAMPLE MEAN = .06

NUMBER OF OF JUDGES =120 JUDGES

NUMBER OF SAMPLE = 12 SAMPLES(FIGURES)

(From computer printout)

Table 5.6.

The differences between the sample means calculated for each profile according to their general rank ordering by patients

Rank No.	1	2	3	4	5	6	7	8	9	10	11	12
1	-	0.39	0.55	1.06	1.07	1.15	1.18	1.25	1.52	1.71	2.14	2.15
2			$0.1\bar{6}$	0.67	0.66	0.76	0.79	0.86	1.13	1.32	1.75	1.76
3				$0.5\bar{1}$	0.52	0.60	0.63	0.70	0.97	1.16	1.59	1.60
4					$0.0\bar{1}$	$0.0\bar{9}$	$0.1\bar{2}$	$0.1\bar{9}$	0.46	0.65	1.08	1.09
5			$0.0\bar{8}$	$0.1\bar{1}$	$0.1\bar{8}$	0.45	0.64	1.07	1.08			
6				$0.0\bar{3}$	$0.1\bar{0}$	0.37	0.56	0.99	1.00			
7					$0.0\bar{7}$	0.34	0.53	0.96	0.97			
8						$0.2\bar{7}$	0.46	0.89	0.90			
9							$0.1\bar{9}$	0.62	0.63			
10								0.43	0.44			
11									$0.0\bar{1}$			
12												

- = comparisons of ranking which are not significantly different according to Tukey's test.

From Table 5.5, the standard error of the sample mean is 0.06. The degrees of freedom for variance (DFE) is 1,309 for the 120 observers and 12 sample profiles. The least difference value at 5% level of significance for these degrees of freedom is 4.62 which is obtained from Table A-4 of Appendix A. According to Tukey's test, the least significant difference is calculated by multiplying 4.62 by the standard error of the mean (Larmond, 1977).

"Therefore, least significant difference = 0.28".

It is shown that any two samples that differ by 0.28 or more are significantly different at 5% level.

Table 5.6 shows that collectively, the patients generally agree with their parents, although they disagree in rankings 11 and 12 in addition to a number of the middle-order rankings. As noted, the parents tended to disagree at the individual stepsof middle order rankings.

c) *Results of the orthodontists' group*

From Table A-13 of Appendix A, which records observation of the orthodontist group, the sample means are arranged according to magnitude in order of preference, as shown in Table 5.7.

The analysis of variance by Larmond (1977) can be carried out on such data (in Table A-13) by the computer

Table 5.7.

From Table A-13 of Appendix A, the sample means are arranged according to magnitude (in the orthodontists' group)

Fig. No.	8	2	1	9	4	6	5	11	3	10	12	7
Mean Scores	+1.47	+1.01	+0.61	+0.40	+0.12	+0.03	-0.18	-0.42	-0.47	-0.60	-0.65	-1.32
Rank No.	1	2	3	4	5	6	7	8	9	10	11	12

Table 5.8.

ANALYSIS OF VARIANCE RESULTS,JUDGED BY ORTHODONTISTS AT DENTAL HOSPITAL

SOURCE OF VARIATION	DF	SS	MS	F
SAMPLES	11	86.61	7.87	24.96
JUDGES	12	.00	.00	.00
ERROR	132	41.65	.32	
TOTAL	155	128.26		

CORRECTION FACTOR(CF) = .00

STANDARD ERROR OF THE SAMPLE MEAN = .16

NUMBER OF OF JUDGES = 13 JUDGES

NUMBER OF SAMPLE = 12 SAMPLES(FIGUPES)

(From computer printout)

Table 5.9.

The differences between the sample means calculated for each profile according to their general rank ordering by orthodontists

Rank No.	1	2	3	4	5	6	7	8	9	10	11	12
1	-	$0.4\bar{6}$	0.86	1.07	1.35	1.44	1.65	1.89	1.94	2.07	2.12	2.79
2			$0.4\bar{0}$	$0.6\bar{1}$	0.89	0.98	1.19	1.43	1.48	1.61	1.66	2.33
3				$0.2\bar{1}$	$0.4\bar{9}$	$0.5\bar{8}$	0.79	1.03	1.08	1.21	1.26	1.93
4					$0.2\bar{8}$	$0.3\bar{7}$	$0.5\bar{8}$	0.82	0.87	1.0	1.05	1.72
5						$0.0\bar{9}$	$0.3\bar{0}$	$0.5\bar{4}$	$0.5\bar{9}$	$0.7\bar{2}$	0.77	1.44
6				$0.2\bar{1}$	$0.4\bar{5}$	$0.5\bar{0}$	$0.6\bar{3}$	$0.6\bar{8}$	1.35			
7					$0.2\bar{4}$	$0.2\bar{9}$	$0.4\bar{2}$	$0.4\bar{7}$	1.14			
8						$0.0\bar{5}$	$0.1\bar{8}$	$0.2\bar{3}$	0.90			
9							$0.1\bar{3}$	$0.1\bar{8}$	0.85			
10								$0.0\bar{5}$	$0.7\bar{2}$			
11									$0.6\bar{2}$			
12												

- = comparisons of ranking which are not significantly different according to Tukey's test.

program (1). The variance ratio (F value) is shown on Table 5.8, and can be used to determine the significance of differences between samples.

From Table 5.7, it is apparent that profile silhouette no. 8 is ranked first and, therefore, preferred by the majority of orthodontists, whereas profile nos. 7 and 12 are least favoured.

The analysis of variance indicated that there were no significant differences between observers in their assessment of the set of test facial profiles. Also it was indicated from the F-ratio table (Appendix A - Table A-3) that the observers found significant differences ($p = 0.01$) between each of the profiles from most preference (no. 8) to least preference (no. 12).

From Table 5.8, the standard error of the sample mean is 0.16. The degree of freedom of variance (DFE) is 132 for the 13 observers and 12 sample profiles. The least different value at the 5% level of significance for these degrees of freedom is 4.62 which is obtained from Table A-4 of Appendix A. According to Tukey's test, the least significant difference is calculated by multiplying 4.62 by the standard error of the mean (Larmond, 1977).

"Therefore, least significant difference = 0.74".

It is shown that any two samples that differ by 0.76 or more are significantly different at 5% level.

Table 5.9 indicates that the orthodontist group generally discriminated between profiles, although they did not show differences of ranking between succeeding steps.

The order of preference shown in Tables 5.1, 5.4 and 5.7, in each group of the observers, is taken to calculate the rank correlation coefficient by using Spearmans' rank correlation coefficient (Fraunhofer and Murray, 1976).

The results of rank correlation coefficient in two sets of three judge groups are recorded in Tables 5.10, 5.11 and 5.12.

From Tables 5.10, 5.11 and 5.12, the rank correlation coefficient (R) approaches 1. Obviously the values of (R) .95, .97 and .95 show a high degree of correlation between the patients to the parents, the patients to the orthodontists, and the parents to the orthodontists.

The significance of these correlations can be tested by using "t" distribution. The value of "t" for df = 10 is t = 3.169 at the 0.01% level of probability in Table A-32 of Appendix A. From the experiment in Tables 5.10, 5.11 and 5.12, "t" distribution values are all more than 3.169. Thus it can be concluded that the agreement between the patients and the parents, the parents and the orthodontists, and the patients and the orthodontists are highly statistically significant.

Table 5.10

RANK CORRELATION COEFFICIENT BETWEEN TOTAL PARENTS-ORTHODONTISTS

FIG. NO.	1	2	3	4	5	6	7	8	9	10	11	12
TOTAL PARENTS	3	2	8	6	7	5	11	1	4	9	10	12
ORTHODONTISTS	3	2	9	5	7	6	12	1	4	10	8	11
RANK DIFFERENCE	0.	0.	1.	-1.	0.	1.	1.	0.	0.	1.	-2.	-1.
SQUARE OF DIFFERENCE.	0.	0.	1.	1.	0.	1.	1.	0.	0.	1.	4.	1.

SPEARMANS RANK CORRELATION COEFFIENCT(R) = .97
T DISTRIBUTION VALUE = 11.64
DEGREE OF FREEDOM = 10

(From computer printout by using computer program (2))

Table 5.11.

RANK CORRELATION COEFFICIENT BETWEEN TOTAL PATIENTS-ORTHODONTISTS

FIG. NO.	1	2	3	4	5	6	7	8	9	10	11	12
TOTAL PATIENTS	3	2	7	5	6	8	12	1	4	9	10	11
ORTHODONTISTS	3	2	9	5	7	6	12	1	4	10	8	11
RANK DIFFERENCE	0.	0.	2.	0.	1.	-2.	0.	0.	0.	1.	-2.	0.
SQUARE OF DIFFERENCE.	0.	0.	4.	0.	1.	4.	0.	0.	0.	1.	4.	0.

SPEARMANS RANK CORRELATION COEFFIENCT(R) = .95
T DISTRIBUTION VALUE = 9.73
DEGREE OF FREEDOM = 10

(From computer printout by using computer program (2))

Table 5.12.

RANK CORRELATION COEFFICIENT BETWEEN TOTAL PARENTS-PATIENTS

FIG. NO.	1	2	3	4	5	6	7	8	9	10	11	12
TOTAL PARENTS	3	2	8	6	7	5	11	1	4	9	10	12
TOTAL PATIENTS	3	2	7	5	6	8	12	1	4	9	10	11
RANK DIFFERENCE	0.	0.	-1.	-1.	-1.	3.	1.	0.	0.	0.	0.	-1.
SQUARE OF DIFFERENCE.	0.	0.	1.	1.	1.	9.	1.	0.	0.	0.	0.	1.

SPEARMANS RANK CORRELATION COEFFIENCT(R) = .95
T DISTRIBUTION VALUE = 9.73
DEGREE OF FREEDOM = 10

(From computer printout by using computer program (2))

In order to test multicorrelation among parent, patient and orthodontist groups, Kendall's "W" method is used (Mendenhall et al., 1974).

Table 5.13.

The average ranking no. in three groups

Fig. No.	Parents	Patients	Orthodontists	R	R^2
1	3	3	3	9	81
2	2	2	2	6	36
3	8	7	9	24	576
4	6	5	5	16	256
5	7	6	7	20	400
6	5	8	6	19	361
7	11	12	12	35	1225
8	1	1	1	3	9
9	4	4	4	12	144
10	9	9	10	28	784
11	10	10	8	28	784
12	12	11	11	34	1156
				$\Sigma R=234$	$\Sigma R^2=5812$

Where: $W = \frac{12(SSR)}{k^2 n(n^2-1)}$

k = The number of different sets of ranking for the (n).

n = Number of silhouette profiles.

$SSR = \Sigma R^2 - \frac{(\Sigma R)^2}{n}$

Hence, from Table 5.13:

$W = 0.97$.

Therefore, this value, W = 0.97 indicates a high degree of association or agreement among the three different groups in ranking 12 lateral silhouette profiles.

From Tables 5.15, 5.16 and 5.17, the first top rank is profile no. 8 that has facial profile component factors within the range of the esthetic model. The other 3 or 4 top ranks of profile have many profile component factors that relate to the standard values. The 4 bottom ranks of profile have few profile component factors that relate to the standard values.

Note: Few subjects gave any special comment on the questionnaire sheets.

Some of them misunderstood that nos. 1, 2, 3, 4, and 5 on the questionnaire sheet did not refer to the figure of silhouette profile nos. 1, 2, 3, 4, and 5.

One subject commented that she did not like a profile which had a big nose.

Some did not like the profile that had the chin more prominent than lips.

One recorded that "just straighten my teeth, leave my face alone".

Table 5.14.

The measurement of facial profile component factor in 12 samples from the projected slides on the tracing paper
(Esthetic model values noted in brackets)

Fig. No.	Fronto-nasal angle Mean 136° (130°-140°)	Columellar length angle (21°-24.5°)	Naso-labial angle Mean 98° (90°-110°)	Lower lip to E line (-2±3)	Upper lip sulcus depth to H.L. (5)	Inferior labial sulcus angle Mean 122° (110°-134°)	Chin prominence to upper lip lower lip plane 0-(+4)	Verticle proportion (1:1)	Total facial contour (-11±4)
1	140	24	103	-5	2.5	137	+1	.95:1	-9
2	140	21	97.5	-3.5	5.5	148.5	+3	1:1	-12
3	133	26	97.5	-4.5	4.5	139	-2	1:1	-6
4	143	23.5	90	-3.5	7.5	131	0	.95:1	-8
5	137	26	99	0	7.5	115	-8	.97:1	-15
6	136	24	105.5	-3.5	2.5	140	0	1:1	-7.5
7	152	27	82	-6.5	2.5	130.5	-6	1:1	-7
8	138	23	99	-3.5	5.5	125	+3.5	1:1	-12.5
9	133	23.5	110	-4.5	3.5	136	+3	1:1	-10
10	143	26	120.5	-7.5	2	132	+11	.95:1	-3.5
11	140	30	110	-9	2.5	145	+7	.8:1	-8.5
12	144	23	128	-1.5	3.5	140	0	1.2:1	-23

Table 5.15.

Relationship of the rank order (no.) to the measurement values in the parent's (mothers) group
(Esthetic model values noted in brackets)

Rank No.	Fig. No.	Fronto-nasal angle (130^{o}-140^{o})	Columellar length angle (21^{o}-24.5^{o})	Naso-labial angle (90^{o}-110^{o})	Lower lip to E line (-2±3)	Upper lip sulcus depth to H.L. (5)	Inferior labial sulcus angle (110^{o}-134^{o})	Chin prominence to upper lip lower lip plane 0-(+4)	Vertical proportion (1:1)	Total facial contour (-11±4)
1	8	138	23	99	-3.5	5.5	125	+3.5	1:1	-12.5
2	2	140	21	97.5	-3.5	5.5	148.5	+3	1:1	-12
3	1	140	24	103	-5	2.5	137	+1	.95:1	-9
4	9	133	23.5	110	-4.5	3.5	136	+3	1:1	-10
5	6	136	24	105.5	-3.5	2.5	140	0	1:1	-7.5
6	4	143	23.5	90	-3.5	7.5	131	0	.95:1	-8
7	5	137	26	99	0	7.5	115	-8	.97:1	-15
8	3	133	26	97.5	-4.5	4.5	139	-2	1:1	-6
9	10	143	26	120.5	-7.5	2	132	+11	.95:1	-3.5
10	11	140	30	110	-9	2.5	145	+7	.8:1	-8.5
11	7	152	27	82	-6.5	2.5	130.5	-6	1:1	-7
12	12	144	23	128	-1.5	3.5	140	0	1.2:1	-23

Table 5.16.

Relationship of the rank order (no.) to the measurement values in the patients' group
(Esthetic model values noted in brackets)

Rank No.	Fig. No.	Fronto-nasal angle (130^{o}-140^{o})	Columellar length angle (21^{o}-24.5^{o})	Naso-labial angle (90^{o}-110^{o})	Lower lip to E line (-2±3)	Upper lip sulcus depth to H.L. (5)	Inferior labial sulcus angle (110^{o}-134^{o})	Chin prominence to upper lip lower lip plane 0-(+4)	Vertical proportion (1:1)	Total facial contour (-11±4)
1	8	138	23	99	-3.5	5.5	125	+3.5	1:1	-12.5
2	2	140	21	97.5	-3.5	5.5	148.5	+3	1:1	-12
3	1	140	24	103	-5	2.5	137	+1	.95:1	-9
4	9	133	23.5	110	-4.5	3.5	136	+3	1:1	-12
5	4	143	23.5	90	-3.5	7.5	131	0	.95:1	-8
6	5	137	26	99	0	7.5	115	-8	.97:1	-15
7	3	133	26	97.5	-4.5	4.5	139	-2	1:1	-6
8	6	136	24	105.5	-3.5	2.5	140	0	1:1	-7.5
9	10	143	26	120.5	-7.5	2	132	+11	.95:1	3.5
10	11	140	30	110	-9	2.5	145	+7	.8:1	-8.5
11	12	144	23	128	-1.5	3.5	140	0	1.2:1	-23
12	7	152	27	82	-6.5	2.5	130.5	-6	1:1	-7

Table 5.17.

Relationship of the rank order (no.) to the measurement values in the orthodontists' group
(Esthetic model values noted in barckets)

Rank No.	Fig. No.	Fronto-nasal angle (130^{o}-140^{o})	Columellar length angle (21^{o}-24.5^{o})	Naso-labial angle (90^{o}-110^{o})	Lower lip to E line (-2±3)	Upper lip sulcus depth to H.L. (5)	Inferior labial sulcus angle (110^{o}-134^{o})	Chin prominence to upper lip lower lip plane 0-(+4)	Vertical proportion (1:1)	Total facial contour (-11±4)
1	8	138	23	99	-3.5	5.5	125	+3.5	1:1	-12.5
2	2	140	21	97.5	-3.5	5.5	148.5	+3	1:1	-12
3	1	140	24	103	-5	2.5	137	+1	.95:1	-9
4	9	133	23.5	110	-4.5	3.5	136	+3	1:1	-10
5	4	143	23.5	90	-3.5	7.5	131	0	.95:1	-8
6	6	136	24	105.5	-3.5	2.5	140	0	1:1	-7.5
7	5	137	26	99	0	7.5	115	-8	.97:1	-15
8	11	140	30	110	-9	2.5	145	+7	.8:1	-8.5
9	3	133	26	97.5	-4.5	4.5	139	-2	1:1	-6
10	10	143	26	120.5	-7.5	2	132	+11	.95:1	-3.5
11	12	144	23	128	-1.5	3.5	140	0	1.2:1	-23
12	7	152	27	82	-6.5	2.5	130.5	-6	1:1	-7

A few subjects commented that the samples of silhouette profiles were difficult to rank.

One orthodontist commented that he liked the profile for which the lips fell on the E plane.

Another orthodontist did not like the profile that showed the chin protrusion.

5.7. Discussion

In this study, facial preference was evaluated only by silhouette profiles. They lack the colour, the mobility and, to an important extent, the expressiveness of the living face.

The statistical analyses show that all of the three observer groups: patients, parents (mothers), and orthodontists broadly agree in the perception of profile preference. The three of the top end order preferences for each group are very similar and the bottom end order preferences are only slightly different in the three groups. The ones between top and bottom end are moderately different. Thus the most pleasing and the least pleasing profiles appear to be easier to distinguish than ones in between.

However, the two most pleasing which ranked no. 1 and no. 2 are silhouette profiles no. 8 and no. 2

respectively (and were chosen in each group). They have facial profile components which closely relate to the desirable range (acceptable range), as shown in Table 5.14. In three or four of the bottom ranking profiles, which are profiles nos. 9, 10, 11 and 12, these facial profile components have some factors that relate well to the acceptable range, but with other components which are not within the acceptable range. But in the middle ranks, some orders of preference do not relate to facial profile component factors. This is because it is not only difficult to determine order of preference in the middle, but, psychologically, the top range and the bottom range might always command the major attention of the observers. The attention is less when they are asked to rank the ones in between.

The present study agrees with Foster's study (1973). He found the closeness of choices among all groups, distinguished according to age, 8 through 16 years, and a definite separation of adult males and females. He also indicated that the public not only shares a common esthetic standard but also has a discerning eye for detail of silhouette profile. The public is a more astute analyst of faces and of orthodontic results than might be expected. Furthermore, Pitt and Karen (1977) found that 93% of 207 patients' parents agreed with the orthodontic conception of the ideal profile drawing.

The present study is concerned with the living profile components comprising many variable factors. Therefore, this study does not identify which distances, lines and angles are preferred by the patients, the parents and the orthodontists. But it can be said that the two most pleasing profiles (silhouette profile nos. 8 and 2) were chosen by the patients, the parents and orthodontists. They have the facial component factors falling within the acceptable range of the esthetic standard model, as shown in Table 5.14. These results do not agree with Peck and Peck (1970). They found that the U.S. general public admires a fuller more protrusive dentofacial pattern than customary cephalometric standards. However, their study used samples chosen from professional models and beauty contest winners. Thus, features other than the facial profile outline, such as eyes, nose, lips and complexion may exert considerable influence on the pleasurable judgement of the face. This possibility has been precluded from the present study.

The weak points in this experiment are as follows:

1) Time for the subjects to do the test was not taken into account. The subjects used different amounts of time for ranking the profiles. It can only be presumed that all subjects regarded the test with equal seriousness.

2) The number in the orthodontist evaluation group is very small compared to the patient and the parents'

group, with greater possible effects of subjective variations.

3) The number of silhouette profiles is only 12 and does not cover representative profiles of the general population.

This latter criticism can be levelled at most similar studies such as those of Peck and Peck (1970), and Riedel (1957).

In this study, but may be worse in Peck and Peck's, there is the problem of the primary selection bias, intentional and unintentional, which decided on the range of variations to be used. Peck and Peck's sample must have been based upon preferences of a particular set of judges who could influence public tastes as much as they themselves might have been influenced by general tastes.

EXPERIMENT I(b)

The general theoretical premise of the study is that standards of judgement of female facial beauty are essentially cultural in character but are also influenced by ethno-racial averages of features (Martin, 1964).

The aim of this experiment is to find out whether or not there is essentially a single cultural standard in the multi-cultural and multi-racial Australian society.

5.8. Materials and Methods

Although subjects in Experiment I(a) were asked to record their race (ethnic) group, this information was not coded for the mechanical tabulation. In order to gain some evidence of the effect of ethnic status in order of profile preference, a representative sample was selected for each of four classifications:

i) Caucasian (North) European (E.P.). From this broad category, the following nationalities are represented in the samples: British, Scandinavian, French, German.

ii) Caucasian Mediterranean (M.P.). From this broad category, the following nationalities are

represented in the sample: Greek, Maltese, Lebanese, Italian.

iii) Caucasian Australian (A.P.). This category is based on the subjects who indicated "Australian" for "race".

iv) Total poly-racial in Australia (T.P.) refers to all of the subjects in Groups 1, 2 and 3.

Note - "Race" and "Racial": For simplicity in the questionnaire "race" was the preferred identification of family cultural and ethnic background. It might have been more appropriate to use "ethnic" because all subjects were of the Caucasian racial group. None of the subjects expressed difficulty or misunderstanding with use of the description "race".

5.9. Results

The sample means for ranking of the 12 silhouette profiles by the parents and patients in the various ethno-racial ("racial") groups are shown in Tables A-5, A-6, A-7, A-8, A-9, A-10, A-11 and A-12 of Appendix A. The order of preference of the silhouette profiles in each group was found from the order of magnitude of the mean scores. The rank order correlation of the esthetic judgement among the various "racial" groups in Australia was then computed. The results of rank correlation are shown in Tables A-20 to A-31 of Appendix A.

Table 5.18.

Summary correlation coefficients between the various "racial" groups of the patients in Australia.

Racial Group	E.P.	M.P.	A.P.	T.P.
European patients (E.P.)	-	.92	.92	.92
Mediterranean patients (M.P.)		-	.93	.96
Australian patients (A.P.)			-	.99
Total poly-racial patients (T.P.)				-

Table 5.19.

Summary correlation coefficients between the various "racial" groups of the parents in Australia.

Racial Group	E.P.	M.P.	A.P.	T.P.
European parents (E.P.)	-	.92	.92	.93
Mediterranean parents (M.P.)		-	.99	.99
Australian parents (A.P.)			-	.99
Total poly-racial parents (T.P.)				-

Table 5.18 shows summary correlation coefficients between the various "racial" groups of the patients from Tables A-26 to A-31 of Appendix A. Table 5.19 shows summary correlation coefficient between the various "racial" groups of parents from Tables A-20 to A-25 of Appendix A.

The values in Tables 5.18 and 5.19 show that there is complete agreement in judgement of the female facial profile outline (silhouette profiles) in the poly-racial Australian society. It might be concluded that there is essentially a single cultural standard in the multi-cultural Australian society as represented by these patients and parents at the Dental Hospital.

5.10. Discussion

The data generally support the proposition that Caucasian European, Caucasian Mediterranean, Caucasian Australian and total mixed parents or patients share a common esthetic standard for judging silhouette profile outlines of female faces.

The close agreement between different ethno-racial or ethno-cultural groups may be due to the fact that:

(1) the mass media of modern life are very influential in unifying people's tastes. Television, motion picture, newspapers and magazines all provide daily reinforcement for facial stereotype; and

(2) the subjects are all Caucasian even though they may have different cultural backgrounds.

Therefore the people, even if they are of different backgrounds, come to live in the same culture. They have been influenced by mass media. Also the children, who are of different cultural background, are born or are growing in the same environment. They have been influenced from the same mass media.

However, in the study of international and trans-cultural groups, esthetic agreement has been reported by Udry (1965), Ford, Prothro and Child (1969) using works of art instead of faces as their testing medium.

Martin (1964) found that American whites and American blacks share a common esthetic standard - the Caucasian facial model - for judging beauty, at least of the female face. Iliffe (1960) found that a common basis for judging facial beauty indeed existed, and it was shared by men and women of all ages in all parts of England, and in almost all occupations.

The present study agrees with these previous studies. Thus, it was reasonable in Experiment I(a) to use total patient and total parent data without the need to take into account cultural backgrounds when comparing profiles.

CHAPTER 6

EXPERIMENT II

Many observers have noted that the demand for correction of dentofacial disharmony was often based on psychological factors. The motivation for orthodontic treatment has brought together the physical aspect of orthodontics with the emotive aspects which set the stage for a further look at self-percept and self-concept.

From previous literature reviews, the parental background and family need, correlated with the child's dentofacial problem, affects demand for orthodontic treatment. Baldwin and Barnes (1966) noted, that among more than half the orthodontic cases reported, the children were seeking treatment because of their mothers' wish.

The aim of this experiment is to test self recognition by patient and recognition by parents. Patients are recognisable by their mothers according to individuality of profiles.

6.1. The Experimental Hypotheses are:

a) The patients have poor perception of their own facial profiles.

b) Their mothers have poor perception of their children's profiles.

6.2. Materials and Methods

The materials used in this experiment consisted of two parts:

a) Experimental groups: these consisted of subjects divided into two groups -

Group I - these subjects were 23 randomly selected new orthodontic patients, aged 10 to 15 years old. Eight were boys and 15 were girls.

Group II - consisted of the mothers of the 23 patients in Group I, aged between 30 and 50 years.

b) Questionnaire sheets: these were provided for the identification of the test observers, whether completed by the children or their respective mothers. The main section of the questionnaire comprised three parts:

i) Part A - which was answered by the patients, i.e. the children;

ii) Part B - which was answered by the mothers of the patients;

iii) Silhouettes of the 23 child patients.

6.3. Method of Silhouette Profile Preparation

The method of preparing was the same as the method of silhouette profile preparation used in Experiment I(a).

6.4. Example of Questionnaire in Experiment II

PROFILE PERCEPTION

The following questionaire is part of our survey to study the profile perception of patients and parents attending the Dental Hospital.

Please complete the following spaces before answering the questions:

Name ..... Age .....years .....months

Sex .....(Female or Male).

Please answer the following section A or B .

If you are the patient please answer section A only.

If you are a parent please answer section B only.

Patient: Section A Which one is your profile picture as shown on the following page?

Please answer by marking (X) on the profile number box that correspons with the profile picture .

1	2	3	4	5	6	7	8
9	10	11	12	13	14	15	16
17	18	19	20	21	22	23	

Parent: Section B Which one is your son or daughter's profile picture as shown on the following page?

Please answer by marking (X) on the following profile number box that corresponds with the profile picture.

1	2	3	4	5	6	7	8
9	10	11	12	13	14	15	16
17	18	19	20	21	22	23	

Figure 6.1. Questionnaire sheet.

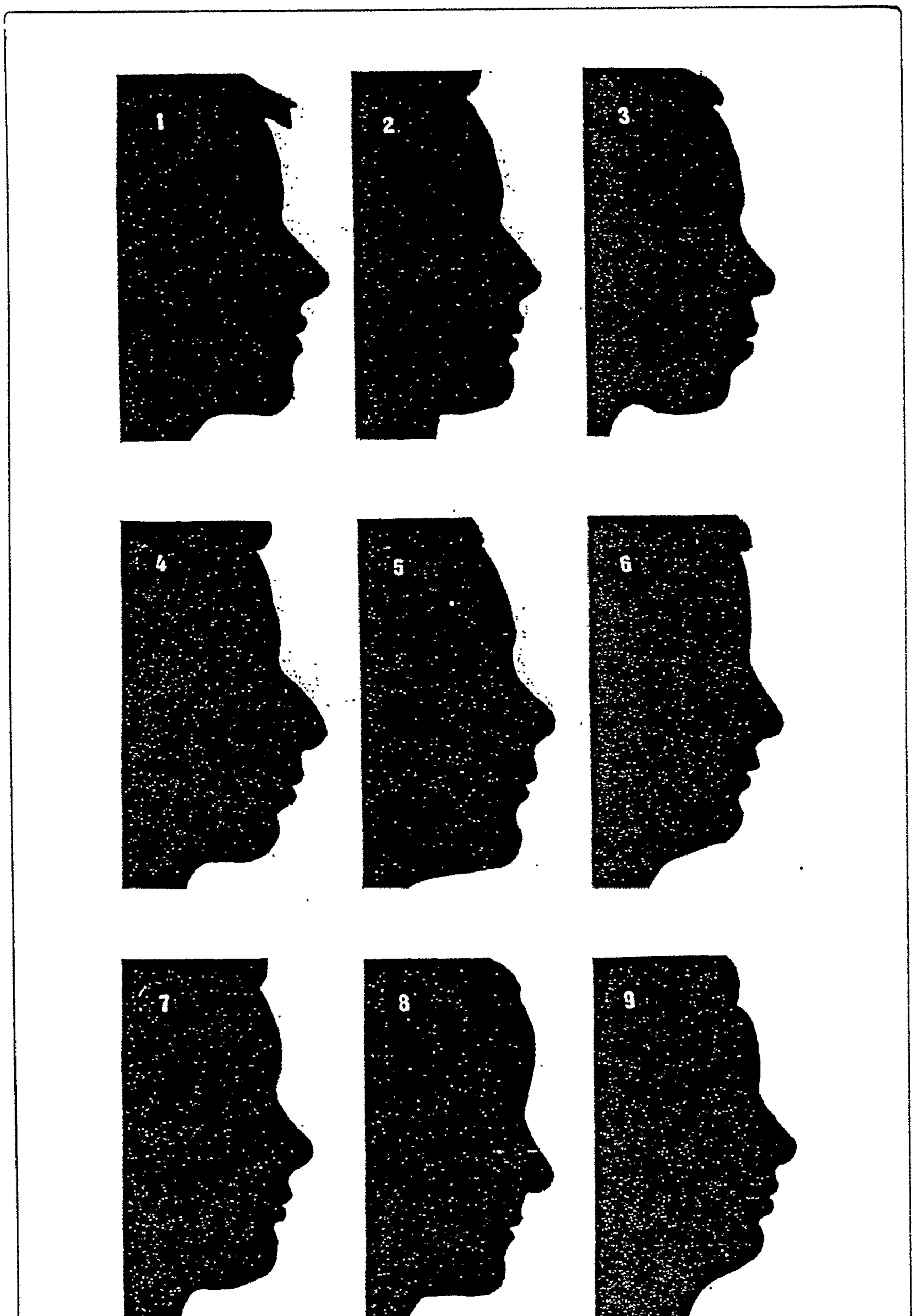


Figure 6.2. Silhouette profiles of the patients.

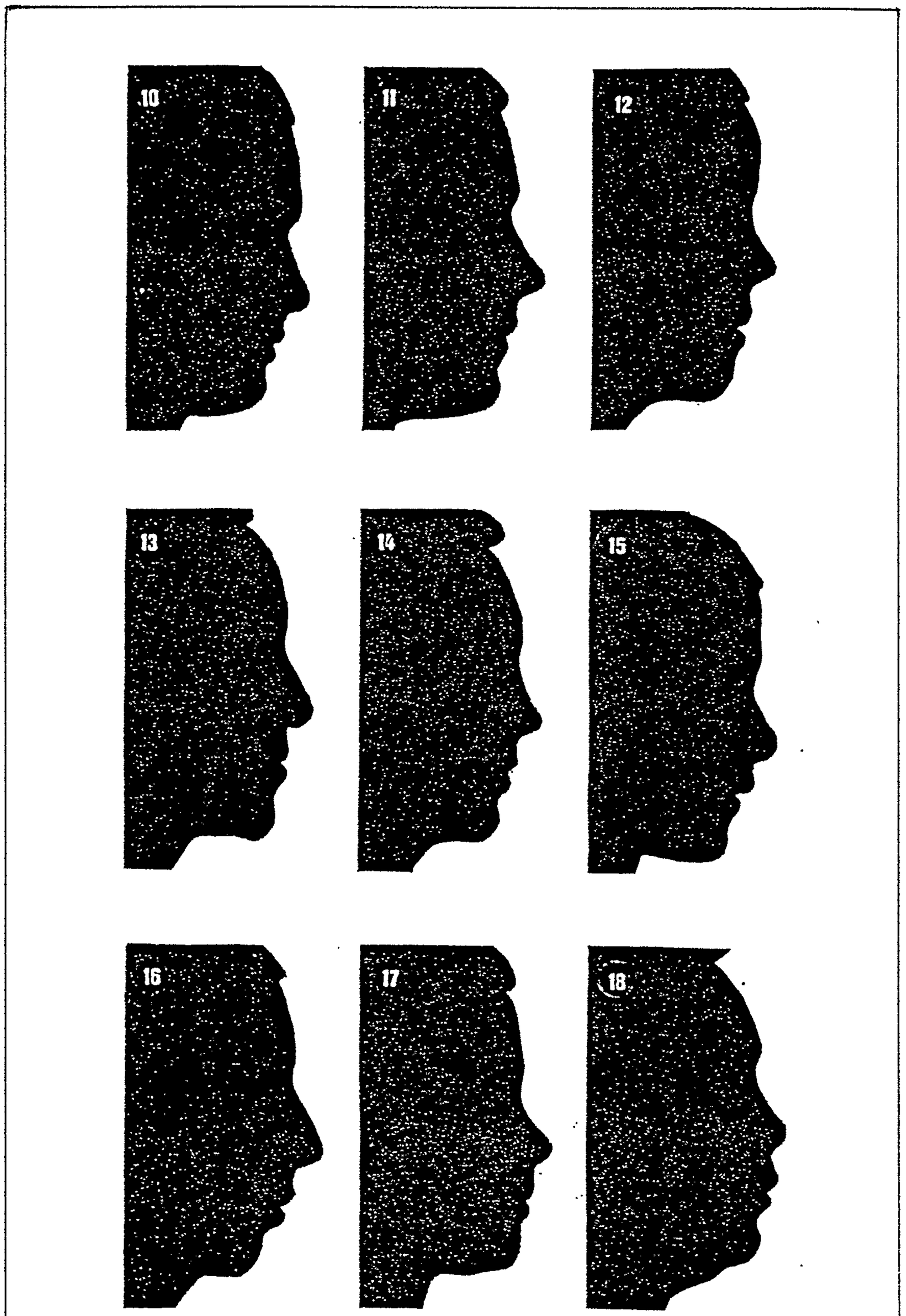


Figure 6.3. Silhouette profiles of the patients.

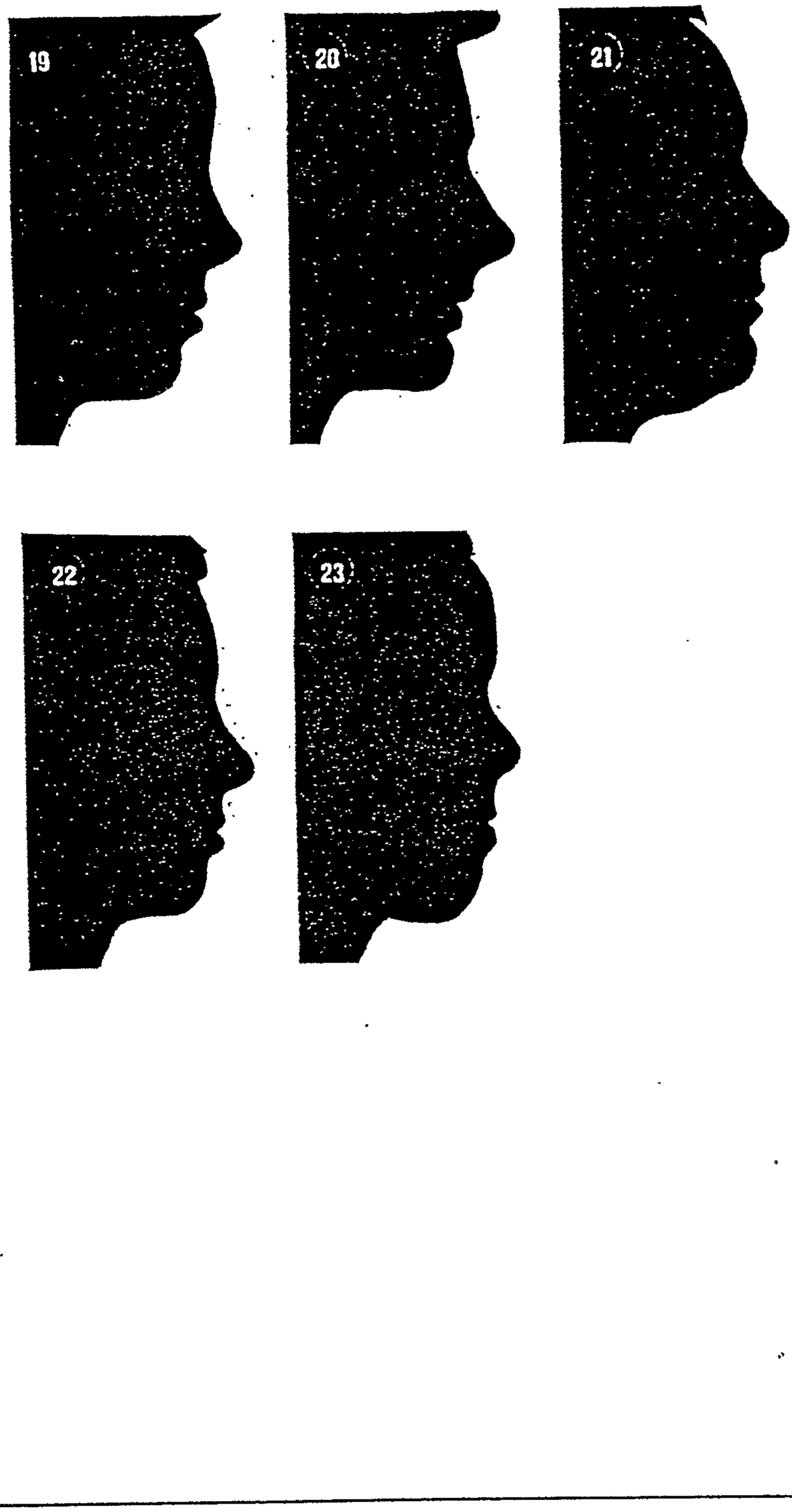


Figure 6.4. Silhouette profiles of the patients.

6.5. Method of Testing

a) The subjects in Group I were asked to choose their own profile from the series of silhouette profiles.

b) Each mother was asked to choose her son's or daughter's profile from the silhouette profiles.

c) Every subject carried out the identification test independently (with no other person present).

6.6. Findings and Results

In carrying out the experiment, some subjects were unavailable to do the test. Only 18 patient subjects and 15 mothers were available. Since the total number in the patient sample was small, the data for boys and girls were combined.

It was found that only 2 out of 18 patients could recognize themselves, and that 5 out of 15 of the mothers could identify their children's profiles.

The data were analyzed statistically, as shown in Tables 6.1 and 6.2.

6.7. Method of Statistical Analysis

The normal approximation to the binomial distribution method (Mendenhall, Ott and Larson, 1974 - shown in Method B-1 of Appendix B) is used.

As previously noted, research hypotheses for the patient's perception and the mother's perception survey are:

a) the patients have poor perception of their own facial profiles;

b) the patients' mothers have poor perception of their children's facial profiles.

Therefore, the statement that the patients can recognize their own facial profiles is equivalent to saying: "the probability of correct perception is equal to or greater than .5". In a similar way the patient's mother can recognize her child's profile, that is equivalent to saying: "the probability of correct perception is equal to or greater than .5". Hence the null hypothesis for the patient perception survey is that 50% of the patients can perceive their own profile. Furthermore, the "null" hypothesis for the patients' mothers perception survey is that 50% of the mothers can perceive their children's profiles. The results of statistical tests are shown in Tables 6.1 and 6.2 as follows.

Table 6.1.

The result of statistical test of self-perception in the patient group

No. of Patient subjects	No. of successes (x)	Mean (μ) = nP*	σ(S.D.) = $\sqrt{npq}$*	At .05% level = 1.96σ	Areas of acceptance (range)	Rejected area x < range < x
18	2	9	2.12	4.15	4.85-13.15	2 < 4.85-13.15 <

(* See Appendix B for explanation of use of symbols).

Table 6.1 summarizes the data and statistical analysis of patient self-perception and leads to the rejection of the null hypothesis in favour of the research hypothesis. It can be concluded that the patients have poor perception of their own facial profiles.

Table 6.2.

The result of statistical test of perception of their children's profile in the patients' mothers group

No. of Mother subjects	No. of successes (x)	Mean (μ) = nP	σ(S.D.) = $\sqrt{npq}$	At .05% level = 1.96σ	Areas of acceptance (range)	Rejected area x < range < x
15	5	7.5	1.9	3.72	3.78-11.22	< 3.78-11.22 <

Statistical analysis of the data (according to method in Appendix B) for the mother group indicates that the null hypothesis cannot be rejected.

6.8. Discussion

Several investigators such as Pitt and Karabik (1977) found that 56% of the patients' parent subjects are able to correctly identify their profiles from groups of silhouette profiles. Deloach (1978) used 10 representative profiles for testing black women of various educational and social backgrounds. The result showed that the respondents generally could not recognize their own profile type. Giddon, Hershon and Lennartoson (1974) noted that the subjects differed in their ability to recreate their own profile from 3 adjustable cardboard pieces.

In the present experiment, the patients were asked to choose their own profiles from the silhouette profiles which were copied from their profile slides. The results show that the patients could not recognize themselves. This is not surprising because people mostly visualize themselves full-face, looking into a mirror, without much, if any, idea of their profile. Another reason for failure of identification is that the patient subjects may be too young to be concerned about their own profiles, even if they come to the orthodontic clinic for correction of dentofacial malocclusion. It may be that the patients are concerned about their malocclusion rather than about

facial profile. These explanations for failure of self-identification of profile could be tested in further studies.

In the parents' (mothers') group of the present study, it is shown that mothers are likely to be able to recognize their children's profiles. Even though only one-third of the mothers successfully identified their own children, according to statistical interpretation, they could well have accomplished this at a further test. One interpretation of this finding is that some of the mothers were confused by profiles of other children who could have been similar to their own children. It is very hard to relate the difference between the perception of the patient of their own profiles and the perception of the mother of their children's profiles. However, at least in the present experiment it can be observed that the mothers might be interested in their children's soft tissue profiles.

However, some weak points in this experiment include:

1) the observers were small in number;

2) no account was taken of the possible difficulty experienced by the mothers (and possibly by the patients) in being presented with some profiles which had similar profile component factors.

CHAPTER 7

SUMMARY AND CONCLUSION

EXPERIMENT I(a)

One hundred and twenty female patients, together with 104 patients' mothers who were concerned about treatment in the orthodontic clinic at the Dental Hospital in Sydney, and 13 orthodontists and orthodontists-in-training who had treated patients at the Dental Hospital were asked to rank 12 silhouette living profiles from the most pleasing to the least pleasing. These 12 silhouette profiles were prepared from standardized photographs of young adult females who had slight convexity to concavity of total facial contour and provided a wide range of differences of nose, lip and chin profile component factors. Two of the 12 silhouette profiles possessed profile characteristics closely related to esthetic standard values (Table 5.14).

It was concluded that:

1) the first and second most pleasing profiles ranked by each observer group were the same (Figs. 8 and 2 respectively);

2) there was agreement among the patients, patients' mothers and orthodontists at the Dental Hospital;

3) the result of evaluation of the 2 most pleasing female profiles ranked by the patients, patients' mothers and orthodontists related closely to the standard model esthetic measurements (Table 5.14).

EXPERIMENT I(b)

The patient subjects and the mother subjects in Experiment I(a) were asked to record their ethnic or racial group. The data were divided into four classes: Caucasian (North) European, Caucasian Mediterranean, Caucasian Australian, total poly-racial Australian groups. All subjects were asked to rank the 12 silhouette profiles from the most pleasing to the least pleasing.

The present study found that there was high correlation between the esthetic judgement of the various racial groups in Australia. Thus, it may be concluded that there is essentially a single cultural standard in a poly-racial group of Dental Hospital clients. This group may reasonably represent Australian society for the judgement of silhouette profile outlines.

EXPERIMENT II

Eighteen patient subjects were asked to choose their own profiles from 23 silhouette profiles presented. One of the silhouette profiles belonged to each patient. Fifteen mother subjects were asked to choose their children's profile. The results were that only 2 out of 18 patients could recognize themselves, and 5 out of 15 mothers could recognize their children's profiles.

Statistical analysis, of the finding of the identification test, indicates that the patient subjects have poor perception of their own profiles. In the mother group, approximately 30% of the mothers were able to recognize their children's profile from the silhouettes, but because of the small size of the group, this percentage was not regarded as statistically significant.

SECTION 3

Appendix A

Computer Program I

```
C*************************************************************
C
C     PROGRAM TO ANALYSIS THE RANK OF PROFILE PREFERENCE OF
C    AUSTRALIAN IN SYDNEY BY THE METHOD OF FISHER AND YATE
C     (1942), ISUSED TO DETERMINE THE SCORE GIVEN TO EACH RANK
C    WRITTEN BY K, SRISUK, 1982, FOR THE PURPOSE OF MRS N. SRISUK'S
C     MASTER DEGREE THESIS IN DENTAL SCIENCE(C     M.D.SC., ORTHODONTICS)
C    FACULTY OF DENTISTRY, SYDNEY UNIVERSITY, AUSTRALIA
C
C*************************************************************
      PROGRAM RANK(INPUT,OUTPUT,TAPE5=INPUT,TAPE6=OUTPUT)
      DIMENSION X(200,12),SUMR(200),SUMC(12),SUMY(200),Y(200)
      DIMENSION TITLE(8),XMEAN1(12),TITLE2(8)
C
C
C     INPUT THE TITLES OF SCORE-TABLE(TITLE) AND TITLE OF RESULTS
      READ(5,5) TITLE
      READ(5,5) TITLE2
    5 FORMAT(8A10)
C
C     INPUT THE NUMBER OF JUDGES
      READ(5,1) N
    1 FORMAT(I3)
C
C
C     PRINT TITLE AND HEADINGS OF THE SCORES
    6 FORMAT(1H1,27X,8A10,//)
      WRITE(6,6) TITLE
      WRITE(6,7)
    7 FORMAT(1X,45X,'SAMPLES'//1X,'JUDGES',3X,'FIG.1',2X
     +'FIG.2',3X'FIG.3',3X,'FIG.4',3X,'FIG.5',3X,'FIG.6',3X,
     +'FIG.7',3X,'FIG.8',3X,'FIG.9',2X,'FIG.10',2X,'FIG.11',3X
     +,'FIG.12',3X,'TOTAL',//)
C
C     INITIALIZE THE SUM SCORES BY EACH JUDGE
      DO 10 J=1,12
      SUMC(J)=0.0
   10 CONTINUE
C
C     INPUT THE RANK SCORES
C
      DO 30 I=1,N
      SUMR(I)=0.0
      READ(5,100)(X(I,J),J=1,12)
  100 FORMAT(12F5.2)
C
C     CALCULATE THE TOTAL SUM OF SCORES BY EACH JUDGE
      DO 35 J=1,12
      SUMR(I)=SUMR(I)+X(I,J)
   35 CONTINUE
C
C     PRINT THE RAW DATA(SCORES) AND SUM OF SCORES BY EACH JUDGE
      WRITE(6,200) I,(X(I,J),J=1,12),SUMR(I)
  200 FORMAT(1X,I3,2X,11(1X,F7.2),2X,F8.2,1X,F6.2)
C
C     CALCULATE TOTAL SUM SCORES OF EACH FIGURE
      DO 300 J=1,12
      SUMC(J)=SUMC(J)+X(I,J)
  300 CONTINUE
   30 CONTINUE
C
C
C     CALCULATE THE TOTAL SCORES WHICH WERE JUDGED BY EACH JUDGE
      Z=0.0
      DO 39 I=1,N
      Z=Z+SUMR(I)
   39 CONTINUE
C
C     PRINT THE TOTAL SCORES OF EACH FIGURE AND TOTAL SCORE BY EACH
C     JUDGE
      WRITE(6,400)(SUMC(J),J=1,12),Z
  400 FORMAT(//,1X,'TOTAL',11(1X,F7.2),2X,F8.2,1X,F6.2)
C
C     CALCULATE MEAN OF SCORES OF EACH FIGURE
      DO 41 J=1,12
      XMEAN1(J)=SUMC(J)/FLOAT(N)
   41 CONTINUE
C
C     CALCULATE MEAN OF TOTAL SCORES BY EACH JUDGE
      XMEAN2=Z/FLOAT(N)
      WRITE(6,450)(XMEAN1(J),J=1,12),,XMEAN2
  450 FORMAT(//,1X,'MEAN',1X,11(1X,F7.2),2X,F8.2,1X,F6.2)
```

```
C
C     CALCULATE CORRECTION FACTOR(CF)
C
      CF=Z*Z/(12.0*FLOAT(N))
C
C     CALCULATE SUM OF SQUARES SAMPLES(SSS)
C
C     SSS=SUM OF THE SQUARES OF TOTAL FOR EACH SAMPLE/NO.
C     OF JUDGMENT FOR EACH SAMPLE - CF
C     AA=SUM TOTAL OF EACH SAMPLE OR AA(J),J=1,12
C
      XX=0.0
      DO 75 J=1,12
      XX=XX+SUMC(J)*SUMC(J)
   75 CONTINUE
C
      SSS = XX/FLOAT(N) - CF
C
C
C
C
C     CALCULATE SUM OF SQUARES,JUDGES(SSJ)
C
      YY=0.0
      DO 85 I=1,N
      YY= YY+SUMR(I)*SUMR(I)
   85 CONTINUE
      SSJ = YY/12.0 - CF
C
C
C     CALCULATE SUM OF SQUARES,TOTAL(SST)
      ZZ=0.0
      DO 95 I=1,N
      DO 95 J=1,12
      ZZ=ZZ+X(I,J)*X(I,J)
   95 CONTINUE
      SST = ZZ - CF
C
C     CALCULATE SUM OF SQUARES,ERROR(SSE)
      SSE=SST - SSS - SSJ
C
C     DEGREE OF FREEDOM,SAMPLES(DFS)
      DFS=12.0-1.0
C
C     DEGREE OF FREEDOM,JUDGES(DFJ)
      DFJ = FLOAT(N)-1.0
C
C     DEGREE OF FREEDOM,TOTAL(DFT)
C
      DFT = FLOAT(N)*12.0-1.0
C
C     DEGREE OF FREEDOM,ERROR(DFE)
C
      DFE = DFT-DFJ-DFS
C
C     CALCULATE MEAN SQUARE(XMS)FOR ANY VARIABLE
C
C     XMSS=MEAN SQUARES OF SAMPLES.
C
      XMSS = SSS/DFS
C
C     XMSJ=MEAN SQUARES OF JUDGES
      XMSJ = SSJ/DFJ
C
C     XMSE=MEAN SQUARES OF ERROR
      XMSE = SSE/DFE
C
C
C     CALCULATE THE VARIANCE RATIO,SAMPLES(FS)
C
        FS=XMSS/XMSE
C
C     CALCULATE THE VARIANCE RATIO,JUDGES(FJ)
C
      FJ = XMSJ/XMSE
C
C     TABULATE THE ANALYSIS OF THE VARIANCE TABLE
C
        LDFS=IFIX(DFS)
        LDFJ=IFIX(DFJ)
        LDFT=IFIX(DFT)
        LDFE=IFIX(DFE)
```

```
C     PRINT THE TITLE2
      WRITE(6,333) TITLE2
  333 FORMAT(1H1,10X,8A10,//)
      WRITE(6,444)
  444 FORMAT(1X,'SOURCE OF VARIATION ',7X,'  DF  ',5X,'  SS  '
     +7X,'  MS  ',7X,'  F  ',//)
C
      WRITE(6,500) LDFS,SSS,XMSS,FS
  500 FORMAT(1X,'SAMPLES',13X,5X,I7,3(5X,F7.2))
C
      WRITE(6,600)LDFJ,SSJ,XMSJ,FJ
  600 FORMAT(/,1X,'JUDGES',14X,5X,I7,3(5X,F7.2),//)
C
      WRITE(6,777) LDFE,SSE,XMSE
  777 FORMAT(1X,'ERROR',20X,I7,3(5X,F7.2),//)
C
C     SUM TOTAL OF DEGREE OF FREEDOM AND SS
      SSTO = SSS+SSJ+SSE
C
      WRITE(6,700) LDFT,SSTO
  700 FORMAT(/,1X,'TOTAL',14X,6X,I7,5X,F7.2,//////)
C
C     CALCULATE THE STANDARD ERROR OF THE SAMPLE MEAN(SE)
C
      SE = SQRT(XMSE/FLOAT(N))
C
      WRITE(6,750) CF
  750 FORMAT(1X,'CORRECTION FACTOR(CF) = ',F6.2,//)
C
C
      WRITE(6,800) SE
  800 FORMAT(1X,'STANDARD ERROR OF THE SAMPLE MEAN   =  ',F6.2)
C
      WRITE(6,900) N
  900 FORMAT(//,' NUMBER  OF OF JUDGES  ='I3,'  JUDGES'///' NUMBER  OF
     +  SAMPLE   = 12   SAMPLES(FIGURES)'///' DF = DEGREE OF FREEDOM
     +'///' SS   =  SUM OF SQUARES'///' MS  =  MEAN SQUARE
     +'///' F   =  VARIANCE RATIO',//////)
      STOP
      END
```

Computer Program 2

```
C     ***************************************************************
C
C     PROGRAM TO CALCULATE  THE RANK CORRELATION COEFFICIENT BETWEEN
C     VARIOUS GROUPS OF JUDGMENT TO PROFILE PREFERENCE BY SPEARMANS
C     METHOD(FROM FRAUNHOFER,MURRAY,1976)
C     WRITTEN BY K. SRISUK FOR THE PURPOSE OF MRS.N SRISUK'S
C     MASTER'S DEGREE THESIS (M.D.SC.),1982 FACULTY OF DENTISTRY
C     SYDNEY UNIVERCITY
C
C     ***************************************************************
      PROGRAM SRCOC(INPUT,OUTPUT,TAPE5=INPUT,TAPE6=OUTPUT)
      DIMENSION M(12),N(12),D(12),DD(12),TITLE(8)
C
C     INPUT THE TITLE
      READ(5,5) TITLE
      WRITE(6,7) TITLE
    5 FORMAT(8A10)
    7 FORMAT(1H1,8A10,///)
C
C     INPUT THE RANKING DATA FROM THE PATIENTS,PARENTS OR
C     ORTHODONTISTS
C
      READ(5,100)(M(J),J=1,12)
      READ(5,100)(N(J),J=1,12)
  100 FORMAT(12I2)
C
      WRITE(6,15)
   15 FORMAT(1X,'FIG. NO.',13X,'1',3X,'2',3X,'3',3X,'4',3X,'5',3X,'6',
     +3X,'7',3X,'8',3X,'9',2X,'10',2X,'11',2X,'12',//)
C
      SUMDD=0.0
      DO 10 J=1,12
      D(J)=FLOAT(N(J))-FLOAT(M(J))
      DD(J)=D(J)*D(J)
      SUMDD=SUMDD+DD(J)
   10 CONTINUE
      WRITE(6,200)(M(J),J=1,12),(N(J),J=1,12)
  200 FORMAT(1X,'PATIENTS',10X,12(2X,I2)//
     +1X,'PARENTS',11X,12(2X,I2),//)
      WRITE(6,300)(D(J),J=1,12)
  300 FORMAT(1X,'RANK DIFFERENCE',3X,12F4.0,//)
C
      WRITE(6,350)(DD(J),J=1,12)
  350 FORMAT(1X,'SQUARE OF DIFF.',3X,12F4.0,/////////)
C
C     CALCULATE SPEARMANS RANK CORRELATION COEFFICIENT(R)
C     USING THE FORMULA
C
      R=1.0 - ((6.0*SUMDD)/(12.0*12.0*12.0-12.0))
C
C     TEST THE SIGNIFICANCE OF THIS CORRELATION(R) BY USING
C     THE 'T' DISTRIBUTION,PROVIDED NO. OF SAMPLE IS NOT LESS
C     THAN 10
C
      T=R*(SQRT((12.0-2.0)/(1-R*R)))
C
C     DEGREE OF FREEDOM = NO. OF SAMPLE - 2
      LDF=10
C
      WRITE(6,400) R,T,LDF
  400 FORMAT(1X,'SPEARMANS RANK CORRELATION COEFFIENCT(R) =',F6.2//
     +1X,'T DISTRIBUTION VALUE =',F6.2//
     +1X,'DEGREE OF FREEDOM =',I3/////////)
      STOP
      END
```

Table A-1

Scores for ranked data

The mean deviations of the 1st, 2nd, 3rd ... largest members of samples of different sizes; zero and negative values omitted.

Ordinal number	Size of Sample									
	—	2	3	4	5	6	7	8	9	10
1		0.56	0.85	1.03	1.16	1.27	1.35	1.42	1.49	1.54
2				0.30	0.50	0.64	0.76	0.85	0.93	1.00
3						0.20	0.35	0.47	0.57	0.66
4								0.15	0.27	0.38
5										0.12
	11	12	13	14	15	16	17	18	19	20
1	1.59	1.63	1.67	1.70	1.74	1.76	1.79	1.82	1.84	1.87
2	1.06	1.12	1.16	1.21	1.25	1.28	1.32	1.35	1.38	1.41
3	0.73	0.79	0.85	0.90	0.95	0.99	1.03	1.07	1.10	1.13
4	0.46	0.54	0.60	0.66	0.71	0.76	0.81	0.85	0.89	0.92
5	0.22	0.31	0.39	0.46	0.52	0.57	0.62	0.67	0.71	0.75
6		0.10	0.19	0.27	0.34	0.39	0.45	0.50	0.55	0.59
7				0.09	0.17	0.23	0.30	0.35	0.40	0.45
8						0.08	0.15	0.21	0.26	0.31
9								0.07	0.13	0.19
10										0.06
	21	22	23	24	25	26	27	28	29	30
1	1.89	1.91	1.93	1.95	1.97	1.98	2.00	2.01	2.03	2.04
2	1.43	1.46	1.48	1.50	1.52	1.54	1.56	1.58	1.60	1.62
3	1.16	1.19	1.21	1.24	1.26	1.29	1.31	1.33	1.35	1.36
4	0.95	0.98	1.01	1.04	1.07	1.09	1.11	1.14	1.16	1.18
5	0.78	0.82	0.85	0.88	0.91	0.93	0.96	0.98	1.00	1.03
6	0.63	0.67	0.70	0.73	0.76	0.79	0.82	0.85	0.87	0.89
7	0.49	0.53	0.57	0.60	0.64	0.67	0.70	0.73	0.75	0.78
8	0.36	0.41	0.45	0.48	0.52	0.55	0.58	0.61	0.64	0.67
9	0.24	0.29	0.33	0.37	0.41	0.44	0.48	0.51	0.54	0.57
10	0.12	0.17	0.22	0.26	0.30	0.34	0.38	0.41	0.44	0.47
11		0.06	0.11	0.16	0.20	0.24	0.28	0.32	0.35	0.38
12				0.05	0.10	0.14	0.19	0.22	0.26	0.29
13						0.05	0.09	0.13	0.17	0.21
14								0.04	0.09	0.12
15										0.04

Tests of psychological preference and some other experimental data suffice to place a series of magnitudes in order of preference, without supplying metrical values. Analyses of variance, correlations, etc., can be carried out on such data by using the normal scores, appropriate to each position in order, in a sample of the size observed. Ties may be scored with the means of the ordinal values involved, but in such cases the sums of squares given will require correction.

(From Larmond, 1977)

Table A-2

Variance ratio — 5 percent points for distribution of F

n_1 — degrees of freedom for numerator
n_2 — degrees of freedom for denominator

n_2 \ n_1	1	2	3	4	5	6	8	12	24	∞
1	161.4	199.5	215.7	224.6	230.2	234.0	238.9	243.9	249.0	254.3
2	18.51	19.00	19.16	19.25	19.30	19.33	19.37	19.41	19.45	19.50
3	10.13	9.55	9.28	9.12	9.01	8.94	8.84	8.74	8.64	8.53
4	7.71	6.94	6.59	6.39	6.26	6.16	6.04	5.91	5.77	5.63
5	6.61	5.79	5.41	5.19	5.05	4.95	4.82	4.68	4.53	4.36
6	5.99	5.14	4.76	4.53	4.39	4.28	4.15	4.00	3.84	3.67
7	5.59	4.74	4.35	4.12	3.97	3.87	3.73	3.57	3.41	3.23
8	5.32	4.46	4.07	3.84	3.69	3.58	3.44	3.28	3.12	2.93
9	5.12	4.26	3.86	3.63	3.48	3.37	3.23	3.07	2.90	2.71
10	4.96	4.10	3.71	3.48	3.33	3.22	3.07	2.91	2.74	2.54
11	4.84	3.98	3.59	3.36	3.20	3.09	2.95	2.79	2.61	2.40
12	4.75	3.88	3.49	3.26	3.11	3.00	2.85	2.69	2.50	2.30
13	4.67	3.80	3.41	3.18	3.02	2.92	2.77	2.60	2.42	2.21
14	4.60	3.74	3.34	3.11	2.96	2.85	2.70	2.53	2.35	2.13
15	4.54	3.68	3.29	3.06	2.90	2.79	2.64	2.48	2.29	2.07
16	4.49	3.63	3.24	3.01	2.85	2.74	2.59	2.42	2.24	2.01
17	4.45	3.59	3.20	2.96	2.81	2.70	2.55	2.38	2.19	1.96
18	4.41	3.55	3.16	2.93	2.77	2.66	2.51	2.34	2.15	1.92
19	4.38	3.52	3.13	2.90	2.74	2.63	2.48	2.31	2.11	1.88
20	4.35	3.49	3.10	2.87	2.71	2.60	2.45	2.28	2.08	1.84
21	4.32	3.47	3.07	2.84	2.68	2.57	2.42	2.25	2.05	1.81
22	4.30	3.44	3.05	2.82	2.66	2.55	2.40	2.23	2.03	1.78
23	4.28	3.42	3.03	2.80	2.64	2.53	2.38	2.20	2.00	1.76
24	4.26	3.40	3.01	2.78	2.62	2.51	2.36	2.18	1.98	1.73
25	4.24	3.38	2.99	2.76	2.60	2.49	2.34	2.16	1.96	1.71
26	4.22	3.37	2.98	2.74	2.59	2.47	2.32	2.15	1.95	1.69
27	4.21	3.35	2.96	2.73	2.57	2.46	2.30	2.13	1.93	1.67
28	4.20	3.34	2.95	2.71	2.56	2.44	2.29	2.12	1.91	1.65
29	4.18	3.33	2.93	2.70	2.54	2.43	2.28	2.10	1.90	1.64
30	4.17	3.32	2.92	2.69	2.53	2.42	2.27	2.09	1.89	1.62
40	4.08	3.23	2.84	2.61	2.45	2.34	2.18	2.00	1.79	1.51
60	4.00	3.15	2.76	2.52	2.37	2.25	2.10	1.92	1.70	1.39
120	3.92	3.07	2.68	2.45	2.29	2.17	2.02	1.83	1.61	1.25
∞	3.84	2.99	2.60	2.37	2.21	2.09	1.94	1.75	1.52	1.00

(From Larmond, 1977)

Table A-3

Variance ratio — 1 percent point for distribution of F

n_1 — degrees of freedom for numerator

n_2 — degrees of freedom for denominator

n_2 \ n_1	1	2	3	4	5	6	8	12	24	∞
1	4052	4999	5403	5625	5764	5859	5981	6106	6234	6366
2	98.49	99.00	99.17	99.25	99.30	99.33	99.36	99.42	99.46	99.50
3	34.12	30.81	29.46	28.71	28.24	27.91	27.49	27.05	26.60	26.12
4	21.20	18.00	16.69	15.98	15.52	15.21	14.80	14.37	13.93	13.46
5	16.26	13.27	12.06	11.39	10.97	10.67	10.29	9.89	9.47	9.02
6	13.74	10.92	9.78	9.15	8.75	8.47	8.10	7.72	7.31	6.88
7	12.25	9.55	8.45	7.85	7.46	7.19	6.84	6.47	6.07	5.65
8	11.26	8.65	7.59	7.01	6.63	6.37	6.03	5.67	5.28	4.86
9	10.56	8.02	6.99	6.42	6.06	5.80	5.47	5.11	4.73	4.31
10	10.04	7.56	6.55	5.99	5.64	5.39	5.06	4.71	4.33	3.91
11	9.65	7.20	6.22	5.67	5.32	5.07	4.74	4.40	4.02	3.60
12	9.33	6.93	5.95	5.41	5.06	4.82	4.50	4.16	3.78	3.36
13	9.07	6.70	5.74	5.20	4.86	4.62	4.30	3.96	3.59	3.16
14	8.86	6.51	5.56	5.03	4.69	4.46	4.14	3.80	3.43	3.00
15	8.68	6.36	5.42	4.89	4.56	4.32	4.00	3.67	3.29	2.87
16	8.53	6.23	5.29	4.77	4.44	4.20	3.89	3.55	3.18	2.75
17	8.40	6.11	5.18	4.67	4.34	4.10	3.79	3.45	3.08	2.65
18	8.28	6.01	5.09	4.58	4.25	4.01	3.71	3.37	3.00	2.57
19	8.18	5.93	5.01	4.50	4.17	3.94	3.63	3.30	2.92	2.49
20	8.10	5.85	4.94	4.43	4.10	3.87	3.56	3.23	2.86	2.42
21	8.02	5.78	4.87	4.37	4.04	3.81	3.51	3.17	2.80	2.36
22	7.94	5.72	4.82	4.31	3.99	3.76	3.45	3.12	2.75	2.31
23	7.88	5.66	4.76	4.26	3.94	3.71	3.41	3.07	2.70	2.26
24	7.82	5.61	4.72	4.22	3.90	3.67	3.36	3.03	2.66	2.21
25	7.77	5.57	4.68	4.18	3.86	3.63	3.32	2.99	2.62	2.17
26	7.72	5.53	4.64	4.14	3.82	3.59	3.29	2.96	2.58	2.13
27	7.68	5.49	4.60	4.11	3.78	3.56	3.26	2.93	2.55	2.10
28	7.64	5.45	4.57	4.07	3.75	3.53	3.23	2.90	2.52	2.06
29	7.60	5.42	4.54	4.04	3.73	3.50	3.20	2.87	2.49	2.03
30	7.56	5.39	4.51	4.02	3.70	3.47	3.17	2.84	2.47	2.01
40	7.31	5.18	4.31	3.83	3.51	3.29	2.99	2.66	2.29	1.80
60	7.08	4.98	4.13	3.65	3.34	3.12	2.82	2.50	2.12	1.60
120	6.85	4.79	3.95	3.48	3.17	2.96	2.66	2.34	1.95	1.38
∞	6.64	4.60	3.78	3.32	3.02	2.80	2.51	2.18	1.79	1.00

(From Larmond, 1977)

Table A-4

Significant studentized range at the 5% level

Degrees of freedom, f	Number of treatments, a																		
	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1	18.0	26.7	32.8	37.2	40.5	43.1	45.4	47.3	49.1	50.6	51.9	53.2	54.3	55.4	56.3	57.2	58.0	58.8	59.6
2	6.09	8.28	9.80	10.89	11.73	12.43	13.03	13.54	13.99	14.39	14.75	15.08	15.38	15.65	15.91	16.14	16.36	16.57	16.77
3	4.50	5.88	6.83	7.51	8.04	8.47	8.85	9.18	9.46	9.72	9.95	10.16	10.35	10.52	10.69	10.84	10.98	11.12	11.24
4	3.93	5.00	5.76	6.31	6.73	7.06	7.35	7.60	7.83	8.03	8.21	8.37	8.52	8.67	8.80	8.92	9.03	9.14	9.24
5	3.61	4.54	5.18	5.64	5.99	6.28	6.52	6.74	6.93	7.10	7.25	7.39	7.52	7.64	7.75	7.86	7.95	8.04	8.13
6	3.46	4.34	4.90	5.31	5.63	5.89	6.12	6.32	6.49	6.65	6.79	6.92	7.04	7.14	7.24	7.34	7.43	7.51	7.59
7	3.34	4.16	4.68	5.06	5.35	5.59	5.80	5.99	6.15	6.29	6.42	6.54	6.65	6.75	6.84	6.93	7.01	7.08	7.16
8	3.26	4.04	4.53	4.89	5.17	5.40	5.60	5.77	5.92	6.05	6.18	6.29	6.39	6.48	6.57	6.65	6.73	6.80	6.87
9	3.20	3.95	4.42	4.76	5.02	5.24	5.43	5.60	5.74	5.87	5.98	6.09	6.19	6.28	6.36	6.44	6.51	6.58	6.65
10	3.15	3.88	4.33	4.66	4.91	5.12	5.30	5.46	5.60	5.72	5.83	5.93	6.03	6.12	6.20	6.27	6.34	6.41	6.47
11	3.11	3.82	4.26	4.58	4.82	5.03	5.20	5.35	5.49	5.61	5.71	5.81	5.90	5.98	6.06	6.14	6.20	6.27	6.33
12	3.08	3.77	4.20	4.51	4.75	4.95	5.12	5.27	5.40	5.51	5.61	5.71	5.80	5.88	5.95	6.02	6.09	6.15	6.21
13	3.06	3.73	4.15	4.46	4.69	4.88	5.05	5.19	5.32	5.43	5.53	5.63	5.71	5.79	5.86	5.93	6.00	6.06	6.11
14	3.03	3.70	4.11	4.41	4.64	4.83	4.99	5.13	5.25	5.36	5.46	5.56	5.64	5.72	5.79	5.86	5.92	5.98	6.03
15	3.01	3.67	4.08	4.37	4.59	4.78	4.94	5.08	5.20	5.31	5.40	5.49	5.57	5.65	5.72	5.79	5.85	5.91	5.96
16	3.00	3.65	4.05	4.34	4.56	4.74	4.90	5.03	5.15	5.26	5.35	5.44	5.52	5.59	5.66	5.73	5.79	5.84	5.90
17	2.98	3.62	4.02	4.31	4.52	4.70	4.86	4.99	5.11	5.21	5.31	5.39	5.47	5.55	5.61	5.68	5.74	5.79	5.84
18	2.97	3.61	4.00	4.28	4.49	4.67	4.83	4.96	5.07	5.17	5.27	5.35	5.43	5.50	5.57	5.63	5.69	5.74	5.79
19	2.96	3.59	3.98	4.26	4.47	4.64	4.79	4.92	5.04	5.14	5.23	5.32	5.39	5.46	5.53	5.59	5.65	5.70	5.75
20	2.95	3.58	3.96	4.24	4.45	4.62	4.77	4.90	5.01	5.11	5.20	5.28	5.36	5.43	5.50	5.56	5.61	5.66	5.71
24	2.92	3.53	3.90	4.17	4.37	4.54	4.68	4.81	4.92	5.01	5.10	5.18	5.25	5.32	5.38	5.44	5.50	5.55	5.59
30	2.89	3.48	3.84	4.11	4.30	4.46	4.60	4.72	4.83	4.92	5.00	5.08	5.15	5.21	5.27	5.33	5.38	5.43	5.48
40	2.86	3.44	3.79	4.04	4.23	4.39	4.52	4.63	4.74	4.82	4.90	4.98	5.05	5.11	5.17	5.22	5.27	5.32	5.36
60	2.83	3.40	3.74	3.98	4.16	4.31	4.44	4.55	4.65	4.73	4.81	4.88	4.94	5.00	5.06	5.11	5.15	5.20	5.24
120	2.80	3.36	3.69	3.92	4.10	4.24	4.36	4.47	4.56	4.64	4.71	4.78	4.84	4.90	4.95	5.00	5.04	5.09	5.13
∞	2.77	3.32	3.63	3.86	4.03	4.17	4.29	4.39	4.47	4.55	4.62	4.68	4.74	4.80	4.84	4.89	4.93	4.97	5.01

(From Larmond, 1977)

Table A-5

THE RANKING SCORE TABLE, JUDGED BY PARENTS (CAUCASIAN EUROPEAN)

	SAMPLES												
JUDGES	FIG.1	FIG.2	FIG.3	FIG.4	FIG.5	FIG.6	FIG.7	FIG.8	FIG.9	FIG.10	FIG.11	FIG.12	TOTAL
1	.54	1.63	.31	.79	-1.12	.10	-1.63	1.12	-.10	-.31	-.54	-.79	-.00
2	.79	.31	.10	-.79	-1.12	.54	-1.63	1.63	-.54	-.31	-.10	-1.12	-.00
3	.10	-.54	-.79	-.54	.79	-.10	-1.63	1.63	1.12	.31	-1.12	-.31	-.00
4	.54	1.12	-.10	-.31	.10	-1.63	1.63	.79	-.54	-.79	-1.12	.31	-.00
5	.10	.31	1.12	-.31	.54	-.54	.79	1.63	-.10	-1.12	-.79	-1.63	-.00
6	-.31	.10	1.12	-.10	.54	.31	-1.12	.79	1.63	-.79	-.54	-1.63	-.00
7	-.10	-.79	-.31	-1.12	.31	.10	-.79	1.63	.54	-.54	1.12	-1.63	0.00
8	.10	.79	.31	.54	-.79	-1.12	-1.63	1.63	1.12	-.31	-.10	-.54	-.00
9	.54	1.12	.79	-1.63	.10	.31	-.31	1.63	-.79	-1.12	-.10	-.54	-.00
10	1.12	.79	.54	.31	-.10	.10	-1.63	1.63	-.79	-.54	-.31	-1.12	-.00
11	1.12	.79	-.31	.10	-.10	.31	-1.12	1.63	.54	-.79	-.54	-1.63	-.00
12	1.12	.79	.31	.10	-.79	.10	-1.12	1.63	.54	-.54	-.31	-1.63	-.00
13	.10	1.12	.31	.54	.79	-.10	-1.12	1.63	-.31	-.54	-.79	-1.63	-.00
14	.10	.54	.31	.79	1.12	-.31	-.54	1.63	-.79	-1.12	-.10	-1.63	-.00
15	.54	.31	-.31	.79	1.12	-.10	.54	1.63	.10	-.79	-1.12	-1.63	-.00
16	.54	1.12	.31	-.31	-.54	.10	-1.63	1.63	.79	-.10	-.79	-1.12	-.00
17	-.10	.79	-.54	-.31	-.79	.10	-1.12	1.63	1.12	.31	.54	-1.63	0.00
18	1.12	.31	.79	.10	-.79	.54	-.54	1.63	-.10	-1.63	-.31	-1.12	-.00
19	.54	.31	.10	.54	1.12	-.31	-1.63	1.63	.79	-.10	-.79	-1.12	-.00
20	.31	1.12	.54	.10	-.54	.79	-1.63	1.63	-.10	-.79	-.31	-1.12	-.00
21	.31	1.12	.54	-.10	-1.12	-.54	-.79	1.63	.79	-.31	.10	-1.63	-.00
22	.54	1.63	.31	.79	-1.63	.10	.79	1.12	-.10	-.31	-.54	-1.12	-.00
23	.54	1.12	-.54	-.31	.31	.10	-1.12	1.63	.79	-.10	-.79	-1.63	-.00
24	-.10	-.79	-.31	-1.63	.31	.10	-1.12	.79	1.63	.54	1.12	-.54	.00
25	.79	1.63	-.54	.54	.31	-1.12	-.79	1.12	-.31	-.10	.10	-1.63	-.00
26	1.63	1.12	-.10	.79	.10	.31	-.54	.54	-1.12	-.31	-1.63	-.79	-.00
27	.10	.79	.31	-1.12	-.10	-.31	-1.63	1.63	-.79	.54	1.12	-.54	0.00
28	-.10	.54	-.54	-.31	.79	-1.12	.10	1.63	1.12	.31	-.79	-1.63	-.00
29	.54	1.12	-.10	-.31	-.79	.31	-1.63	.79	1.63	-1.12	.10	-.54	-.00
30	1.12	.79	-1.12	-.79	.54	.10	-.31	1.63	-.54	-.10	.31	-1.63	-.00
TOTAL	14.18	23.77	2.51	-6.03	.81	-2.88	-25.98	42.92	7.23	-12.57	-9.02	-34.94	-.00
MEAN	.47	.79	.08	-.20	.03	-.10	-.87	1.43	.24	-.42	-.30	-1.16	-.00

Table A-6

THE RANKING SCORE TABLE, JUDGED BY PARENTS (CAUCASIAN MEDITERANEAN)

	SAMPLES												
JUDGES	FIG.1	FIG.2	FIG.3	FIG.4	FIG.5	FIG.6	FIG.7	FIG.8	FIG.9	FIG.10	FIG.11	FIG.12	TOTAL
1	.10	1.12	-1.12	-.31	-.10	1.63	.79	.54	-1.63	.31	-.54	-.79	-.00
2	.31	.79	1.12	1.63	.54	.10	-.31	-.54	-.10	-.79	-1.12	-1.63	-.00
3	1.63	.79	-1.12	1.12	.54	.31	-.31	.10	-.10	-.54	-1.63	-.79	-.00
4	.79	.54	-.10	.10	-.54	-.79	-1.63	.31	1.63	1.12	-1.12	-.31	-.00
5	.79	1.12	-1.12	.54	-.10	-.31	-1.63	1.63	.10	-.79	-.54	.31	-.00
6	.54	1.12	.31	.79	-.10	.10	-1.63	1.63	-1.12	-.31	-.54	-.79	-.00
7	-.54	-1.12	-.79	1.63	.79	-1.63	.10	.54	.31	-.31	-.10	1.12	.00
8	-.54	-.79	1.12	-.10	-.79	.31	-1.12	1.63	.10	-.31	.54	-1.63	-.00
9	.79	1.12	.31	.10	-.10	.54	-.31	1.63	-.54	-.79	-1.12	-1.63	-.00
10	-.10	1.12	-.54	-.31	-1.63	1.63	-.79	.79	.31	.10	-1.12	.54	.00
11	.79	.31	.10	-.31	-.10	.54	-1.12	1.12	1.63	-.54	-.79	-1.63	-.00
12	.79	1.63	-.10	1.12	-.31	-.54	.54	.31	.10	-1.12	-.79	-1.63	-.00
13	.79	-.10	-.31	.10	1.12	-.54	-1.63	.31	1.63	-.79	.54	-1.12	-.00
14	.54	1.63	.31	-.54	.79	.10	-.79	1.12	-.10	-.31	-1.12	-1.63	-.00
15	1.12	.79	.54	.10	-.31	.31	-1.63	1.63	-.10	-.54	-1.12	-.79	-.00
16	.31	1.12	.10	-.54	-1.12	-.10	-.79	1.63	.79	.54	-.31	-1.63	-.00
17	.54	-.10	-.54	.10	.79	-.79	-1.63	1.63	1.12	.31	-.31	-1.12	-.00
18	1.12	.79	.54	-.79	.31	.10	-.54	1.63	-.31	-1.12	-.10	-1.63	-.00
19	.31	.79	-.79	-.10	-.31	.10	-1.63	1.63	1.12	-.54	.54	-1.12	0.00
20	.10	1.63	.31	.79	-.10	.54	-1.63	1.12	-.54	-.31	-.79	-1.12	-.00
21	.79	1.63	.10	.31	-.79	.54	-.31	1.12	-.54	-.10	-1.12	-1.63	-.00
22	.54	.31	.10	-.31	.79	-.10	-1.63	1.63	1.12	-1.12	-.54	-.79	-.00
23	.10	1.63	-.79	.31	-.31	.79	-1.12	1.12	-1.63	.54	-.10	-.54	-.00
24	.54	1.63	-.79	-.54	-.31	.79	-1.63	1.12	-.10	.10	.31	-1.12	-.00
25	-.10	1.12	.31	.10	-1.63	.54	-.54	1.63	.79	-.79	-.31	-1.12	-.00
26	.54	1.12	-.79	1.63	-.54	.10	-1.12	.31	.79	-.10	-.31	-1.63	-.00
27	.79	.54	.31	-.31	-1.63	-.54	-.10	1.12	1.63	.10	-.79	-1.12	-.00
28	.79	1.12	-1.63	-.10	.10	.54	-.54	1.63	.31	-.31	-1.12	-.79	-.00
29	-.54	-.10	-1.12	-.54	.10	.31	-.31	1.63	1.12	.79	-.79	-1.63	-.00
TOTAL	14.71	24.88	-6.07	5.67	-4.95	4.58	-24.99	31.70	7.79	-7.62	-16.31	-29.39	-.00
MEAN	.51	.86	-.21	.20	-.17	.16	-.86	1.09	.27	-.26	-.56	-1.01	-.00

Table A-7

THE RANKING SCORE TABLE JUDGED BY PARENTS AUSTRALIAN

	SAMPLES												
JUDGES	FIG.1	FIG.2	FIG.3	FIG.4	FIG.5	FIG.6	FIG.7	FIG.8	FIG.9	FIG.10	FIG.11	FIG.12	TOTAL
1	.10	.79	.54	.31	-.10	1.12	-.31	1.63	-.54	-.79	-1.12	-1.63	-.00
2	.54	.31	.10	-.10	1.12	-.31	-.54	.79	1.63	-1.12	-1.63	-.79	-.00
3	1.63	-.31	-.54	1.12	.10	.54	-.79	.31	-.10	.79	-1.12	-1.63	-.00
4	.10	.54	-.10	-.31	.79	1.12	-.79	1.63	.31	-1.12	-.54	-1.63	-.00
5	1.12	.79	.10	-.54	.54	.31	-.10	1.63	-1.12	-.79	-.31	-1.63	-.00
6	-.31	.31	-.54	-.79	.79	.54	-1.12	1.63	1.12	-.10	.10	-1.63	-.00
7	-.54	.31	.54	.10	1.63	-.10	-.79	1.12	.79	-.31	-1.12	-1.63	-.00
8	1.12	.79	-1.12	-.79	1.63	-.10	-1.63	.31	.54	-.31	.10	-.54	-.00
9	.79	-.10	.31	.10	.54	-.31	-1.12	1.63	1.12	-.54	-.79	-1.63	-.00
10	-.10	1.12	.10	.79	.31	-.31	-.54	1.63	.54	-1.63	-.79	-1.12	-.00
11	1.12	.10	-.10	.31	.54	-.31	-1.12	.79	1.63	-.54	-.79	-1.63	-.00
12	.79	.54	.31	-.54	-.31	-.10	.10	1.63	1.12	-1.12	-.79	-1.63	-.00
13	.79	1.12	.54	.10	-.54	-.10	-1.12	1.63	.31	-.79	-.31	-1.63	-.00
14	.54	.10	-.31	.31	1.12	-.10	-1.63	1.63	.79	-.79	-.54	-1.12	-.00
15	.79	1.12	-.10	-.54	.31	.54	-1.63	1.63	.10	-.31	-.79	-1.12	-.00
16	.54	1.63	-.31	-.10	.10	-.54	-1.12	1.12	.79	-.79	.31	-1.63	-.00
17	1.12	-.31	.54	-1.12	.10	-.10	-.79	1.63	.31	-.54	.79	-1.63	-.00
18	1.12	1.63	.79	-.31	-.54	.31	-1.12	-.10	.54	.10	-.79	-1.63	-.00
19	1.12	.79	-.79	-.54	.31	-.31	-1.12	1.63	.54	.10	-.10	-1.63	-.00
20	.10	1.12	.54	-.54	.31	.79	-1.12	1.63	-.79	-.10	-.31	-1.63	-.00
21	1.12	.79	.31	-.31	.10	-.10	-1.12	1.63	-.79	.54	-.54	-1.63	-.00
22	.31	-1.63	.10	1.12	-.10	-.31	-.79	1.63	.79	-.54	.54	-1.12	.00
23	.79	.31	.10	-.54	.54	-.31	-.79	1.63	1.12	-.10	-1.12	-1.63	-.00
24	-.31	.31	.54	-.10	1.12	-.54	-1.63	1.63	.79	.10	-1.12	-.79	-.00
25	.31	1.63	-.31	.10	-.79	-.54	-1.63	1.12	.79	-.10	-1.12	.54	-.00
26	-.79	.79	-.54	1.63	-.31	-.10	-1.63	1.12	.54	.31	-1.12	.10	-.00
27	.10	-.31	1.63	.79	1.12	-.10	-1.63	.31	.54	-.79	-1.12	-.54	-.00
28	-.10	.10	.31	.79	.54	-.54	-1.63	1.63	1.12	-.31	-.79	-1.12	-.00
29	1.12	.31	.10	-.79	-1.63	.54	-1.12	.79	1.63	-.31	-.10	-.54	-.00
30	-.10	.10	-1.12	1.12	.79	.54	-1.63	.31	1.63	-.31	-.79	-.54	-.00
31	-.31	1.12	-.79	-.54	-1.63	.10	-1.12	-.10	1.63	.79	.31	.54	.00
32	1.63	1.12	.31	.79	-.31	.54	-.10	.10	-.54	-.79	-1.12	-1.63	-.00
33	.54	.31	.10	.79	-1.12	1.12	-.10	1.63	-.54	-.31	-.79	-1.63	-.00
34	1.12	.54	.31	-.79	-1.63	.79	-.10	1.63	-.54	-.31	-1.12	.10	-.00
35	-.79	.79	-.31	-.54	-.10	.10	-1.63	1.63	1.12	.54	.31	-1.12	.00
36	1.12	.79	-.10	.31	-1.12	-.31	.10	1.63	.54	-.79	-.54	-1.63	-.00
37	.54	.79	-.31	-.10	1.12	.10	-1.63	1.63	.31	-.54	-.79	-1.12	-.00
38	.54	1.12	.31	-.10	-.54	.10	-.31	1.63	.79	-1.12	-.79	-1.63	-.00
39	.79	1.12	.31	.10	-.79	-.54	-1.12	1.63	.54	-.31	-.10	-1.63	-.00
40	1.12	-.10	.10	-.31	.31	.79	-1.63	1.63	.54	-.54	-.79	-1.12	-.00
41	.10	.54	.31	1.12	-.31	-.54	1.63	-1.12	.79	-.10	-1.63	-.79	-.00
42	.79	1.63	-.10	.10	.31	-.79	-.31	1.12	.54	-.54	-1.63	-1.12	-.00
43	.54	.79	-1.12	.31	-.79	-.31	-.54	1.63	1.12	.10	-.10	-1.63	-.00
44	.10	1.63	-1.63	.54	-.10	1.12	-1.12	.79	.31	-.31	-.54	-.79	-.00
45	.54	1.12	-.79	.79	-.54	.31	-.31	1.63	.10	-.10	-1.63	-1.12	-.00
TOTAL	23.30	28.10	-1.78	3.20	2.89	3.70	-40.29	54.42	24.50	-16.54	-28.77	-52.73	-.00
MEAN	.52	.62	-.04	.07	.06	.08	-.90	1.21	.54	-.37	-.64	-1.17	-.00

Table A-8

THE RANKING SCORE TABLE JUDGED BY TOTAL PARENTS

JUDGES	SAMPLES FIG.1	FIG.2	FIG.3	FIG.4	FIG.5	FIG.6	FIG.7	FIG.8	FIG.9	FIG.10	FIG.11	FIG.12	TOTAL
1	.10	.79	.54	.31	-.10	1.12	-.31	1.63	-.54	-.79	-1.12	-1.63	-.00
2	.54	.31	.10	-.10	1.12	-.31	-.54	.79	1.63	-1.12	-1.63	-.79	-.00
3	1.63	-.31	-.54	1.12	.10	.54	-.79	.31	-.10	.79	-1.12	-1.63	-.00
4	.10	.54	-.10	-.31	.79	1.12	-.79	1.63	.31	-1.12	-.54	-1.63	-.00
5	1.12	.79	.10	-.54	.54	.31	-.10	1.63	-1.12	-.79	-.31	-1.63	-.00
6	-.31	.31	-.54	-.79	.79	.54	-1.12	1.63	1.12	-.10	.10	-1.63	-.00
7	-.54	.31	.54	.10	1.63	-.10	-.79	1.12	.79	-.31	-1.12	-1.63	-.00
8	1.12	.79	-1.12	-.79	1.63	-.10	-1.63	.31	.54	-.31	.10	-.54	-.00
9	.79	-.10	.31	.10	.54	-.31	-1.12	1.63	1.12	-.54	-.79	-1.63	-.00
10	-.10	1.12	.10	.79	.31	-.31	-.54	1.63	.54	-1.63	-.79	-1.12	-.00
11	1.12	.10	-.10	.31	.54	-.31	-1.12	.79	1.63	-.54	-.79	-1.63	-.00
12	.79	.54	.31	-.54	-.31	-.10	.10	1.63	1.12	-1.12	-.79	-1.63	-.00
13	.79	1.12	.54	-.10	-.54	-.10	-1.12	1.63	.31	-.79	-.31	-1.63	-.00
14	.54	.10	-.31	.31	1.12	-.10	-1.63	1.63	.79	-.79	-.54	-1.12	-.00
15	.79	1.12	-.10	-.54	.31	.54	-1.63	1.63	.10	-.31	-.79	-1.12	-.00
16	.54	1.63	-.31	-.10	.10	-.54	-1.12	1.12	.79	-.79	.31	-1.63	-.00
17	1.12	-.31	.54	-1.12	.10	-.10	-.79	1.63	.31	-.54	.79	-1.63	-.00
18	1.12	1.63	.79	-.31	-.54	.31	-1.12	-.10	.54	.10	-.79	-1.63	-.00
19	1.12	.79	-.79	-.54	.31	-.31	-1.12	1.63	.54	.10	-.10	-1.63	-.00
20	.10	1.12	.54	-.54	.31	.79	-1.12	1.63	-.79	-.10	-.31	-1.63	-.00
21	1.12	.79	.31	-.31	.10	-.10	-1.12	1.63	-.79	.54	-.54	-1.63	-.00
22	.31	-1.63	.10	1.12	-.10	-.31	-.79	1.63	.79	-.54	.54	-1.12	.00
23	.79	.31	.10	-.54	.54	-.31	-.79	1.63	1.12	-.10	-1.12	-1.63	-.00
24	-.31	.31	.54	-.10	1.12	-.54	-1.63	1.63	.79	.10	-1.12	-.79	-.00
25	.31	1.63	-.31	.10	-.79	-.54	-1.63	1.12	.79	-.10	-1.12	.54	-.00
26	-.79	.79	-.54	1.63	-.31	-.10	-1.63	1.12	.54	.31	-1.12	.10	-.00
27	.10	-.31	1.63	.79	1.12	-.10	-1.63	.31	.54	-.79	-1.12	-.54	-.00
28	-.10	.10	.31	.79	.54	-.54	-1.63	1.63	1.12	-.31	-.79	-1.12	-.00
29	1.12	.31	.10	-.79	-1.63	.54	-1.12	.79	1.63	-.31	-.10	-.54	-.00
30	-.10	.10	-1.12	1.12	.79	.54	-1.63	.31	1.63	-.31	-.79	-.54	-.00
31	-.31	1.12	-.79	-.54	-1.63	-.10	-1.12	-.10	1.63	.79	.31	.54	.00
32	1.63	1.12	.31	.79	-.31	.54	-.10	.10	-.54	-.79	-1.12	-1.63	-.00
33	.54	.31	.10	.79	-1.12	1.12	-.10	1.63	-.54	-.31	-.79	-1.63	-.00
34	1.12	.54	.31	-.79	-1.63	.79	-.10	1.63	-.54	-.31	-1.12	.10	-.00
35	-.79	.79	-.31	-.54	-.10	.10	-1.63	1.63	1.12	.54	.31	-1.12	.00
36	1.12	.79	-.10	.31	-1.12	-.31	.10	1.63	.54	-.79	-.54	-1.63	-.00
37	.54	.79	-.31	-.10	1.12	.10	-1.63	1.63	.31	-.54	-.79	-1.12	-.00
38	.54	1.12	.31	-.10	-.54	.10	-.31	1.63	.79	-1.12	-.79	-1.63	-.00
39	.79	1.12	.31	.10	-.79	-.54	-1.12	1.63	.54	-.31	-.10	-1.63	-.00
40	1.12	-.10	.10	-.31	.31	.79	-1.63	-1.63	.54	-.54	-.79	-1.12	-.00
41	.10	.54	.31	1.12	-.31	-.54	1.63	-1.12	.79	-.10	-1.63	-.79	-.00
42	.79	1.63	-.10	.10	.31	-.79	-.31	1.12	.54	-.54	-1.63	-1.12	-.00
43	.54	.79	-1.12	.31	-.79	-.31	-.54	1.63	1.12	.10	-.10	-1.63	-.00
44	.10	1.63	-1.63	.54	-.10	1.12	-1.12	.79	.31	-.31	-.54	-.79	-.00
45	.54	1.12	-.79	.79	-.54	.31	-.31	1.63	.10	-.10	-.10	-1.12	-.00
46	.54	1.63	.31	-.79	-1.12	.10	-1.63	1.12	-.10	-.31	-.54	-.79	-.00
47	.79	.31	.10	-.79	1.12	.54	-1.63	1.63	-.54	-.31	-.10	-1.12	-.00
48	.10	.54	-.79	-.54	.79	-.10	-1.63	1.63	1.12	.31	-1.12	-.31	-.00
49	.54	1.12	-.10	-.31	.10	-1.63	-1.63	.79	-.54	-.79	-1.12	.31	-.00
50	.10	.31	1.12	-.31	.54	-.54	.79	1.63	-.10	-1.12	-.79	-1.63	-.00
51	-.31	.10	1.12	-.10	.54	-.31	-1.12	.79	1.63	-.79	-.54	-1.63	0.00
52	-.10	.79	-.31	-1.12	.31	.10	-.79	1.63	.54	-.54	1.12	-.54	-.00
53	.10	.79	.31	.54	-.79	-1.12	-1.63	1.63	1.12	-.31	-.10	-.54	-.00
54	.54	1.12	.79	-1.63	.10	.31	-.31	1.63	-.79	-1.12	-.10	-.54	-.00
55	1.12	.79	.54	.31	-.10	.10	-1.63	1.63	-.79	-.54	-.31	-1.12	-.00
56	1.12	.79	-.31	.10	-.10	.31	-1.12	1.63	.54	-.79	-.54	-1.63	-.00
57	1.12	.79	.31	-.10	-.79	.10	-1.12	1.63	.54	-.54	-.31	-1.63	-.00
58	.10	1.12	.31	.54	.79	-.10	-1.12	1.63	-.31	-.54	-.79	-1.63	-.00
59	.10	.54	.31	.79	1.12	-.31	-.54	1.63	-.79	-1.12	-.10	-1.63	-.00
60	.54	.31	-.31	.79	1.12	-.10	-.54	1.63	.10	-.79	-1.12	-1.63	-.00
61	.54	1.12	.31	-.31	-.54	-.10	-1.63	1.63	.79	-.10	-.79	-1.12	-.00
62	-.10	.79	-.54	-.31	-.79	.10	-1.12	1.63	1.12	.31	-.54	-1.63	0.00
63	1.12	.31	.79	.10	-.79	.54	-.54	1.63	-.10	-1.63	-.31	-1.12	-.00
64	.54	.31	.10	-.54	1.12	-.31	-1.63	1.63	.79	-.10	-.79	-1.12	-.00
65	.31	1.12	.54	.10	-.54	.79	-1.63	1.63	-.10	-.79	-.31	-1.12	-.00
66	.31	1.12	.54	-.10	-1.12	-.54	-.79	1.63	.79	-.31	.10	-1.63	-.00
67	.54	1.63	.31	-.79	-1.63	.10	.79	1.12	-.10	-.31	-.54	-1.12	-.00
68	.54	1.12	-.54	-.31	.31	.10	-1.12	1.63	.79	-.10	-.79	-1.63	-.00
69	-.10	-.79	-.31	-1.63	.31	-.10	-1.12	.79	1.63	.54	1.12	-.54	.00
70	.79	1.63	-.54	.54	.31	-1.12	-.79	1.12	-.31	-.10	.10	-1.63	-.00
71	1.63	1.12	-.10	.79	.10	.31	-.54	.54	-1.12	-.31	-1.63	-.79	-.00
72	.10	.79	.31	-1.12	-.10	-.31	-1.63	1.63	-.79	.54	1.12	-.54	0.00
73	-.10	.54	-.54	-.31	.79	-1.12	.10	1.63	1.12	.31	-.79	-1.63	-.00
74	.54	1.12	-.10	-.31	-.79	.31	-1.63	.79	1.63	-1.12	.10	-.54	-.00
75	1.12	.79	-1.12	-.79	.54	.10	-.31	1.63	-.54	-.10	.31	-1.63	-.00
76	.10	1.12	-1.12	-.31	-.10	1.63	.79	.54	-1.63	.31	-.54	-.79	-.00
77	.31	.79	1.12	1.63	.54	.10	-.31	-.54	-.10	-.79	-1.12	-1.63	-.00
78	1.63	.79	-1.12	1.12	.54	.31	-.31	.10	-.10	-.54	-1.63	-.79	-.00
79	.79	.54	-.10	.10	-.54	-.79	-1.63	.31	1.63	1.12	-1.12	-.31	-.00
80	.79	1.12	-1.12	.54	-.10	-.31	-1.63	1.63	.10	-.79	-.54	.31	-.00
81	.54	1.12	.31	.79	-.10	.10	-1.63	1.63	-1.12	-.31	-.54	-.79	-.00
82	-.54	-1.12	-.79	1.63	.79	-1.63	.10	.54	.31	-.31	-.10	1.12	.00
83	-.54	.79	1.12	-.10	-.79	.31	-1.12	1.63	.10	-.31	.54	-1.63	-.00
84	.79	1.12	.31	.10	-.10	.54	-.31	1.63	-.54	-.79	-1.12	.54	.00
85	-.10	1.12	-.54	-.31	-1.63	1.63	-.79	.79	.31	.10	-1.12	-1.63	-.00
86	.79	.31	.10	-.31	-.10	.54	-1.12	1.12	1.63	-.54	-.79	-1.63	-.00
87	.79	1.63	-.10	1.12	-.31	-.54	.54	.31	.10	-1.12	-.79	-1.12	-.00
88	.79	-.10	-.31	.10	1.12	-.54	-1.63	.31	1.63	-.79	.54	-1.12	-.00
89	.54	1.63	.31	-.54	.79	.10	-.79	1.12	-.10	-.31	-1.12	-1.63	-.00
90	1.12	.79	.54	.10	-.31	.31	-1.63	1.63	-.10	-.54	-.31	-1.63	-.00
91	.31	1.12	.10	-.54	-1.12	-.10	-.79	1.63	.79	.54	-.31	-1.12	-.00
92	.54	-.10	-.54	.10	.79	-.79	-1.63	1.63	1.12	.31	-.31	-1.12	-.00
93	1.12	.79	.54	-.79	.31	-.10	-.54	1.63	-.31	-1.12	-.10	-1.63	-.00
94	.31	.79	-.79	-.10	-.31	-.10	-1.63	1.63	1.12	-.54	.54	-1.12	0.00
95	.10	1.63	.31	.79	-.10	.54	-1.63	1.12	-.54	-.31	-.79	-1.12	-.00
96	.79	1.63	.10	.31	-.79	.54	-.31	1.12	-.54	-.10	-1.12	-1.63	-.00
97	.54	.31	.10	-.31	.79	-.10	-1.63	1.63	1.12	-1.12	-.54	-.79	-.00
98	.10	1.63	-.79	.31	-.31	.79	-1.12	1.12	-1.63	.54	-.10	-.54	-.00
99	.54	1.63	-.79	-.54	-.31	.79	-1.63	1.12	-.10	.10	.31	-1.12	-.00
100	-.10	1.12	.31	.10	-1.63	.54	-.54	1.63	.79	-.79	-.31	-1.12	-.00
101	.54	1.12	-.79	1.63	-.54	.10	-1.12	.31	.79	-.10	-.31	-1.63	-.00
102	.79	.54	.31	-.31	-1.63	-.54	-.10	1.12	1.63	.10	-1.12	-.79	-.00
103	.79	1.12	-1.63	-.10	.10	.54	-.54	1.63	.31	-.31	-.79	-1.63	-.00
104	.54	-.10	-1.12	-.54	.10	.31	-.31	1.63	1.12	.79	-.79	-1.63	-.00
TOTAL	52.19	76.75	-5.34	2.84	-1.25	5.40	-91.26	129.04	39.52	-36.73	-54.10	-117.06	-.00
MEAN	.50	.74	-.05	.03	-.01	.05	-.88	1.24	.38	-.35	-.52	-1.13	-.00

Table A-9

THE RANKING SCORE TABLE, JUDGED BY PATIENTS (CAUCASIAN EUROPEAN)

SAMPLES

JUDGES	FIG.1	FIG.2	FIG.3	FIG.4	FIG.5	FIG.6	FIG.7	FIG.8	FIG.9	FIG.10	FIG.11	FIG.12	TOTAL
1	.31	.79	-.31	-.54	.54	-.79	.10	1.63	1.12	-.10	-1.12	-1.63	-.00
2	.54	1.63	.31	.79	-1.12	.10	-1.63	1.12	-.10	-.31	-.54	-.79	-.00
3	1.63	.54	-.31	-.54	.31	-.10	-1.12	.79	.10	-.79	1.12	-1.63	-.00
4	1.12	.54	.79	-1.63	-.79	-.10	1.63	.31	-.31	-.54	-1.12	.10	-.00
5	.79	.31	-.54	.54	1.12	-.10	-1.63	1.63	-.31	.10	-.79	-1.12	-.00
6	.31	.54	-.31	-.10	.79	1.12	-1.12	1.63	.10	-.54	-.79	-1.63	-.00
7	.79	.54	-.10	.10	1.63	-.31	-.79	1.12	-.54	-1.12	.31	-1.63	-.00
8	.10	.79	.31	.54	-.10	1.12	-1.63	1.63	-.31	-.54	-.79	-1.12	-.00
9	.79	1.63	.54	.31	.10	-1.12	-.79	1.12	-.54	-.10	-.31	-1.63	-.00
10	1.63	.54	.31	.10	1.12	-.10	-1.63	-.79	-1.12	-.31	.79	-.54	-.00
11	.31	1.12	.54	.79	-.79	-.31	-1.63	1.63	.10	-.10	-.54	-1.12	-.00
12	.54	1.12	.31	.79	-.31	-.10	-1.12	1.63	.10	-.79	-.54	-1.63	-.00
13	1.63	.54	.31	-.54	-.10	.79	-.79	1.12	.10	-.31	-1.12	-1.63	-.00
14	1.12	.54	.31	.79	-.31	.10	-1.63	1.63	-.10	-.54	-1.12	-.79	-.00
15	.10	1.12	.31	.54	.79	-.10	-1.12	1.63	-.31	-.54	-.79	-1.63	-.00
16	.54	.79	-1.12	1.12	.10	-.31	-.79	1.63	.31	-.10	-.54	-1.63	-.00
17	.54	.79	-1.12	-.79	1.12	-.54	-1.63	1.63	-.10	-.31	.10	.31	.00
18	.54	-.79	-.54	.79	.10	-.10	.31	1.63	1.12	-.31	-1.12	-1.63	-.00
19	-.54	.79	-.79	-.31	1.12	.31	-1.63	1.63	.54	.10	-1.12	-.10	-.00
20	.54	1.12	.10	-.10	-.31	.79	-1.12	1.63	.31	-.54	-.79	-1.63	-.00
21	-.54	1.63	1.12	-.79	-.31	.79	-1.12	.31	.54	-.10	.10	-1.63	-.00
22	.54	1.63	1.12	-.31	-.79	-.10	-1.63	.79	.31	-.54	.10	-1.12	-.00
23	1.63	1.12	-.54	.54	.79	.31	-.31	.10	-.10	-1.12	-.79	-1.63	-.00
24	1.12	.79	.54	-.79	-.54	.31	-1.63	1.63	-.10	.10	-.31	-1.12	-.00
25	.54	1.63	.31	-.10	.10	-.31	-1.12	1.12	-1.63	.79	-.54	-.79	-.00
26	1.12	.79	-1.63	.54	-.31	.10	-.54	1.63	.31	-.10	-1.12	-.79	-.00
27	-.79	1.63	-.31	.79	-1.63	.31	-.54	1.12	.10	.54	-.10	-1.12	-.00
28	1.63	1.12	-.79	.54	-.10	.10	-1.63	.79	.31	-1.12	-.31	-.54	-.00
29	.31	1.63	.54	-.54	.10	-1.12	-1.63	1.12	-.31	-.10	.79	-.79	-.00
30	1.63	1.12	-.79	-.54	.31	.10	-.10	.79	-.31	-1.12	.54	-1.63	-.00
31	.54	1.63	.79	1.12	-.79	.31	-1.12	-.54	-.31	-.10	.10	-1.63	-.00
TOTAL	21.06	29.71	-.64	3.11	1.84	1.05	-31.13	34.84	-1.03	-10.56	-12.36	-35.89	-.00
MEAN	.68	.96	-.02	.10	.06	.03	-1.00	1.12	-.03	-.34	-.40	-1.16	-.00

Table A-10

THE RANKING SCORE TABLE, JUDGED BY PATIENTS (CAUCASIAN MEDITERANEAN)

	SAMPLES											
JUDGES	FIG.1	FIG.2	FIG.3	FIG.4	FIG.5	FIG.6	FIG.7	FIG.8	FIG.9	FIG.10	FIG.11	FIG.12	TOTAL
1	.79	.54	1.12	.10	-.10	-.54	-1.63	1.63	.31	-.31	-1.12	-.79	-.00
2	.79	.54	-.54	.31	-.79	-.10	-1.63	1.63	.10	1.12	-1.12	-.31	-.00
3	1.12	1.63	.31	.54	.10	-.10	-.31	.79	-1.12	-.54	-.79	-1.63	-.00
4	.10	1.12	-.10	.54	.31	-.31	-1.63	1.63	-.79	-.54	-1.12	.79	-.00
5	.54	1.12	-.79	-1.12	.31	-.54	-1.63	1.63	.79	.10	-.10	-.31	.00
6	.54	1.63	-.10	1.12	.31	-1.12	-1.63	.79	.10	-.31	-.79	-.54	-.00
7	.79	.54	1.12	.31	-.31	-.54	-1.63	1.63	-.10	.10	-1.12	-.79	-.00
8	1.63	.79	.31	.54	-.10	-.54	-.79	1.12	.10	-.31	-1.12	-1.63	-.00
9	.31	1.12	-.31	.10	-1.12	-.10	-1.63	1.63	.54	.79	-.54	-.79	-.00
10	.54	.79	.10	1.12	-.79	-.31	-1.63	1.63	-.10	.31	-.54	-1.12	-.00
11	.54	1.63	.31	.79	-.10	-.31	-1.63	1.12	.10	-.79	-.54	-1.12	-.00
12	.79	1.12	.54	.10	-.10	.31	-1.63	1.63	-1.12	-.31	-.54	-.79	-.00
13	1.63	.79	-.79	-.54	.54	-1.12	-1.63	1.12	.10	-.10	-.31	.31	-.00
14	.54	1.12	.79	.10	-.79	.31	-1.63	1.63	-.10	-.31	-.54	-1.12	-.00
15	.79	1.12	.54	.10	-.10	.31	-.54	1.63	-.31	-1.63	-1.12	-.79	-.00
16	.54	.31	-.10	.10	1.12	-.79	-1.63	1.63	.79	-.31	-1.12	-.54	-.00
17	1.12	-.54	.31	.79	.54	-.10	-.31	1.63	.10	-1.12	-.79	-1.63	-.00
18	1.12	-.10	.54	-.54	.31	-.31	-1.12	1.63	.79	.10	-1.63	-.79	-.00
19	.54	.10	1.12	-.10	.31	-.31	-1.63	1.63	.79	-.54	-.79	-1.12	-.00
20	.10	1.63	.31	1.12	-.10	-.54	-1.12	.54	-.31	.79	-1.63	-.79	-.00
21	.79	.54	-.10	.10	-.31	-1.12	-.54	1.63	.31	1.12	-.79	-1.63	-.00
22	1.63	.54	-1.12	-.10	-.54	.79	-1.63	.31	.10	-.31	1.12	-.79	-.00
23	.31	1.63	-.10	.54	.10	-.79	-1.12	1.12	.79	-.54	-.31	-1.63	-.00
24	.54	1.12	-.10	.31	.79	-.54	-1.12	1.63	.10	-.79	-.31	-1.63	-.00
25	.79	1.12	.10	-.79	-.54	-1.12	-1.63	1.63	.31	-.10	.54	-.31	.00
TOTAL	18.92	21.95	3.37	5.54	-1.05	-9.53	-33.05	34.62	2.27	-4.43	-17.12	-21.49	-.00
MEAN	.76	.88	.13	.22	-.04	-.38	-1.32	1.38	.09	-.18	-.68	-.86	-.00

Table A-11

THE RANKING SCORE TABLE, JUDGED BY PATIENTS AUSTRALIAN

JUDGES	SAMPLES FIG.1	FIG.2	FIG.3	FIG.4	FIG.5	FIG.6	FIG.7	FIG.8	FIG.9	FIG.10	FIG.11	FIG.12	TOTAL
1	.79	-.54	-.79	.54	-.31	.31	-1.12	1.12	1.63	-.10	.10	-1.63	-.00
2	-.10	1.63	-.31	.10	.79	.31	-1.63	1.12	.54	-.79	-.54	-1.12	-.00
3	.54	.79	-.54	1.12	.10	-.31	-1.63	1.63	.31	-.10	-.79	-1.12	-.00
4	-.54	1.63	-.31	-.79	.31	.10	-1.12	-.10	.79	.54	-1.63	1.12	.00
5	.79	1.12	.54	-.54	.31	.10	-1.12	1.63	-.79	-.31	-1.63	-.10	-.00
6	.31	-.10	.54	-1.63	.10	1.12	-1.12	.79	-.31	-.54	1.63	-.79	0.00
7	1.63	.31	.10	.54	.79	-.79	-.54	1.12	-.10	-.31	-1.12	-1.63	-.00
8	.54	1.12	-.54	.31	.79	.10	-1.63	1.63	-.10	-.79	-1.12	-.31	-.00
9	.54	.79	.10	.31	-.54	-.10	-.79	1.63	1.12	-1.63	-.31	-1.12	-.00
10	-.31	.31	.10	-.10	-.54	.54	-.79	1.63	1.12	.79	-1.63	-1.12	-.00
11	.54	-1.12	-.79	.79	.10	.31	-1.12	1.63	-.54	-.31	-1.63	-.10	-.00
12	-.79	-.31	.31	-1.63	-.10	.10	-1.12	1.63	1.12	.79	-.54	.54	.00
13	.31	1.63	-.54	.79	-.31	-.79	1.12	.54	.10	-1.12	-.10	-1.63	-.00
14	.31	.79	1.12	.54	-1.12	.10	-.31	1.63	-.54	-1.63	-.10	-.79	-.00
15	-1.63	-.54	-.10	1.12	.79	.54	-.79	1.63	.31	.10	-1.12	-.31	.00
16	1.12	.79	.54	.10	-.31	-.54	-1.63	1.63	-.10	-.79	.31	-1.12	-.00
17	.79	1.63	-.54	.31	.10	-.10	-1.63	.54	1.12	-.31	-1.12	-.79	-.00
18	.79	-.10	1.63	-1.63	.31	-.54	-.79	.10	-.31	.54	1.12	-1.12	-.00
19	.10	1.12	.54	-.54	.31	.79	-1.12	1.63	-.79	-.10	-.31	-1.63	-.00
20	1.12	.54	.10	.79	-.79	-1.12	-1.63	1.63	.31	-.31	-.10	-.54	-.00
21	1.63	.31	-.31	1.12	-.10	-.54	-1.12	.79	.10	.54	-.79	-1.63	-.00
22	.79	.31	1.12	-.31	-.54	.54	.10	1.63	-.79	-1.63	-.10	-1.12	-.00
23	.10	1.63	-.54	1.12	-1.12	-.10	-1.63	.79	.54	.31	-.31	-.79	-.00
24	1.12	.31	.54	.79	.10	-.10	-.31	1.63	-.54	-.79	-1.12	-1.63	-.00
25	-.10	.54	-.31	-.31	.79	-1.12	1.63	-1.63	-.79	-.54	.10	1.12	0.00
26	-.79	-.10	.79	-.31	1.12	.54	-1.63	1.63	.31	-1.12	.10	-.54	-.00
27	.79	1.12	-.79	.54	.10	.31	-1.63	1.63	-.10	-.31	-1.12	-.54	-.00
28	1.63	-.31	-.54	.54	.79	1.12	.31	-.10	-.79	-1.12	-1.63	.10	-.00
29	-.31	.31	-.79	-1.12	.54	.79	-.54	1.63	1.12	.10	-1.63	-.10	-.00
30	1.12	.79	.31	-.10	.54	-.31	-1.12	1.63	.10	-.79	-.54	-1.63	-.00
31	.54	1.12	-.79	.10	-.10	-.31	-1.63	1.63	.31	.79	-.54	-1.12	-.00
32	.54	1.63	.31	-.31	.79	-.54	-1.12	.10	1.12	-.10	-.79	-1.63	-.00
33	1.12	1.63	-.54	-.79	.79	.54	-1.12	.31	.10	-.31	-.10	-1.63	-.00
34	1.12	.31	.54	.79	.10	-1.12	-.79	1.63	-.10	-.54	-.31	-1.63	-.00
35	.54	1.12	-.10	.79	.10	-.54	-1.12	1.63	-.79	.31	-.31	-1.63	-.00
36	-.10	1.12	.10	.54	-.31	-.54	-1.63	1.63	.79	.31	-.79	-1.12	-.00
37	-.79	1.63	-.10	-.31	-1.63	-1.12	1.12	.79	.31	.10	-.54	.54	.00
38	.10	1.63	-.10	-.31	.54	1.12	-.54	.79	.31	-1.12	-.79	-1.63	-.00
39	.79	1.12	.10	-.10	.54	.31	-1.12	1.63	-.54	-.79	-.31	-1.63	-.00
40	1.63	-1.12	1.12	-.79	.79	-.10	.54	-.31	.31	-1.63	.10	-.54	-.00
41	.79	.31	1.12	.10	.54	-.31	-.79	1.63	-.54	-1.63	-.10	-1.12	-.00
42	1.12	-.54	-.79	-.31	-.31	-.10	-1.63	1.63	.79	-1.12	-.54	.10	-.00
43	.10	-.10	-.79	.54	.79	1.12	-.31	1.63	.31	-.54	-1.12	-1.63	-.00
44	.54	1.12	.79	.10	.31	-.10	-1.63	1.63	-.31	-.79	-.54	-1.12	-.00
45	.79	.31	-1.63	-1.12	1.12	-.54	.10	-.10	1.63	-.31	.54	-.79	0.00
46	.54	-.31	.31	.10	1.12	-.10	-1.12	1.63	.79	-.79	-1.63	-.54	-.00
47	.31	-.10	-.10	-.54	1.12	1.63	-.31	.79	-1.12	-1.63	.54	-.79	-.00
48	1.63	1.12	-1.12	.10	-.31	-.54	-.10	.31	.54	.79	-.79	-1.63	-.00
49	.31	1.12	-.79	.54	.10	-.54	-1.12	1.63	-.10	-.31	-1.63	.79	-.00
50	.79	1.12	-.10	.10	-.54	.31	-.79	1.63	.54	-1.63	-.31	-1.12	-.00
51	.10	.79	1.12	.31	-.54	-1.12	.54	-.10	1.63	-.31	-1.63	-.79	-.00
52	1.12	.10	-.10	-.31	.31	-.54	-1.12	1.63	.54	.79	-.79	-1.63	-.00
53	.54	1.12	-1.12	.79	-.10	.10	-.79	1.63	.31	-.54	-.31	-1.63	-.00
54	-.10	.54	.31	.10	-1.63	-.54	-.79	1.63	1.12	-.31	.79	-1.12	.00
55	1.63	.79	.54	.31	-.31	.10	-1.12	1.12	-.79	-.54	-.10	-1.63	-.00
56	.79	1.12	-.10	.54	-.54	.10	-1.63	1.63	.31	-.31	-.79	-1.12	-.00
57	1.63	-.31	.10	-.10	-1.63	.79	.31	.54	1.12	-.79	-1.12	-.54	-.00
58	-.54	1.63	.54	.79	.31	.10	-1.63	1.12	-.10	-.79	-.31	-1.12	-.00
59	1.12	.54	.79	-.54	-.31	1.63	-.79	.31	.10	-.10	-1.12	-1.63	-.00
60	1.12	.54	-1.63	.31	1.63	.10	-.31	.79	-.10	-.79	-.54	-1.12	-.00
61	.10	1.63	-.31	.31	-.79	-.10	-1.63	.79	.54	1.12	-.54	-1.12	-.00
62	1.12	.79	-1.12	-.31	-.79	-.54	-1.63	1.63	.54	.31	.10	-.10	.00
63	1.63	-1.12	-.79	-.54	-1.63	.79	.31	.54	-.10	.10	1.12	-.31	.00
64	.31	.54	1.12	-.31	.79	-.54	.10	1.63	-.10	-.79	-1.12	-1.63	-.00
TOTAL	35.81	42.86	-2.57	4.27	3.32	.12	-51.74	71.55	13.42	-25.62	-33.99	-57.43	-.00
MEAN	.56	.67	-.04	.07	.05	.00	-.81	1.12	.21	-.40	-.53	-.90	-.00

Table A-12

THE RANKING SCORE TAHLE,JUDGED BY TOTAL PATIENTS

SAMPLES

JUDGES	FIG.1	FIG.2	FIG.3	FIG.4	FIG.5	FIG.6	FIG.7	FIG.8	FIG.9	FIG.10	FIG.11	FIG.12	TOTAL
1	.79	-.54	-.79	.54	-.31	.31	-1.12	1.12	1.63	-.10	.10	-1.63	-.00
2	-.10	1.63	-.31	.10	.79	.31	-1.63	1.12	.54	-.79	-.54	-1.12	-.00
3	.54	.79	-.54	1.12	.10	-.31	-1.63	1.63	.31	-.10	-.79	-1.12	-.00
4	-.54	1.63	-.31	-.79	.31	.10	-1.12	-.10	.79	.54	-1.63	1.12	.00
5	.79	1.12	.54	-.54	.31	.10	-1.12	1.63	-.79	-.31	-1.63	-.10	-.00
6	.31	-.10	.54	-1.63	.10	1.12	-1.12	.79	-.31	-.54	1.63	-.79	0.00
7	1.63	.31	.10	.54	.79	-.79	-.54	1.12	-.10	-.31	-1.12	-1.63	-.00
8	.54	1.12	-.54	.31	.79	.10	-1.63	1.63	-.10	-.79	-1.12	-.31	-.00
9	.54	.79	.10	.31	-.54	-.10	-.79	1.63	1.12	-1.63	-.31	-1.12	-.00
10	-.31	.31	.10	-.10	-.54	.54	-.79	1.63	1.12	.79	-1.63	-1.12	-.00
11	.54	1.12	-.79	.79	.10	.31	-1.12	1.63	-.54	-.31	-1.63	-.10	-.00
12	-.79	-.31	.31	-1.63	-.10	.10	-1.12	1.63	1.12	.79	-.54	.54	.00
13	.31	1.63	-.54	.79	-.31	-.79	1.12	.54	.10	-1.12	-.10	-1.63	-.00
14	.31	.79	1.12	.54	-1.12	.10	-.31	1.63	-.54	-1.63	-.10	-.79	-.00
15	-1.63	-.54	-.10	1.12	.79	.54	-.79	1.63	.31	.10	-1.12	-.31	.00
16	1.12	.79	.54	.10	-.31	-.54	-1.63	1.63	-.10	-.79	.31	-1.12	-.00
17	.79	1.63	-.54	.31	.10	-.10	-1.63	.54	1.12	-.31	-1.12	-.79	-.00
18	.79	-.10	1.63	-1.63	.31	-.54	-.79	.10	-.31	.54	1.12	-1.12	-.00
19	.10	1.12	.54	-.54	.31	.79	-1.12	1.63	-.79	-.10	-.31	-1.63	-.00
20	1.12	.54	.10	.79	-.79	-1.12	-1.63	1.63	.31	-.31	-.10	-.54	-.00
21	1.63	.31	-.31	1.12	-.10	-.54	-1.12	.79	.10	.54	-.79	-1.63	-.00
22	.79	.31	1.12	-.31	-.54	.54	.10	1.63	-.79	-1.63	-.10	-1.12	-.00
23	.10	1.63	-.54	1.12	-1.12	-.10	-1.63	.79	.54	.31	-.31	-.79	-.00
24	1.12	.31	.54	.79	.10	-.10	-.31	1.63	-.54	-.79	-1.12	-1.63	-.00
25	-.10	.54	-.31	.31	.79	-1.12	1.63	-1.63	-.79	-.54	.10	1.12	0.00
26	-.79	-.10	.79	-.31	1.12	.54	-1.63	1.63	.31	-1.12	.10	-.54	-.00
27	.79	1.12	-.79	.54	.10	.31	-1.63	1.63	-.10	-.31	-1.12	-.54	-.00
28	1.63	-.31	-.54	.54	.79	1.12	.31	-.10	-.79	-1.12	-1.63	.10	-.00
29	-.31	.31	-.79	-1.12	.54	.79	-.54	1.63	1.12	.10	-1.63	-.10	-.00
30	1.12	.79	.31	-.10	.54	-.31	-1.12	1.63	.10	-.79	-.54	-1.63	-.00
31	.54	1.12	-.79	.10	-.10	-.31	-1.63	1.63	.31	.79	-.54	-1.12	-.00
32	.54	1.63	.31	-.31	.79	-.54	-1.12	.10	1.12	-.10	-.79	-1.63	-.00
33	1.12	1.63	-.54	-.79	.79	.54	-1.12	.31	.10	-.31	-.10	-1.63	-.00
34	1.12	.31	.54	.79	.10	-1.12	-.79	1.63	-.10	-.54	-.31	-1.63	-.00
35	.54	1.12	-.10	.79	.10	-.54	-1.12	1.63	-.79	.31	-.31	-1.63	-.00
36	-.10	1.12	.10	.54	-.31	-.54	-1.63	1.63	.79	.31	-.79	-1.12	-.00
37	-.79	1.63	-.10	-.31	-1.63	-1.12	1.12	.79	.31	.10	-.54	.54	.00
38	.10	1.63	-.10	-.31	.54	1.12	-.54	.79	.31	-1.12	-.79	-1.63	-.00
39	.79	1.12	.10	-.10	.54	.31	-1.12	1.63	-.54	-.79	-.31	-1.63	-.00
40	1.63	-1.12	1.12	-.79	.79	-.10	.54	-.31	.31	-1.63	.10	-.54	-.00
41	.79	.31	1.12	.10	.54	-.31	-.79	1.63	-.54	-1.63	-.10	-1.12	-.00
42	1.12	.54	-.79	.31	-.31	-.10	-1.63	1.63	.79	-1.12	-.54	.10	-.00
43	.10	-.10	-.79	.54	.79	1.12	-.31	1.63	.31	-.54	-1.12	-1.63	-.00
44	.54	1.12	.79	.10	.31	-.10	-1.63	1.63	-.31	-.79	-.54	-1.12	-.00
45	.79	.31	-1.63	-1.12	1.12	-.54	.10	-.10	1.63	-.31	.54	-.79	0.00
46	.54	-.31	.31	.10	1.12	-.10	-1.12	1.63	.79	-.79	-1.63	-.54	-.00
47	.31	.10	-.10	-.54	1.12	1.63	-.31	.79	-1.12	-1.63	.54	-.79	-.00
48	1.63	1.12	-1.12	.10	-.31	-.54	-.10	.31	.54	.79	-.79	-1.63	-.00
49	.31	1.12	-.79	.54	.10	-.54	-1.12	1.63	-.10	-.31	-1.63	.79	-.00
50	.79	1.12	-.10	.10	-.54	.31	-.79	1.63	.54	-1.63	-.31	-1.12	-.00
51	.10	.79	1.12	.31	-.54	-1.12	.54	-.10	1.63	-.31	-1.63	-.79	-.00
52	1.12	.10	-.10	-.31	.31	-.54	-1.12	1.63	.54	.79	-.79	-1.63	-.00
53	.54	1.12	-1.12	.79	-.10	.10	-.79	1.63	.31	-.54	-.31	-1.63	-.00
54	-.10	.54	.31	.10	-1.63	-.54	-.79	1.63	1.12	-.31	.79	-1.12	.00
55	1.63	.79	.54	.31	-.31	.10	-1.12	1.12	-.79	-.54	-.10	-1.63	-.00
56	.79	1.12	-.10	.54	-.54	.10	-1.63	1.63	.31	-.31	-.79	-1.12	-.00
57	1.63	-.31	.10	-.10	-1.63	.79	.31	.54	1.12	-.79	-1.12	-.54	-.00
58	-.54	1.63	.54	.79	.31	.10	-1.63	1.12	-.10	-.79	-.31	-1.12	-.00
59	1.12	.54	.79	-.54	-.31	1.63	-.79	.31	-.10	-.10	-1.12	-1.63	-.00
60	1.12	.54	-1.63	.31	1.63	.10	-.31	.79	.10	-.79	-.54	-1.12	-.00
61	.10	1.63	-.31	.31	-.79	-.10	-1.63	.79	.54	1.12	-.54	-1.12	-.00
62	1.12	.79	-1.12	-.31	-.79	-.54	-1.63	1.63	.54	.31	.10	-.10	.00
63	1.63	-1.12	-.79	-.54	-1.63	.79	.31	.54	-.10	.10	1.12	-.31	.00
64	.31	.54	1.12	-.31	.79	-.54	.10	1.63	-.10	-.79	-1.12	-1.63	-.00
65	.31	.79	-.31	-.54	.54	-.79	.10	1.63	1.12	-.10	-1.12	-1.63	-.00
66	.54	1.63	.31	.79	-1.12	.10	-1.63	1.12	-.10	-.31	-.54	-.79	-.00
67	1.63	.54	-.31	-.54	.31	-.10	-1.12	.79	.10	-.79	1.12	-1.63	-.00
68	1.12	.54	.79	-1.63	-.79	-.10	-1.63	.31	-.31	-.54	-1.12	.10	-.00
69	.79	.31	-.54	.54	1.12	-.10	-1.63	1.63	-.31	.10	-.79	-1.12	-.00
70	.31	.54	-.31	-.10	.79	1.12	-1.12	1.63	.10	-.54	-.79	-1.63	-.00
71	.79	.54	-.10	.10	1.63	-.31	-.79	1.12	-.54	-1.12	.31	-1.63	-.00
72	.10	.79	.31	.54	-.10	-1.12	-1.63	1.63	-.31	-.54	-.79	-1.12	-.00
73	.79	1.63	.54	.31	.10	-1.12	-.79	1.12	-.54	-.10	-.31	-1.63	-.00
74	1.63	.54	.31	.10	1.12	-.10	-1.63	-.79	-1.12	-.31	.79	-.54	-.00
75	.31	1.12	.54	.79	-.79	-.31	-1.63	1.63	.10	-.10	-.54	-1.12	-.00
76	.54	1.12	.31	.79	-.31	-.10	-1.12	1.63	.10	-.79	-.54	-1.63	-.00
77	1.63	.54	.31	-.54	-.10	.79	-.79	1.12	.10	-.31	-1.12	-1.63	-.00
78	1.12	.54	.31	.79	-.31	.10	-1.63	1.63	-.10	-.54	-1.12	-.79	-.00
79	.10	1.12	.31	.54	.79	-.10	-1.12	1.63	-.31	-.54	-.79	-1.63	-.00
80	.54	.79	-1.12	1.12	.10	-.31	-.79	1.63	.31	-.10	-.54	-1.63	-.00
81	.54	.79	-1.12	-.79	1.12	-.54	-1.63	1.63	-.10	-.31	.10	.31	.00
82	.54	-.79	-.54	.79	.10	-.10	.31	1.63	1.12	-.31	-1.12	-1.63	-.00
83	-.54	.79	-.79	-.31	1.12	.31	-1.63	1.63	.54	.10	-1.12	-.10	-.00
84	.54	1.12	.10	-.10	-.31	.79	-1.12	1.63	.31	-.54	-.79	-1.63	-.00
85	-.54	1.63	1.12	-.79	-.31	.79	-1.12	.31	.54	-.10	.10	-1.63	-.00
86	.54	1.63	1.12	-.31	-.79	-.10	-1.63	.79	.31	-.54	.10	-1.12	-.00
87	1.63	1.12	-.54	.54	.79	.31	-.31	.10	-.10	-1.12	-.79	-1.63	-.00
88	1.12	.79	.54	-.79	-.54	.31	-1.63	1.63	-.10	.10	-.31	-1.12	-.00
89	.54	1.63	.31	-.10	.10	-.31	-1.12	1.12	-1.63	.79	-.54	-.79	-.00
90	1.12	.79	-1.63	.54	-.31	.10	-.54	1.63	.31	-.10	-1.12	-.79	-.00
91	-.79	1.63	-.31	.79	-1.63	.31	-.54	1.12	.10	.54	-.10	-1.12	-.00
92	1.63	1.12	-.79	.54	-.10	.10	-1.63	.79	.31	-1.12	-.31	-.54	-.00
93	.31	1.63	.54	-.54	.10	-1.12	-1.63	1.12	-.31	-.10	.79	-.79	-.00
94	1.63	1.12	-.79	-.54	.31	.10	-.10	.79	-.31	-1.12	.54	-1.63	-.00
95	.54	1.63	.79	1.12	-.79	.31	-1.12	-.54	-.31	-.10	.10	-1.63	-.00
96	.79	.54	1.12	.10	-.10	-.54	-1.63	1.63	.31	-.31	-1.12	-.79	-.00
97	.79	.54	-.54	.31	-.79	-.10	-1.63	1.63	.10	1.12	-1.12	-.31	-.00
98	1.12	1.63	.31	.54	.10	-.10	-.31	.79	-1.12	-.54	-.79	-1.63	-.00
99	.10	1.12	-.10	.54	.31	-.31	-1.63	1.63	-.79	-.54	-1.12	.79	-.00
100	.54	1.12	-.79	-1.12	.31	-.54	-1.63	1.63	.79	.10	-.10	-.31	.00
101	.54	1.63	-.10	1.12	.31	-1.12	-1.63	.79	.10	-.31	-.79	-.54	-.00
102	.79	.54	1.12	.31	-.31	-.54	-1.63	1.63	-.10	.10	-1.12	-.79	-.00
103	1.63	.79	.31	.54	-.10	-.54	-.79	1.12	.10	-.31	-1.12	-1.63	-.00
104	.31	1.12	-.31	.10	-1.12	-.10	-1.63	1.63	.54	.79	-.54	-.79	-.00
105	.54	.79	.10	1.12	-.79	-.31	-1.63	1.63	-.10	.31	-.54	-1.12	-.00
106	.54	1.63	.31	.79	-.10	-.31	-1.63	1.12	.10	-.79	-.54	-1.12	-.00
107	.79	1.12	.54	.10	-.10	.31	-1.63	1.63	-1.12	-.31	-.54	-.79	-.00
108	1.63	.79	-.79	-.54	.54	-1.12	-1.63	1.12	.10	-.10	-.31	.31	-.00
109	.54	1.12	.79	.10	-.79	.31	-1.63	1.63	-.10	-.31	-.54	-1.12	-.00
110	.79	1.12	.54	.10	-.10	.31	-.54	1.63	-.31	-1.63	-1.12	-.79	-.00
111	.54	.31	-.10	.10	1.12	-.79	-1.63	1.63	.79	-.31	-1.12	-.54	-.00
112	1.12	-.54	.31	.79	.54	-.10	-.31	1.63	.10	-1.12	-.79	-1.63	-.00
113	1.12	-.10	.54	-.54	.31	-.31	-1.12	1.63	.79	.10	-1.63	-.79	-.00
114	.54	.10	1.12	-.10	.31	-.31	-1.63	1.63	.79	-.54	-.79	-1.12	-.00
115	.10	1.63	.31	1.12	-.10	-.54	-1.12	.54	-.31	.79	-1.63	-.79	-.00
116	.79	.54	-.10	.10	-.31	-1.12	-.54	1.63	.31	1.12	-.79	-1.63	-.00
117	1.63	.54	-1.12	-.10	-.54	.79	-1.63	.31	.10	-.31	1.12	-.79	-.00
118	.31	1.63	-.10	.54	.10	-.79	-1.12	1.12	.79	-.54	-.31	-1.63	-.00
119	.54	1.12	-.10	.31	.79	-.54	-1.12	1.63	.10	-.79	-.31	-1.63	-.00
120	.79	1.12	.10	-.79	-.54	-1.12	-1.63	1.63	.31	-.10	.54	-.31	.00
TOTAL	75.79	94.52	.16	12.92	4.11	-8.36	-115.92	141.01	14.66	-40.61	-63.47	-114.81	-.00
MEAN	.63	.79	.00	.11	.03	-.07	-.97	1.18	.12	-.34	-.53	-.96	-.00

Table A-13

THE RANKING SCORE TABLE, JUDGED BY ORTHODONTISTS AT DENTAL HOSPITAL

JUDGES	SAMPLES												
	FIG.1	FIG.2	FIG.3	FIG.4	FIG.5	FIG.6	FIG.7	FIG.8	FIG.9	FIG.10	FIG.11	FIG.12	TOTAL
1	.54	1.12	-.31	-.54	-.10	.10	-1.63	1.63	.79	-1.12	-.31	-.79	-.00
2	.79	1.63	-.79	-.10	-1.63	.10	-1.12	1.12	.54	-.31	.31	-.54	-.00
3	.79	.54	.10	1.12	-1.12	-.79	-1.63	1.63	-.31	.31	-.54	-.10	-.00
4	1.12	.79	.10	-.79	.54	.31	-1.63	1.63	-.54	-.31	-.10	-1.12	-.00
5	.54	.79	-.31	.31	-1.12	.10	-1.63	1.12	1.63	-.10	-.54	-.79	-.00
6	-.79	1.12	-.31	.10	.54	.79	-.10	1.63	.31	-1.63	-.54	-1.12	-.00
7	.79	1.12	-.31	.31	.54	-.79	-1.63	1.63	.10	-.10	-.54	-1.12	-.00
8	1.12	.79	-.79	.10	-.10	.54	-1.63	1.63	-.31	-1.12	.31	-.54	-.00
9	.54	1.63	-1.12	-.10	-.31	.31	-1.63	1.12	.79	-.79	-.54	.10	-.00
10	.79	.54	-.54	1.63	.31	.10	-.10	1.12	-.31	-1.63	-1.12	-.79	-.00
11	.79	1.12	-.54	-.31	.10	.31	-1.63	1.63	.54	-.10	-1.12	-.79	-.00
12	.31	1.12	-.31	.10	.54	-.54	-1.63	1.63	.79	-.10	-.79	-1.12	-.00
13	.54	.79	-1.63	-.31	-.54	-.10	-1.12	1.63	1.12	-.79	.10	.31	.00
TOTAL	7.87	13.10	-6.14	1.52	-2.35	.44	-17.11	19.15	5.14	-7.79	-5.42	-8.41	-.00
MEAN	.61	1.01	-.47	.12	-.18	.03	-1.32	1.47	.40	-.60	-.42	-.65	-.00

Table A-14

ANALYSIS OF VARIANCE RESULTS, JUDGED BY PARENTS (CAUCASIAN EUROPEAN)

SOURCE OF VARIATION	DF	SS	MS	F
SAMPLES	11	161.57	14.69	34.86
JUDGES	29	.00	.00	.00
ERROR	319	134.41	.42	
TOTAL	359	295.99		

CORRECTION FACTOR(CF) = .00

STANDARD ERROR OF THE SAMPLE MEAN = .12

NUMBER OF OF JUDGES = 30 JUDGES

NUMBER OF SAMPLE = 12 SAMPLES(FIGURES)

Table A-15

ANALYSIS OF VARIANCE RESULTS, JUDGED BY PARENTS (CAUCASIAN MEDITERANEAN)

SOURCE OF VARIATION	DF	SS	MS	F
SAMPLES	11	131.99	12.00	23.98
JUDGES	28	.00	.00	.00
ERROR	308	154.13	.50	
TOTAL	347	286.12		

CORRECTION FACTOR(CF) = .00

STANDARD ERROR OF THE SAMPLE MEAN = .13

NUMBER OF OF JUDGES = 29 JUDGES

NUMBER OF SAMPLE = 12 SAMPLES(FIGURES)

Table A-16

ANALYSIS OF VARIANCE RESULTS, JUDGED BY AUSTRALIAN PARENTS

SOURCE OF VARIATION	DF	SS	MS	F
SAMPLES	11	231.88	21.08	48.11
JUDGES	44	.00	.00	.00
ERROR	484	212.10	.44	
TOTAL	539	443.98		

CORRECTION FACTOR(CF) = .00

STANDARD ERROR OF THE SAMPLE MEAN = .10

NUMBER OF OF JUDGES = 45 JUDGES

NUMBER OF SAMPLE = 12 SAMPLES(FIGURES)

Table A-17

ANALYSIS OF VARIANCE RESULTS, JUDGED BY PATIENTS (CAUCASIAN EUROPEAN)

SOURCE OF VARIATION	DF	SS	MS	F
SAMPLES	11	163.78	14.89	34.58
JUDGES	30	.00	.00	.00
ERROR	330	142.07	.43	
TOTAL	371	305.85		

CORRECTION FACTOR(CF) = .00

STANDARD ERROR OF THE SAMPLE MEAN = .12

NUMBER OF OF JUDGES = 31 JUDGES

NUMBER OF SAMPLE = 12 SAMPLES(FIGURES)

Table A-18

ANALYSIS OF VARIANCE RESULTS•JUDGED BY PATIENTS (CAUCASIAN MEDITERANEAN)

SOURCE OF VARIATION	DF	SS	MS	F
SAMPLES	11	161.77	14.71	45.74
JUDGES	24	.00	.00	.00
ERROR	264	84.88	.32	
TOTAL	299	246.65		

CORRECTION FACTOR(CF) = .00

STANDARD ERROR OF THE SAMPLE MEAN = .11

NUMBER OF OF JUDGES = 25 JUDGES

NUMBER OF SAMPLE = 12 SAMPLES(FIGURES)

Table A-19

ANALYSIS OF VARIANCE RESULTS•JUDGED BY AUSTRALIAN PATIENTS

SOURCE OF VARIATION	DF	SS	MS	F
SAMPLES	11	253.78	23.07	42.33
JUDGES	63	.00	.00	.00
ERROR	693	377.66	.54	
TOTAL	767	631.44		

CORRECTION FACTOR(CF) = .00

STANDARD ERROR OF THE SAMPLE MEAN = .09

NUMBER OF OF JUDGES = 64 JUDGES

NUMBER OF SAMPLE = 12 SAMPLES(FIGURES)

Table A-20

RANK CORRELATION COEFFICIENT BETWEEN EUROPEAN-MEDITERRANEAN PARENTS

FIG. NO.	1	2	3	4	5	6	7	8	9	10	11	12
EUROPEAN PARENTS	3	2	5	8	6	7	11	1	4	10	9	12
MEDITERRANEAN PARENTS	3	2	8	5	7	6	11	1	4	9	10	12
RANK DIFFERENCE	0.	0.	3.	-3.	1.	-1.	0.	0.	0.	-1.	1.	0.
SQUARE OF DIFFERENCE.	0.	0.	9.	9.	1.	1.	0.	0.	0.	1.	1.	0.

SPEARMANS RANK CORRELATION COEFFIENCT(P) = .92
T DISTRIBUTION VALUE = 7.59
DEGREE OF FREEDOM = 10

Table A-21

RANK CORRELATION COEFFICIENT BETWEEN AUSTRALIAN PARENTS-EUROPEAN PARENTS

FIG. No.	1	2	3	4	5	6	7	8	9	10	11	12
AUSTRALIAN PARENTS	4	2	8	6	7	5	11	1	3	9	10	12
EUROPEAN PARENTS	3	2	5	8	6	7	11	1	4	10	9	12
RANK DIFFERENCE	-1.	0.	-3.	2.	-1.	2.	0.	0.	1.	1.	-1.	0.
SQUARE OF DIFFERENCE.	1.	0.	9.	4.	1.	4.	0.	0.	1.	1.	1.	0.

SPEARMANS RANK CORRELATION COEFFIENCT(R) = .92
T DISTRIBUTION VALUE = 7.59
DEGREE OF FREEDOM = 10

Table A-22

RANK CORRELATION COEFFICIENT BETWEEN AUSTRALIAN-MEDITERRANEAN PARENTS

FIG. NO.	1	2	3	4	5	6	7	8	9	10	11	12
AUSTRALIAN PARENTS	4	2	8	6	7	5	11	1	3	9	10	12
MEDITERRANEAN PARENTS	3	2	8	5	7	6	11	1	4	9	10	12
RANK DIFFERENCE	-1.	0.	0.	-1.	0.	1.	0.	0.	1.	0.	0.	0.
SQUARE OF DIFFERENCE.	1.	0.	0.	1.	0.	1.	0.	0.	1.	0.	0.	0.

SPEARMANS RANK CORRELATION COEFFIENCT(R) = .99
T DISTRIBUTION VALUE = 18.71
DEGREE OF FREEDOM = 10

Table A-23

RANK CORRELATION COEFFICIENT BETWEEN TOTAL PARENTS-EUROPEAN PARENTS

FIG. NO.	1	2	3	4	5	6	7	8	9	10	11	12
TOTAL PARENTS	3	2	8	6	7	5	11	1	4	9	10	12
EUROPEAN PARENTS	3	2	5	8	6	7	11	1	4	10	9	12
RANK DIFFERENCE	0.	0.	-3.	2.	-1.	2.	0.	0.	0.	1.	-1.	0.
SQUARE OF DIFFERENCE.	0.	0.	9.	4.	1.	4.	0.	0.	0.	1.	1.	0.

SPEARMANS RANK CORRELATION COEFFIENCT(R) = .93
T DISTRIBUTION VALUE = 8.01
DEGREE OF FREEDOM = 10

Table A-24

RANK COPPELATION COEFFICIENT BETWEEN TOTAL PARENTS-MEDITERRANEAN PARENTS

FIG. NO.	1	2	3	4	5	6	7	8	9	10	11	12
TOTAL PARENTS	3	2	8	6	7	5	11	1	4	9	10	12
MEDITEPRANEAN PARENTS	3	2	8	5	7	6	11	1	4	9	10	12
PANK DIFFERENCE	0.	0.	0.	-1.	0.	1.	0.	0.	0.	0.	0.	0.
SQUARE OF DIFFEPENCE.	0.	0.	0.	1.	0.	1.	0.	0.	0.	0.	0.	0.

SPEARMANS PANK CORRELATION COEFFIENCT(R) = .99
T DISTRIBUTION VALUE = 26.60
DEGREE OF FPEEDOM = 10

Table A-25

PANK COPPELATION COEFFICIENT BETWEEN TOTAL PARENTS-AUSTRALIAN PARENTS

FIG. NO.	1	2	3	4	5	6	7	8	9	10	11	12
TOTAL PAPFNTS	3	2	8	6	7	5	11	1	4	9	10	12
AUSTRAI IAN PARENTS	4	2	8	6	7	5	11	1	3	9	10	12
PANK DIFFERENCE	1.	0.	0.	0.	0.	0.	0.	0.	-1.	0.	0.	0.
SQUARE OF DIFFEPENCE.	1.	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.

SPEARMANS PANK COPRELATION COEFFIENCT(R) = .99
T DISTRIPUTION VALUE = 26.60
DEGREE OF FREEDOM = 10

Table A-26

RANK CORRELATION COEFFICIENT BETWEEN EUROPEAN-MEDITERRANEAN PATIENTS

FIG. NO.	1	2	3	4	5	6	7	8	9	10	11	12
EUROPEAN PATIENTS	3	2	7	4	5	6	11	1	8	9	10	12
MEDITERRANEAN PATIENTS	3	2	5	4	7	9	12	1	6	8	10	11
RANK DIFFERENCE	0.	0.	-2.	0.	2.	3.	1.	0.	-2.	-1.	0.	-1.
SQUARE OF DIFFERENCE.	0.	0.	4.	0.	4.	9.	1.	0.	4.	1.	0.	1.

SPEARMANS RANK CORRELATION COEFFIENCT(R) = .92
T DISTRIBUTION VALUE = 7.22
DEGREE OF FREEDOM = 10

Table A-27

RANK CORRELATION COEFFICIENT BETWEEN AUSTRALIAN-EUROPEAN PATIENTS

FIG. NO.	1	2	3	4	5	6	7	8	9	10	11	12
AUSTRALIAN PATIENTS	3	2	8	5	6	7	12	1	4	9	10	11
EUROPEAN PATIENTS	3	2	7	4	5	6	11	1	8	9	10	12
RANK DIFFFRENCE	0.	0.	-1.	-1.	-1.	-1.	-1.	0.	4.	0.	0.	1.
SQUARE OF DIFFERENCE.	0.	0.	1.	1.	1.	1.	1.	0.	16.	0.	0.	1.

SPEARMANS RANK CORRELATION COEFFIENCT(R) = .92
T DISTRIBUTION VALUE = 7.59
DEGREE OF FREEDOM = 10

Table A-28

RANK CORRELATION COEFFICIENT BETWEEN AUSTRALIAN-MEDITERRANEAN PATIENTS

FIG. NO.	1	2	3	4	5	6	7	8	9	10	11	12
AUSTRALIAN PATIENTS	3	2	8	5	6	7	12	1	4	9	10	11
MEDITERRANEAN PATIENTS	3	2	5	4	7	9	12	1	6	8	10	11
RANK DIFFERENCE	0.	0.	-3.	-1.	1.	2.	0.	0.	2.	-1.	0.	0.
SQUARE OF DIFFERENCE.	0.	0.	9.	1.	1.	4.	0.	0.	4.	1.	0.	0.

SPEARMANS RANK CORRELATION COEFFIENCT(R) = .93
T DISTRIBUTION VALUE = 8.01
DEGREE OF FREEDOM = 10

Table A-29

RANK CORRELATION COEFFICIENT BETWEEN TOTAL PATIENTS-EUROPEAN PATIENTS

FIG. NO.	1	2	3	4	5	6	7	8	9	10	11	12
TOTAL PATIENTS	3	2	7	5	6	8	12	1	4	9	10	11
EUROPEAN PATIENTS	3	2	7	4	5	6	11	1	8	9	10	12
RANK DIFFERENCE	0.	0.	0.	-1.	-1.	-2.	-1.	0.	4.	0.	0.	1.
SQUARE OF DIFFERENCE.	0.	0.	0.	1.	1.	4.	1.	0.	16.	0.	0.	1.

SPEARMANS RANK CORRELATION COEFFIENCT(R) = .92
T DISTRIBUTION VALUE = 7.22
DEGREE OF FREEDOM = 10

Table A-30

RANK CORRELATION COEFFICIENT BETWEEN TOTAL PATIENTS-MEDITE. PATIENTS

FIG. NO.	1	2	3	4	5	6	7	8	9	10	11	12
TOTAL PATIENTS	3	2	7	5	6	8	12	1	4	9	10	11
MEDITERRANEAN PATIENTS	3	2	5	4	7	9	12	1	6	8	10	11
RANK DIFFERENCE	0.	0.	-2.	-1.	1.	1.	0.	0.	2.	-1.	0.	0.
SQUARE OF DIFFERENCE.	0.	0.	4.	1.	1.	1.	0.	0.	4.	1.	0.	0.

SPEARMANS RANK CORRELATION COEFFIENCT(R) = .96
T DISTRIBUTION VALUE = 10.57
DEGREE OF FREEDOM = 10

Table A-31

RANK CORRELATION COEFFICIENT BETWEEN TOTAL PATIENTS-AUSTRALIAN PATIENTS

FIG. NO.	1	2	3	4	5	6	7	8	9	10	11	12
TOTAL PATIENTS	3	2	7	5	6	8	12	1	4	9	10	11
AUSTRALIAN PATIENTS	3	2	8	5	6	7	12	1	4	9	10	11
RANK DIFFERENCE	0.	0.	1.	0.	0.	-1.	0.	0.	0.	0.	0.	0.
SQUARE OF DIFFERENCE.	0.	0.	1.	0.	0.	1.	0.	0.	0.	0.	0.	0.

SPEARMANS RANK CORRELATION COEFFIENCT(R) = .99
T DISTRIBUTION VALUE = 26.60
DEGREE OF FREEDOM = 10

Table A-32 Distribution of "t" of, Fisher, R.A. and Yates, F.

The distribution of *t*

Degrees of freedom	Probability of a larger value, sign ignored								
	0.500	0.400	0.200	0.100	0.050	0.025	0.010	0.005	0.001
1	1.000	1.376	3.078	6.314	12.706	25.452	63.657		
2	0.816	1.061	1.886	2.920	4.303	6.205	9.925	14.089	31.598
3	0.765	0.978	1.638	2.353	3.182	4.176	5.841	7.453	12.941
4	0.741	0.941	1.533	2.132	2.776	3.495	4.604	5.598	8.610
5	0.727	0.920	1.476	2.015	2.571	3.163	4.032	4.773	6.859
6	0.718	0.906	1.440	1.943	2.447	2.969	3.707	4.317	5.959
7	0.711	0.896	1.415	1.895	2.365	2.841	3.499	4.029	5.405
8	0.706	0.889	1.397	1.860	2.306	2.752	3.355	3.832	5.041
9	0.703	0.883	1.383	1.833	2.262	2.685	3.250	3.690	4.781
10	0.700	0.879	1.372	1.812	2.228	2.634	3.169	3.581	4.587
11	0.697	0.876	1.363	1.796	2.201	2.593	3.106	3.497	4.437
12	0.695	0.873	1.356	1.782	2.179	2.560	3.055	3.428	4.318
13	0.694	0.870	1.350	1.771	2.160	2.533	3.012	3.372	4.221
14	0.692	0.868	1.345	1.761	2.145	2.510	2.977	3.326	4.140
15	0.691	0.866	1.341	1.753	2.131	2.490	2.947	3.286	4.073
16	0.690	0.865	1.337	1.746	2.120	2.473	2.921	3.252	4.015
17	0.689	0.863	1.333	1.740	2.110	2.458	2.898	3.222	3.965
18	0.688	0.862	1.330	1.734	2.101	2.445	2.878	3.197	3.922
19	0.688	0.861	1.328	1.729	2.093	2.433	2.861	3.174	3.883
20	0.687	0.860	1.325	1.725	2.086	2.423	2.845	3.153	3.850
21	0.686	0.859	1.323	1.721	2.080	2.414	2.831	3.135	3.819
22	0.686	0.858	1.321	1.717	2.074	2.406	2.819	3.119	3.792
23	0.685	0.858	1.319	1.714	2.069	2.398	2.807	3.104	3.767
24	0.685	0.857	1.318	1.711	2.064	2.391	2.797	3.090	3.745
25	0.684	0.856	1.316	1.708	2.060	2.385	2.787	3.078	3.725
26	0.684	0.856	1.315	1.706	2.056	2.379	2.779	3.067	3.707
27	0.684	0.855	1.314	1.703	2.052	2.373	2.771	3.056	3.690
28	0.683	0.855	1.313	1.701	2.048	2.368	2.763	3.047	3.674
29	0.683	0.854	1.311	1.699	2.045	2.364	2.756	3.038	3.659
30	0.683	0.854	1.310	1.697	2.042	2.360	2.750	3.030	3.646
35	0.682	0.852	1.306	1.690	2.030	2.342	2.724	2.996	3.591
40	0.681	0.851	1.303	1.684	2.021	2.329	2.704	2.971	3.551
45	0.680	0.850	1.301	1.680	2.014	2.319	2.690	2.952	3.520
50	0.680	0.849	1.299	1.676	2.008	2.310	2.678	2.937	3.496
55	0.679	0.849	1.297	1.673	2.004	2.304	2.669	2.925	3.476
60	0.679	0.848	1.296	1.671	2.000	2.299	2.660	2.915	3.460
70	0.678	0.847	1.294	1.667	1.994	2.290	2.648	2.899	3.435
80	0.678	0.847	1.293	1.665	1.989	2.284	2.638	2.887	3.416
90	0.678	0.846	1.291	1.662	1.986	2.279	2.631	2.878	3.402
100	0.677	0.846	1.290	1.661	1.982	2.276	2.625	2.871	3.390
120	0.677	0.845	1.289	1.658	1.980	2.270	2.617	2.860	3.373
∞	0.6745	0.8416	1.2816	1.6448	1.9600	2.2414	2.5758	2.8070	3.2905

(From Fraunhofer and Murray, 1976)

Appendix B

STATISTICAL ANALYSIS B-1

"The normal approximation to the binomial distribution"

(Mendenhall et al., 1974).

Mean and Standard Deviation of the Binomial Random Variable:

$$\mu = np$$

$$\sigma = \sqrt{npq}$$

where: p is the probability of success in a given trial

and q = 1-p.

This method is concerned with the probability of an observed sample or, equivalently, reasoning from a known population to the outcome of sampling. The method is intuitive and based on the following reasoning. If a population parameter has a specific value and then a highly contradictory sample is observed, it can be concluded that the hypothesized value of the parameter was incorrect. Contradictory sample results are those that are highly improbable. The more improbable, the more contradictory are the results.

Mendenhall et al. (1974) illustrate with an example: The research hypothesis (what we wish to test) for

Jones' survey is that he will lose in votes (i.e. that the fraction of voters favouring Jones, p, is less than .50). The method attempts to support this research hypothesis by rejecting a null hypothesis that is contrary to the research hypothesis.

The binomial probability distribution for the number of voters favouring Jones is an excellent example of the application of the bell shaped curve. The number of voters x favouring Jones in the sample of 20 (n) can be viewed as the sum of the individual "yes" votes. It would be expected the probability distribution for x to be approximately normal.

Therefore, the null hypothesis for Jones' survey is that 50% of the voters favour his election (the least that he could expect if he would win) or, equivalently, that p = .50. The test statistic is x, the number of prospective voters in the sample favouring his election. The values of x that favour the research hypothesis in contradiction of the null hypothesis are those that are highly improbable assuming the null hypothesis to be true. The mean value of x, assuming that p = .5, is:

$$\mu = np = 20(.5) = 10$$

Then, contradictory values are those lying too far away from μ (Mean).

How do we decide whether a particular x is too far away from μ?

From the knowledge of the empirical rule and the properties of the normal distribution, the probability that x will lie more than 1.96 standard deviations away from μ is 0.05 (see Fig. B-1). For the research hypothesis $p < .5$, contradictory values of x that lead to rejection of the null hypothesis are those lying in the left-hand tail of Figure B-1 more than 1.96 standard deviations below μ. Contradictory values of $\bar{x}$, occur in what is called "the rejection region" for a test.

Rejection region for a test of the hypothesis

$p = .5, \quad n = 20,$

$$\mu = np = 10$$

$$\sigma = \sqrt{npq} = \sqrt{20(.5)(.5)}$$

$$= 2.24$$

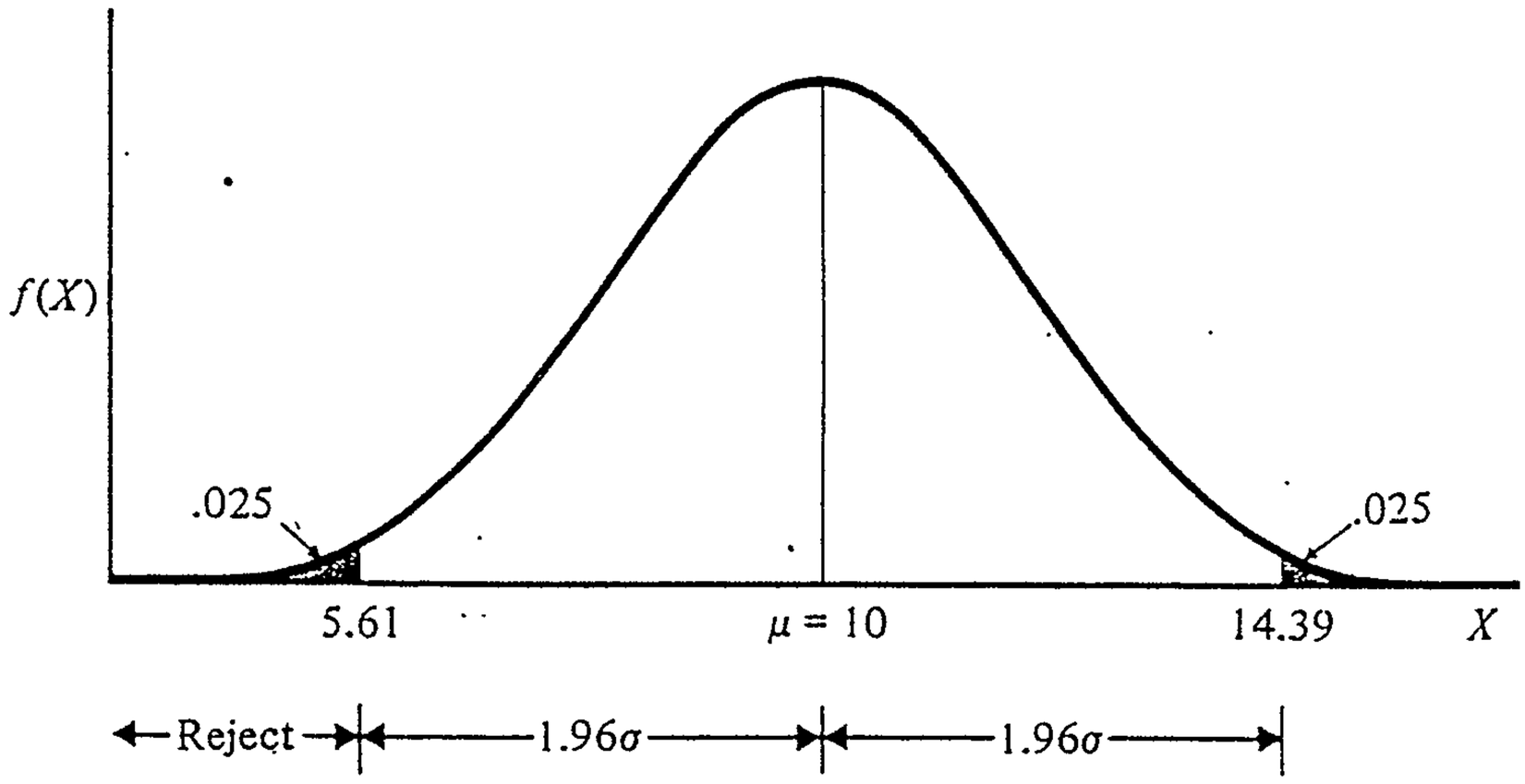
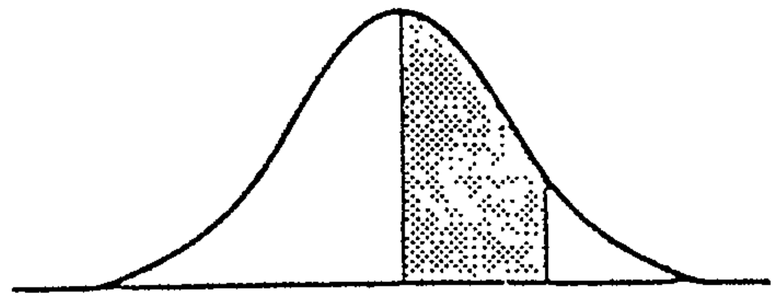


Figure B-1. showing rejected region for test of the hypothesis.

Table B-1 Normal-curve areas.



z	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
0.0	.0000	.0040	.0080	.0120	.0160	.0199	.0239	.0279	.0319	.0359
0.1	.0398	.0438	.0478	.0517	.0557	.0596	.0636	.0675	.0714	.0753
0.2	.0793	.0832	.0871	.0910	.0948	.0987	.1026	.1064	.1103	.1141
0.3	.1179	.1217	.1255	.1293	.1331	.1368	.1406	.1443	.1480	.1517
0.4	.1554	.1591	.1628	.1664	.1700	.1736	.1772	.1808	.1844	.1879
0.5	.1915	.1950	.1985	.2019	.2054	.2088	.2123	.2157	.2190	.2224
0.6	.2257	.2291	.2324	.2357	.2389	.2422	.2454	.2486	.2517	.2549
0.7	.2580	.2611	.2642	.2673	.2704	.2734	.2764	.2794	.2823	.2852
0.8	.2881	.2910	.2939	.2967	.2995	.3023	.3051	.3078	.3106	.3133
0.9	.3159	.3186	.3212	.3238	.3264	.3289	.3315	.3340	.3365	.3389
1.0	.3413	.3438	.3461	.3485	.3508	.3531	.3554	.3577	.3599	.3621
1.1	.3643	.3665	.3686	.3708	.3729	.3749	.3770	.3790	.3810	.3830
1.2	.3849	.3869	.3888	.3907	.3925	.3944	.3962	.3980	.3997	.4015
1.3	.4032	.4049	.4066	.4082	.4099	.4115	.4131	.4147	.4162	.4177
1.4	.4192	.4207	.4222	.4236	.4251	.4265	.4279	.4292	.4306	.4319
1.5	.4332	.4345	.4357	.4370	.4382	.4394	.4406	.4418	.4429	.4441
1.6	.4452	.4463	.4474	.4484	.4495	.4505	.4515	.4525	.4535	.4545
1.7	.4554	.4564	.4573	.4582	.4591	.4599	.4608	.4616	.4625	.4633
1.8	.4641	.4649	.4656	.4664	.4671	.4678	.4686	.4693	.4699	.4706
1.9	.4713	.4719	.4726	.4732	.4738	.4744	.4750	.4756	.4761	.4767
2.0	.4772	.4778	.4783	.4788	.4793	.4798	.4803	.4808	.4812	.4817
2.1	.4821	.4826	.4830	.4834	.4838	.4842	.4846	.4850	.4854	.4857
2.2	.4861	.4864	.4868	.4871	.4875	.4878	.4881	.4884	.4887	.4890
2.3	.4893	.4896	.4898	.4901	.4904	.4906	.4909	.4911	.4913	.4916
2.4	.4918	.4920	.4922	.4925	.4927	.4929	.4931	.4932	.4934	.4936
2.5	.4938	.4940	.4941	.4943	.4945	.4946	.4948	.4949	.4951	.4952
2.6	.4953	.4955	.4956	.4957	.4959	.4960	.4961	.4962	.4963	.4964
2.7	.4965	.4966	.4967	.4968	.4969	.4970	.4971	.4972	.4973	.4974
2.8	.4974	.4975	.4976	.4977	.4977	.4978	.4979	.4979	.4980	.4981
2.9	.4981	.4982	.4982	.4983	.4984	.4984	.4985	.4985	.4986	.4986
3.0	.4987	.4987	.4987	.4988	.4988	.4989	.4989	.4989	.4990	.4990

This table is abridged from Table I of *Statistical Tables and Formulas*, by A. Hald (New York: John Wiley & Sons, Inc., 1952). Reproduced by permission of A. Hald and the publishers, John Wiley & Sons, Inc.

(From Mendenhall et al., 1974)

If x falls in the rejection region, we reject the null hypothesis in favour of the research hypothesis. That is, we conclude that Jones' claim of victory is false. This method is used in the statistical analysis for the profile perception in Experiment II.

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