PERCEPTION OF DIFFERENT FACIAL CHARACTERISTICS BY SAUDIS

Ali H. Hassan BDS, PhD* Reem A. Alansari BDS**

ABSTRACT:

The aim of the present study was to identify the most attractive lip prominence and lower face height in different facial profiles based on the perception of Saudi Arabian laypersons living in the western region of Saudi Arabia. Lateral photographs of 10 Saudi adult subjects with well proportioned faces were presented to a panel of orthodontists and general dentists to choose the most attractive profiles. Photographs were taken using a standardized method for all subjects and were edited and converted into negatives. A male and a female subject were selected as the supernormal sample. Four sets of normal profiles were generated for each of the supernormal subjects by manipulating lip prominence, chin position and lower face height and then presented randomly to lay people to rank each set of pictures in an order of attractiveness and to fill out a simple questionnaire. The percentages of the most acceptable facial features were calculated, ranked and compared using the chi square test (p<0.05). The most attractive lip prominence was the average (39.2%) in the orthognathic facial type, the protrusive (39.3%) in the prognathic facial type and the retrusive (56.5%) in the retrognathic facial type. The most attractive lower face height was the shortest (39.3%) in female. In male, however, the three lower face heights were almost the same with no clear

*Associate Professor (Corresponding Author) Department of Preventive Dental Sciences, Faculty of Dentistry, King Abdulaziz University, Jeddah, Saudi Arabia. P.O.Box: 80209, Jeddah 21589 Email address: aliresearch@gawab.com
**PhD student, Graduate Program of Dental Sciences, Faculty of Dentistry McGill University, Montreal, Quebec, Can

preference. In conclusion, Saudis seem to prefer average but not protrusive lips in orthognathic faces, retrusive lips in the retrognathic faces and protrusive lips in prognathic faces. Minor changes in the lower face height seem less observable by lay people.

INTRODUCTION

The assessment of facial profile and its features is highly subjective and depends on the patient's ethnicity and perception. Concepts of orthodontic treatment have changed nowadays with more emphasis on the patient's opinion and perception of an ideal facial and dental appearance. However, the profile assessment by many orthodontists still depends on old cephalometric standards that were developed based on the actual features of certain populations, regardless of the patient's desires.[1-23] Several studies have been conducted to evaluate profiles using computer animated and discrete profile generation techniques with different chin, lip and nose prominences and to evaluate them as perceived by different populations.[24-31] In a study conducted to evaluate the perception of lip fullness by a White Caucasian sample, the results showed a sex-effect with females preferring fuller lips than males but both males and females preferring lip fullness greater than Rickett's standards.[27] Another study compared Mexican American and Caucasian judges in the acceptability of lip protrusion in computer animations of two male and two female subjects of Mexican descent. The results showed that Mexican Americans preferred upper or lower lip positions to be less protrusive than did Caucasians. [30] In Germany, straight average facial profile was the most attractive as perceived by Germans today, followed by the mildest retrognathic profile and the least attractive were both the extreme retrognathic and prognathic facial profiles. In addition a clear distinction was found between the perception of laypersons and dentists.[31] In a study to evaluate the perception of a Chinese population of seven computer generated profiles, Chinese male and female profiles that were normal or had bimaxillary retrusion were perceived to be the most attractive by dental professionals, dental students, and laypersons, and the least attractive was the profile with prognathic mandible.[32] Perception was also found to be different between the general public and professionals especially, orthodontists and maxillofacial surgeons.[28, 29, 32]

Recently in the western region of Saudi Arabia, cephalometric norms were established for adults and children.[33, 34] Unfortunately, not a single study has been conducted regarding facial profile assessment of the population of that region, which is multi-ethnic in origin. Therefore, establishing facial standards based on the perceptions of Saudi Arabian laypersons is an important task for proper orthodontic diagnosis and treatment.

The objectives of the present study were:

1- Identify the most attractive normal lip prominences in different facial profiles as perceived by Saudi Arabians.

2- Identify the most attractive lower facial height in orthognathic facial type as perceived by Saudi Arabians.

MATERIALS AND METHODS

Lateral facial photographs of 10 Saudi adult subjects with well proportioned faces (pleasant profiles with a Class I dental and skeletal pattern, mesofacial type, average lower face height and lips in good balance and harmony) were presented to a panel of orthodontists and general dentists to choose the most attractive profiles. Lateral facial photographs were taken using a standardized method for all subjects. The photographs were taken at a fixed distance of 36 inches from each subject using a digital camera (Cool Pix Nikon TM 5000 camera, Japan), secured on a tripod. Each subject was photographed with the head in natural head posture whereby the visual axis was parallel to the floor. The Adobe Photoshop software (Adobe System, Inc) was used to trim the selected photographs, edit them and convert them into negatives. In addition, facial features, such as hairstyle, complexion and make-up were eliminated. Dimensions were standardized among the different photographs and actual sizes were maintained during the editing process. One female and one male subject were selected as the most attractive profiles out of the 10 subjects and were used as the supernormal sample.

Four separate sets of facial profiles were generated for both the male and female supernormal subjects by manipulating lip prominence, chin position and lower face height within the acceptable variation of each

facial feature as perceived by the panel of orthodontists and general dentists (Figure.1, 2, 3 & 4). The first three sets were: retrognathic, orthognathic and prognathic facial types, generated by manipulating the anteroposterior position of the chin. In each set, the lip prominence was manipulated to be average, retrusive and protrusive. Lip prominences were defined as follow: Average: the actual lip position of the selected subjects; Protrusive: lips are 2mm ahead of the average prominence and Retrusive: lips are 2mm behind the average prominence. This was measured relative to the Esthetic line of Ricketts, which extends from the tip of the nose to soft tissue pogonion. The advancement or retraction of upper lip was performed from subnasale, lower lip from supramentale, and chin from supramentale. The performed changes were artistically modified to maintain soft tissue continuity. In the fourth set, the lower face height was manipulated to generate short, average and long normal lower face height in the orthognathic facial type in both male and female. Variation in the lower face height was produced by moving the chin vertically while maintaining the anterior contour with attachment to supramentale. The four sets of generated profiles were presented randomly to lay people (600 judges) at different governmental and public places in Jeddah, Makkah and Madina which represent the main cities of the western region of Saudi Arabia.

Chosen judges were asked to rank each set of pictures in an order of attractiveness on scale of one to three, and to fill out a simple questionnaire (Figure 9). The percentage of the most acceptable face height was calculated and ranked. The sample used in the present study was distribution free and therefore, Chi square was used to compare the different percentages of attractiveness ($p<0.05$). The protocol of the present study was approved by the Ethical Committee of the Faculty of Dentistry at King Abdulaziz University.
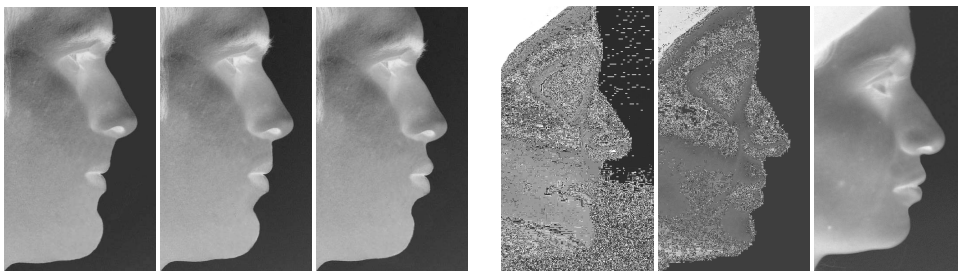

Figure1: The three generated lip prominences in the orthognathic facial type in the supernormal male and female subjects
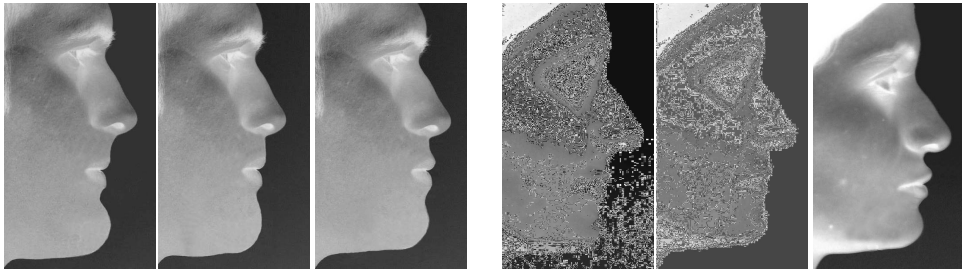
Figure 2: The three generated lip prominences in the prognathic facial type in the supernormal male and female subjects
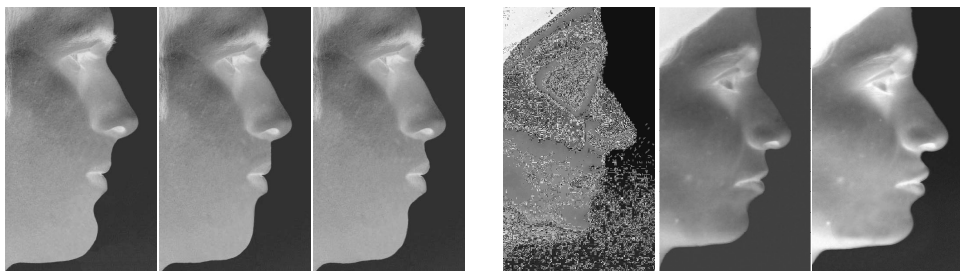

Figure 3: The three generated lip prominences in the retrognathic facial type in the supernormal male and female subjects

Figure 4: The different generated facial heights in the orthognathic facial type in male and female

RESULTS

In the male orthognathic facial type in male, the most attractive lip prominence was the average (39.2%), followed by the retrusive (34.5%) with no statistically significant difference between the two. The least attractive was the protrusive lip prominence (26.3%) which differed significantly ($p<0.05$) from the other two prominences (Table 1). In the female orthognathic facial type, the most attractive lip prominence was also the average (46.3%) followed by the protrusive (37.5%) and the least attractive was the retrusive (16.2%) with a statistically significant difference between the three groups ($p<0.05$) (Table 1)

In the male prognathic facial type, the most attractive lip prominence was the protrusive (39.3%), followed by the retrusive (34%) with no statistically significant difference between the two. In the female prognathic facial type, the most attractive lip prominence was also the protrusive (41.8%), followed by the retrusive (30.2%) but with a statistically significant difference between the two ($p<0.05$)(Table 1).

In the male retrognathic facial type, the most attractive lip prominence was the retrusive (56.5%), followed by the protrusive with a statistically significant difference between the two ($p<0.05$). In the female retrognathic facial type, the most attractive lip prominence was the retrusive (42.7%) followed by the protrusive (31.3%) with a statistically insignificant difference between the two ($p<0.05$) (Table 1)

In the male facial profiles, the three lower face heights were almost the same with no clear preference. However, in the female profile, the most attractive lower face height was the shortest (39.3%), followed by the average (38.4%) with no statistically significant difference between the two lower face heights ($p<0.05$). The longest face height was significantly the least acceptable in the female facial profile ($p<0.05$) (Table 2).

Table 1: the rank of the percentages of the different lip prominences as perceived by the sample in the three facial types

Lip Prominence	Orthognathic Chin		Prognathic Chin		Retrognathic Chin	
	Male	Female	Male	Female	Male	Female
Protrusive Lips	26.3%	37.6%	**39%**	**41.8%**	25.2%	31.5%
Average Lips	**37.1%**	**44.9%**	26.6%	28%	18.4%	25.9%
Retrusive Lips	34.6%	16.1%	34.1%	30.6%	**56.4%**	**42.6%**

Table 2: Saudi's perception of the different face height in the orthognathic facial profile

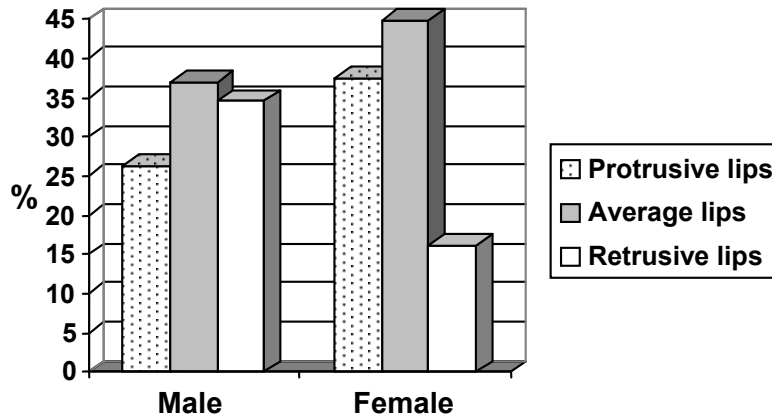| Orthognathic Face		Face Height
Male	Female	
34.1%	22.3%	Long face
33.1	38.4	Average
33.4	39.3	Short face

Figure 5: The rank of the percentages of the different lip prominences as perceived by the sample in the orthognathic facial type
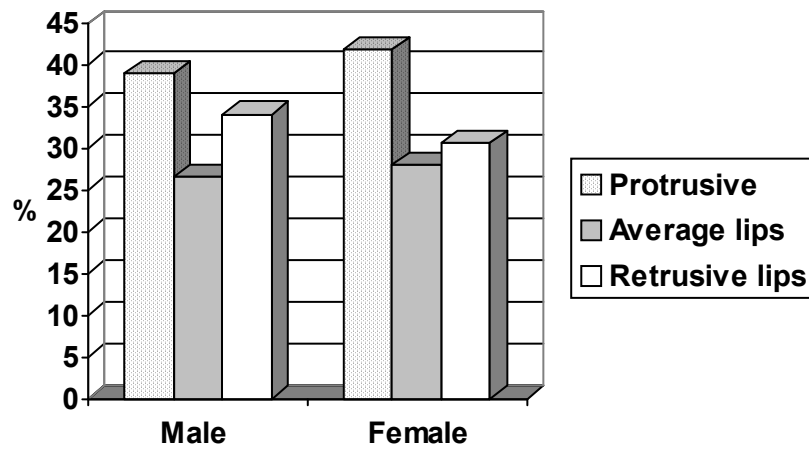
Figure 6: The rank of the percentages of the different lip prominences as perceived by the sample in the prognathic facial type.
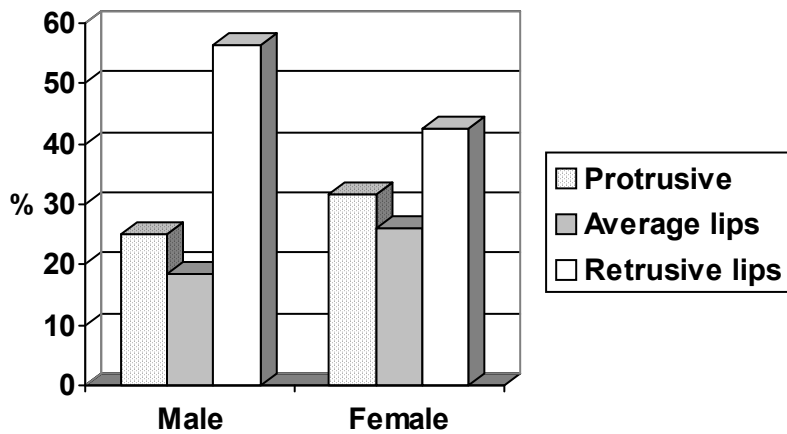

Figure 7: The rank of the percentages of the different lip prominences as perceived by the sample in the retrognathic facial type.
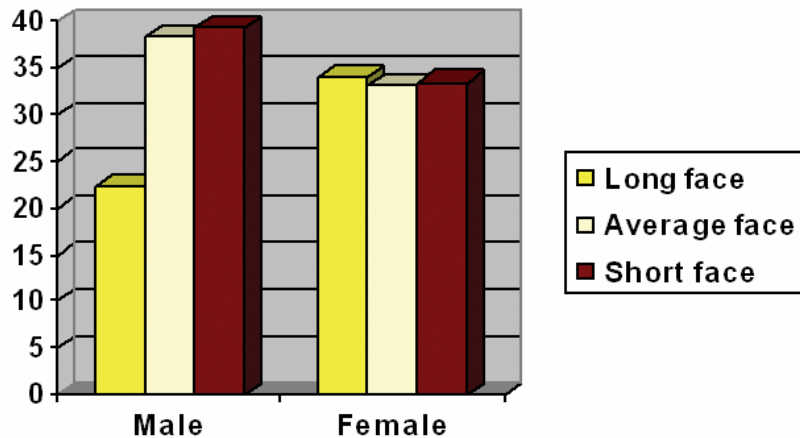
Figure 8: A graph showing the percentage of the chosen different facial heights in both male and female

DISCUSSION

Lip position is critical in orthodontic diagnosis, treatment planning and prognosis. Treating orthodontic patients without taking into account their opinion and chief complaints and depending mainly on their cephalometric features is currently less acceptable. Therefore, the results of the present study are very important and should be considered in the treatment of Saudi Arabians, as they provide evidence of Saudi perceptions of the ideal lip position and lower face height.

In the present study the perception of two important facial features that can be influenced by orthodontic treatment (the lip position in the different facial types and lower face height) were assessed within the normal range values, excluding the extreme features, which do not represent the normal. Unlike previous studies in which seven or more images were shown to judges at the same time,[25-30] only three different profiles were presented in each set, to help the judge concentrate more on their selection. In addition, perception of a larger sample was assessed as compared to previous studies. [25-30]

The most attractive lip positions for Saudi Arabians were; the average in the orthognathic facial type, the protrusive in the prognathic facial type, and the retrusive in the retrognathic facial type. These are important findings, which show direct proportional correlation between lip prominence and chin prominence. Saudis who are known to have bimaxillary protrusion as one of their cephalometric features, [21-24,33,34] do not prefer protrusive lips. This is in agreement with the perception of Maxican Americans and opposite to European Americans. [30] In addition, in the treatment of mild skeletal Class II with deficient chin, extraction in the upper arch could be an acceptable option, since retrusive lip prominence was chosen as the most attractive by Saudi Arabians to fit the retrognathic facial type.

It seems that in males minor changes in the lower face height do not affect the perception of the overall profile in the orthognathic facial type. However, long lower face height is less acceptable in females. In other words, it seems less critical to change lower face height within a few millimeters during orthodontic treatment especially, in males.

CONCLUSION

The perception of lip prominence and lower face height is very important to consider during orthodontic treatment. Saudi Arabians seem to prefer average but not protrusive lips in the orthognathic faces, retrusive lips in retrognathic faces and protrusive lips in prognathic faces. Minor changes in the lower face height seem less observable by laypersons.

REFERENCES

1. Downs WB. Analysis of the dentofacial profile. Angle Orthod. 1956;26: 191-212.

2. Downs WB. Variation in facial relationships: their significance in the treatment and prognosis. Am J Orthod. 1948;34:812-840.

3. Riedel RA. The relation of maxillary structures to cranium in malocclusion and in normal occlusion. Angle Orthod. 1952;22:142-145.

4. Steiner CC. The use of cephalometrics as an aid to planning and assessing orthodontic treatment. Am J Orthod. 1960;29:8.

5. Bishara SE. Longitudinal cephalometric standards from 5 years of age to adulthood. Am J Orthod. 1981;79:35-44.

6. Scheideman GB, Bell WH, Legan HL, Finn RA, Reisch JS. Cephalometric analysis of dentofacial normals. Am J Orthod. 1980;78:404-420.

7. Sassouni VA. Roentgenographic cephalometric analysis of cephalofacio dental relationships. Am J Orthod. 1995;41:735.

8. Franchi L, Baccetti T, McNamara JA Jr. Cephalometric floating norms for North American adults. Angle Orthod. 1998;68:497-502.

9. Huang WJ, Taylor RW, Dasanayake AP. Determining cephalometric norms for Caucasians and African Americans in Birmingham. Angle Orthod. 1998;68:503-512.

10. Anderson AA, Anderson AC, Hornbuckle AC, Hornbuckle K. Biological derivation of a range of cephalometric norms for children of African American descent (after Steiner). Am J Orthod Dentofacial Orthop. 2000;118:90-100.

11. Bailey KL, Taylor RW. Mesh diagram cephalometric norms for Americans of African descent. AmJ Orthod Dentofacial Orthop. 1998;114:218-223.

12. Miyajima K, McNamara JA Jr, Kimura T, Murata S, Iizuka T . Craniofacial structure of Japanese and European-American adults with normal occlusions and well-balanced faces. Am J Orthod Dentofacial Orthop. 1996;110: 431-438.

13. Engel G, Spolter BM. Cephalometric and visual norms for a Japanese population. Am J Orthod. 1981;80:48-60.

14. Hwang HS, Kim WS, McNamara JA Jr. Ethnic differences in the soft tissue profile of Korean and European-American adults with normal occlusions and well-balanced faces. Angle Orthod. 2002;72:72-80.

15. Alcalde RE, Jinno T, Pogrel MA, Matsumura T. Cephalometric Norms in Japanese Adults. J Oral Maxillofac Surg. 1998;56:129-134.

16. Alcalde RE, Jinno T, Orsini MG, Sasaki A, Sugiyama RM, Matsumura T. Soft tissue cephalometric norms in Japanese adults. Am J Orthod Dentofacial Orthop. 2000;118: 84-89.

17. Loutfy MS, Ponitz P, Harris JE. Cephalometric standards for normal Egyptian face. Egypt Dent J. 1971;17:91-100.

18. Bishara SE, Abdalla EM, Hoppens BJ. Cephalometric comparisons of dentofacial parameters between Egyptian and North American adolescents. Am J Orthod Dentofacial Orthop.1990;97:413-421.

19. Hamdan AM, Rock WP. Cephalometric norms in an Arabic population. J Orthod. 2001;28:297-300.

20. Shalhoub SY, Sarhan OA, Shaikh HS. Adult cephalometric norms for Saudi Arabians with a comparison of values for Saudi and North American Caucasians. Br J Orthod. 1987;14:273-279.

21. Sarhan OA, Nashashibi IA. A comparative study between two randomly selected samples from which to derive standards for craniofacial measurements. J Oral Rehabil. 1988;15:251-255.

22. Al-Jasser NM. Cephalometric evaluation of craniofacial variation in normal Saudi population according to Steiner analysis. Saudi Med J. 2000;21:746-750.

23. Al-Jasser NM. Facial esthetics in a selected Saudi population. Saudi Med J. 2003;24:1000-1005.

24. Arpino VJ, Giddon DB, BeGole EA, Evans CA. Presurgical profile preferences of patients and clinicians. Am J Orthod Dentofacial Orthop. 1998;114: 631-637

25. Giddon DB, Sconzo R, Kinchen JA, Evans CA. Quantitative comparison of computerized discrete and animated profile preferences. Angle Orthod. 1996; 66:441-8

26. Kitay D, BeGole EA, Evans CA, Giddon DB. Computer-animated comparison of self-perception with actual profiles of orthodontic and nonorthodontic subjects. Int J Adult Orthodon Orthognath Surg. 1999;14:125-134

27. Cochrane SM, Cunningham SJ, Hunt NP. Perception of facial appearance by orthodontists and the general public. J Clin Orthod. 1997;16:164-168.

28. Cochrane SM, Cunningham SJ, Hunt NP. A comparison of the perception of facial profile by the general public and 3 groups of clinicians. Int J Adult Orthodon Orthognath Surg. 1999;14:291-295.

29. Mejia-Maidl M, Evans CA, Viana G, Anderson NK, Giddon DB. Preferences for facial profiles between Mexican Americans and Caucasians. Angle Orthodontist: 2005;75:953–958.

30. Honn M, Dietz K, Godt A, Goz G. Perceived relative attractiveness of facial profiles with varying degrees of skeletal anomalies. J Orofac Orthop. 2005; 66:187-196.

31. Soh J, Chew MT, Wong HB. A comparative assessment of the perception of Chinese facial profile esthetics. Am J Orthod Dentofacial Orthop. 2005;127:692-699.

32. Hassan AH. Cephaloetric Norms for Saudi Adults living in the Western Region of Saudi Arabia. Angle Orthod 2006;76:18-22, in press.

33. Hassan AH. Cephalometric norms for the Saudi children living in the western region of Saudi Arabia: a research report. Head & Face Medicine 2005;1:5.

Questionnaire of Perception of Facial Appearance
استبيان استحسان أشكال الوجه

[Fig. 9]

Serial #: _____

Gender: ☐ Male ☐ Female ذكر ☐ أنثى ☐ :الجنس

Age: _____ :العمر

Nationality: _____ _____:الجنسية

Education Level: _____ _____:المستوى التعليمي

Occupation: _____ _____:الوظيفة

Please arrange the pictures from each set according to your preference.

الرجاء ترتيب الصور التالية من كل مجموعة حسب الأفضلية لديك:

Picture A:

	Most Acceptable الأكثر استحسانا	**Average** المتوسط	**Least Acceptable** الأقل استحسانا	
Set: **1**	Picture _____ الصورة		Picture _____ الصورة	المجموعة ١
Set: **2**	Picture _____ الصورة	Picture _____ الصورة	Picture _____ الصورة	المجموعة ٢
Set: **3**	Picture _____ الصورة	Picture _____ الصورة	Picture _____ الصورة	المجموعة ٣
Set: **4**	Picture _____ الصورة	Picture _____ الصورة	Picture _____ الصورة	المجموعة ٤

Picture B:

	Most Acceptable الأكثر استحسانا	**Average** المتوسط	**Least Acceptable** الأقل استحسانا	
Set: **1**	Picture _____ الصورة	Picture _____ الصورة	Picture _____ الصورة	المجموعة ١
Set: **2**	Picture _____ الصورة	Picture _____ الصورة	Picture _____ الصورة	المجموعة ٢
Set: **3**	Picture _____ الصورة	Picture _____ الصورة	Picture _____ الصورة	المجموعة ٣
Set: **4**	Picture _____ الصورة	Picture _____ الصورة	Picture _____ الصورة	المجموعة ٤