

Comparison of Chinese and US orthodontists' averaged evaluations of "facial attractiveness" from end-of-treatment facial photographs

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Introduction: This study continues our assessment of agreement and disagreement among 25 Chinese and 20 US orthodontists in the ranking for facial attractiveness of end-of-treatment photographs of randomly sampled growing Chinese and white orthodontic patients. The main aims of this article were to (1) measure the overall pattern of agreement between the mean rankings of US and Chinese orthodontists, and (2) measure the strength of agreement between the rankings of the US and Chinese orthodontists for each patient. **Methods:** Each judge independently ranked standard clinical sets of profile, frontal, and frontal-smiling photographs of 43 US patients and 48 Chinese patients. For each patient, a separate mean rank was computed from the responses of each group of judges. Pearson correlations between the mean ranks of the 2 groups of judges were used to measure their overall agreement. Paired and unpaired *t* tests were used to measure the agreement between the judges of the 2 groups for each patient. **Results:** The overall agreement between the mean rankings of the US and Chinese judges was very high. For the US patients, the correlation between the Chinese and US judges means was $r = 0.92$, $P < 0.0001$. For the Chinese patients, the analogous value was $r = 0.86$, $P < 0.0001$. Agreement between the 2 groups of judges concerning each patient was also generally strong. For two thirds of the patients, the mean ranks of the US and Chinese judges differed by less than 1 unit in a scale of 12. However, for 6 patients considered individually (5 Chinese and 1 US), the assessment of the 2 groups of judges was statistically significantly different at *P* values ranging from 0.02 to less than 0.0001, even after the Bonferroni correction. **Conclusions:** These findings demonstrate that orthodontic clinicians can reliably identify and rank subtle differences between patients, and that differences between judges and between patients can be distinguished at a high level of statistical significance, given appropriate study designs. However, the reasons clinicians give for the differences in their judgments are more difficult to investigate and will require further study. (*Am J Orthod Dentofacial Orthop* 2009;135:621-34)

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International exchanges among orthodontists of different ethnicities and cultural backgrounds have increased dramatically in recent years. This increasing globalization of orthodontics—witness the expanding presence of the World Federation of Orthodontists,¹ for example—sharpens the need for cross-cultural investigations measuring the level of agreement among clinicians from different parts of the world concerning treatment criteria and goals. A key subject requiring investigation is the evaluation of facial attractiveness by clinicians of different cultural backgrounds. To what extent do orthodontists with different cultural heritages evaluate facial attractiveness similarly and how do they differ? Is there a single definition of "facial attractiveness," a kind of innate platonic archetype that is relatively constant across patients and clinicians of different ethnicities and national traditions? Or do orthodontic standards of facial attractiveness differ regionally, just as do styles of clothing, childrearing practices, and social customs? In brief, how universal and

how regionally qualified is the perception of the attractive face among orthodontists?

Contemporary studies by perceptual psychologists have advanced the concept that the main determinants of facial attractiveness are symmetry,²⁻⁴ youthfulness,^{5,6} and averageness.^{2,4,7} But these general principles seem difficult to apply to individual patients in the real world of clinical orthodontics. It seems noteworthy that in a search of recent psychological literature, we found little focus on the issues that consume the major attention of orthodontists. We encountered few references to “smile” in general and none to “teeth,” “gummy smile,” “black triangles,” or “midline deviations.” On the other hand, it is clear that the general public is concerned about smiles and teeth; witness the enormous success of Botox treatments,⁸ tooth whitening,⁹ and indeed orthodontics itself. We need, therefore, to do our own studies, but we should do them in a rigorous empirical manner grounded in the requirements of ordinary orthodontic experience.

Few orthodontic studies appear to have compared judgments of samples of clinically derived facial photographs by representative groups of orthodontists of different ethnic and cultural backgrounds.¹⁰⁻¹⁶ In a general investigation now in progress at Peking University and the University of the Pacific, we are studying the ranking by Chinese and US orthodontists of end-of-treatment facial photographs of Chinese and US orthodontic patients. In a previous article, we focused more on the orthodontists than on the patients by using the data to provide a partial answer to the question, “to what extent do pairs of orthodontists of the same or different ethnicity rank clinical end-of-treatment photographs in the same way.”¹⁶ The unit of comparison was a pair of orthodontists to address the common clinical situation in which 2 orthodontists exchange views about one or more patients. It was found in that study that agreement (ie, correlation among rankings) between pairs of judges ranged from about $r = 0.5$ to $r = 0.7$. In general, agreement was slightly greater when the judges evaluated patients of their own ethnicity and slightly reduced when the 2 judges in the pair were of different ethnicities. However, the magnitude of the differences between comparisons was small. Whereas the correlations between pairs of Chinese and US judges were always positive and almost always highly statistically significant, they accounted for only between a quarter and a third of the variability in judgment across a large sample of patients.

In this article, using the same samples and data sets, we focused more on the average evaluation of each patient by a substantial number of judges. For each of 48 Chinese orthodontic patients and 43 US orthodontic pa-

tients considered individually, we compared the evaluations of a group of 20 US orthodontists with those of a group of 25 Chinese orthodontists. Our main tasks were to answer the following 2 questions. (1) In each cohort of patients (Chinese and US), what was the overall pattern of agreement or disagreement between the average rankings of the US and Chinese orthodontists? (2) For each patient in the Chinese and US cohorts, how strong was the agreement or disagreement between the rankings of the US and Chinese orthodontists?

MATERIAL AND METHODS

The data analyzed in this study are from the same sources as those of our previous article.¹⁶ The images ranked for attractiveness were standard end-of-treatment sets of facial photographs for 91 adolescent orthodontic patients. Each set included a profile, a full-face, and a full-face smiling image (Fig 1). In this study, we refer to the set of 3 images for each patient as a “triplet.” The patients were randomly selected from those who had been treated in the faculty orthodontic clinic of Peking University School of Stomatology ($n = 48$) and in the clinical practice of Dr Helmer Pearson, Director of the Graduate Orthodontic Clinic at the University of Medicine and Dentistry of New Jersey ($n = 43$). The randomized retrospective sampling procedure used to collect these 2 cohorts of patients was the same at both institutions and is summarized schematically in Figure 2. Step 1: at each venue, patients who received treatment during a specified time period were identified. Step 2: each patient was assigned a random number. All subsequent procedures were conducted with the charts sorted in random order. This ensured that the cohort represented the population (ie, practice) from which it was drawn. Step 3: proceeding in random order, all charts with complete records were identified and duplicated for further studies. (For the purposes of the general project of which this study is a part, a complete record was considered to be one in which a lateral cephalogram, study casts, full-mouth intraoral or panoramic x-rays, and a facial photographic triplet were available at the beginning and end of full-bonded orthodontic treatment.) However, only the end-of-treatment facial photographs were used in the presently reported study. Step 4: after identifying a sufficiently large sample with full records, a stratified cohort of 48 patient records divided into 4 groups of 12 records each was created at each venue. Each group contained triplets for 3 Class I nonextraction, 3 Class I extraction, 3 Class II nonextraction, and 3 Class II extraction patients. The ratio of female to male patients in each cohort was 3:1, approximating the ratio of the sexes in both Chinese and US practices. In 1 group of US

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