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Facial beauty- assessing the variables

Abstract

Introduction: Several variables which may affect facial beauty are discussed. While most facial features appear to be under genetic control, the actual direction of facial growth appears less so.

Aim: To discover which aspects of facial appearance are most important in assessing facial attractiveness.

Measurements: Different ways of measuring faces are described.

Materials: Five line drawings were traced from a single treated patient each showing a different aspect of the changes that had taken place during treatment. These were shown to 107 adults, who were asked to judge the attractiveness of each feature.

Results: 74% of judgements considered forward movement of the cheek bones were most important while changes in other features were considered less significant.

Conclusion: Forward facial growth is considered most attractive.

Keywords: facial growth, forward growth, downwards growth, indicator line, redirection of facial growth, Gnathiometer

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Introduction

Facial beauty is arguably the most powerful generator of human emotion. In addition to serving the obvious function of attracting the sexes to each other it has also served to inspire great works of art, prompt sadistic acts, initiate ferocious wars, and reputedly launch a thousand ships. Is it inherited? If so, why do attractive parents often have plain children and vice-versa?

Great beauty is undoubtedly a very special asset, bestowed on very few people. Such is its power that those who possess it find it almost impossible to lead a normal life. Even those who are slightly more attractive than average appear to have many advantages in life while the less attractive are likely to suffer discrimination and rejection.

Children grow up to believe that heroes are good looking, heroines are beautiful, and bad people are ugly. While many might assume that these stereotypes are fictional there is currently substantial evidence to suggest they are based on truth. Attractive babies receive more affection and attention from their parents and other adults, and are more likely to grow up to be well-balanced adults themselves (Bull and Rumsey 1988). Unattractive children are more likely to be bullied at school. Good-looking people are likely to be perceived as more intelligent.[1] Surprisingly they may actually be more intelligent,[2] possibly because they receive more attention at school. They are also likely to get better jobs, rise to higher positions, and earn more money.[3] You are considered to have a higher status if your partner is good looking than if they are plain.

Handsome cadets achieve higher rank by the time they graduate (Ackerman 1990). A judge is likely to give an attractive criminal a shorter sentence.[4] Unattractive people are associated with undesirable personalities and deeds,[5] they are also perceived as deviants, feminists, homosexuals, and politically radical.[6] Criminals who have their appearance improved by facial surgery are less likely to re-offend.

How are faces judged?

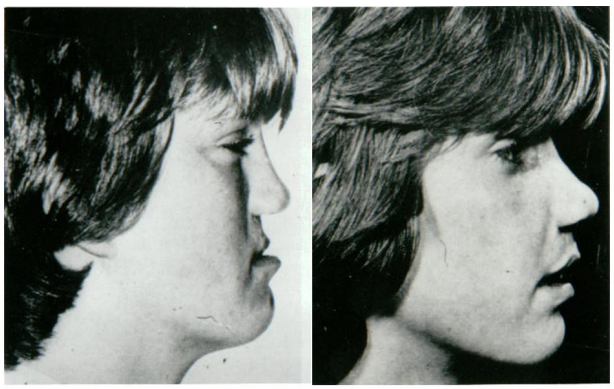
The ability to recognise good looks starts very early in life. Even three-month-old babies prefer attractive mums to unattractive mums.[7] This would suggest that a specific appreciation is coded within us at birth.

It is widely thought that beauty lies in the eye of the beholder. However, if photographs of faces are compared, impartial judges will place each of them into approximately the same rank order of beauty, regardless of the race, colour, or background of either the subjects or surprisingly of the judges themselves.[8] Many people find this hard to accept as personal preferences about facial beauty vary so widely. It was to clarify this point that this research project was initiated.

Scientific assessment of facial appearance

Skeletal form

Facial form is dependent on both the bones and the soft tissues, the former providing the sculptor's armature over which the latter are draped. Changes in the size or position of the bones, especially of the mid-face complex, can make a substantial difference to the appearance of the face (Figure 1).



James and Brook 1985 European Journal of Orthodontics, 7:231-247, 1985.
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Figure 1

The girl illustrated had surgery to bring her maxilla forward. The position of the mid-face is also used by cartoonists to portray good and evil (Figure 2).

Figure 2

Forward growth of the mid-face is generally considered attractive[9] and increased facial height is unattractive.[10] If the jaws grow downwards the teeth are likely to become crowded,[11] especially the lower anteriors,[12] and crowded lower front teeth in any seven-year old child is a certain sign of current and probably future downwards growth. It is clear that crooked teeth are closely and constantly linked to adverse facial growth.

Clinical evidence

Three year old children within industrialised societies tend to leave their mouths open more than 80% of the time[13] and there is strong evidence to show that hanging the mouth open will cause faces to grow vertically.[14,15]

Figure 3 shows these variations can be precipitated by no more than a blocked nose. Many years ago studies of identical twins[16] showed that there is a greater variance in the shape of the facial bones than other parts of the body. This has been supported more recently (Figure 4), confirming that the facial bones are especially open to environmental influences.

The frequency of adverse facial growth

It is rare for mature adults living in industrialised cities to have all 32 teeth in perfect alignment, although this was normal amongst our direct ancestors. This would suggest that adverse 'downwards' growth is now commonplace and ideal 'forward' faces less so, in which case the bulk of current research into facial beauty may have been undertaken on an 'average' but skewed sample of vertical faces.

Skeletal changes during downwards growth

When the face grows vertically the mid-facial complex of bones swings down and back, making it look as though the nose has grown forward although in reality it is the same size, and only looks large by comparison with the flattened cheeks. Thus, a large nose and crowded teeth are the easiest means of recognising downwards growth. Frequently the dropping of the mid-face is followed by a hinging back of the lower jaw which creates a weak chin (Figure 3 & 4) and moves the tongue to the back of the throat. This will partially block the airway making breathing difficult, as a result people tilt their head back[17,18] to open their airway. Tilting the head disguises the weak chin but causes the forehead to slope back and the nose to project even further, producing what orthodontists call a 'convex' face. The bony changes are not restricted to the jaws but may include most of the skull, even the cranial base[19] and cervical vertebra.

Which faces are most attractive?

If facial beauty were randomly distributed throughout a population then a digitally created mean would be considered most attractive. However, Perrett, et al.,[20] found that although an 'average' face was considered more attractive than most individual faces, forward growing "highly attractive faces are systematically different in shape from average".

Although most of the public believe that facial appearance can give an insight to the personality of the individual, this concept has little scientific support. However, one study[21] of vertical and horizontal faces concluded that the former tended to be less conventional and the latter more so. Cunningham[22] suggested that "The pseudo-sciences of phrenology and physiognomy may have made measuring the face seem disreputable to some scientists", and this may have restricted current research on the facial structures.

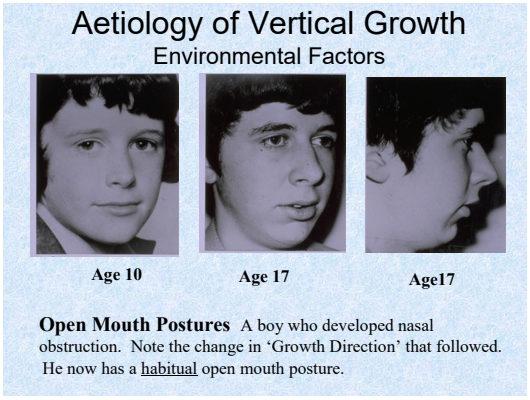

Figure 3

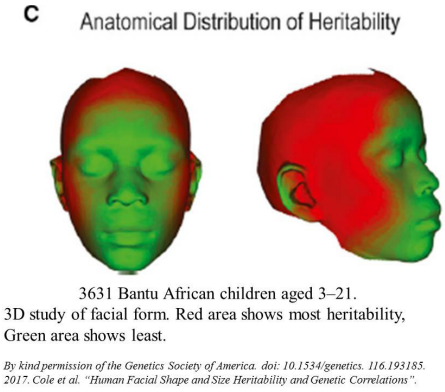

Figure 4

Objective measurement of facial features

Down's 'A' and 'B' points are commonly used to assess the position of the dental skeleton and teeth. But this requires an X-ray. This assessment is also dependent on the position of the incisors and the stability of the base of the skull, which vary.[19]

The indicator line (Figure 5)**:** Some orthodontists measure the distance between the tip of the nose and the edge of the upper front teeth, which increases if the maxilla grows 'downwards'. The tip of the nose is taken as the furthest point from the tragus of the ear. Although intended as no more than an 'indication', this has proved surprisingly constant when tested.[23]

Ideally, for Caucasians, it should measure about 27mm at the age of four and increase approximately one mm each year till puberty, when it should be 36 for girls and 38 for boys. However, only a few very attractive children or adults achieve measurements as low as this. Different races appear to vary marginally.[24]

Lower indicator line: This assesses the position of the lower incisors (Figure 6), which normally reads about 2mm less than the upper

Indicator Line. If both upper and lower Indicator Lines are close to these ideals and the anterior teeth meet with a 1 or 2mm overlap, the facial form is considered to be ideal.

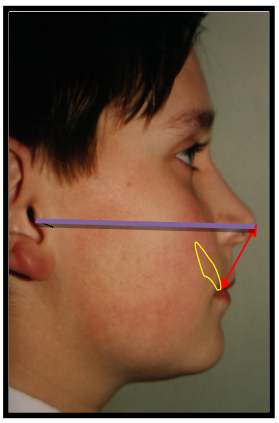

Figure 5

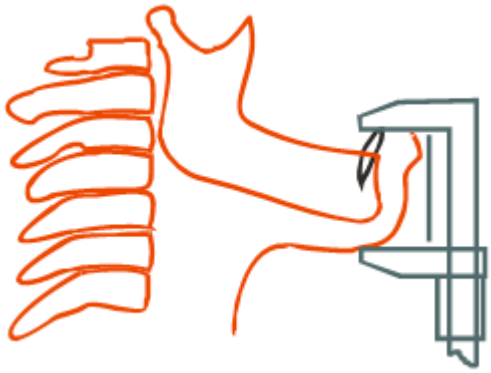

Figure 6

The cheek line: This runs down and forward from the middle of the lower eyelid sagittally at a tangent to the cheek (Figure 7). It helps to establish the position of the mid-face which is not easy to delineate on X-rays.[25] It is suggested that the cheek line should run parallel to the nose.

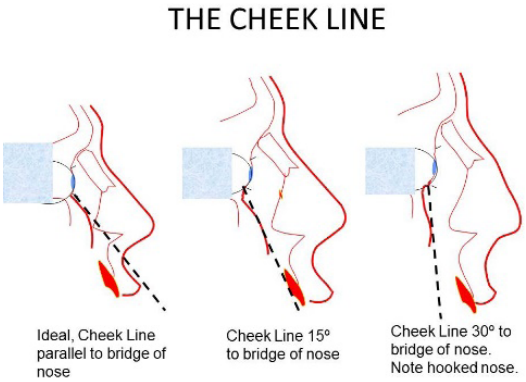

Figure 7

The Angle of the Lower Boarder of the mandible should ideally be about 7 degrees below the Frankfort Plane (Figure 8) which is the line joining the infra-orbital canal and the external auditory meatus of the ear.

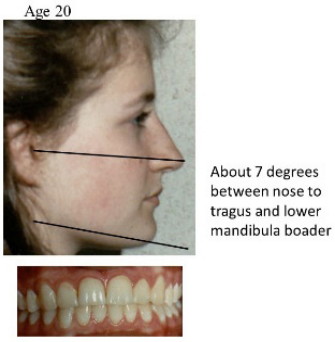

Figure 8

The Gnathiometer is based on the Bolton study[26] of 5.000 white American children. It is able to measure to the nearest millimetre, the forward growth of gnathion (the tip of the chin) relative to the forehead (the most stable part of the face). The Gnathiometer (Figure 9) is a template which can be superimposed on a life size photo of the face.[27]

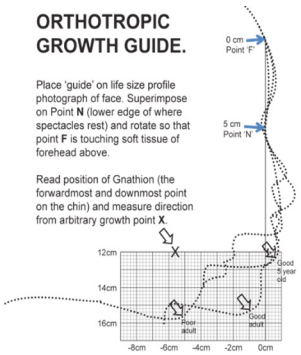

Figure 9

Method and materials

The facial contours of a patient, Figure 10, who was treated by orthotropic were traced four times (Figure 10). Because the cheek bones are not easily visible on either a frontal or profile picture of the face, three-quarter views were used.

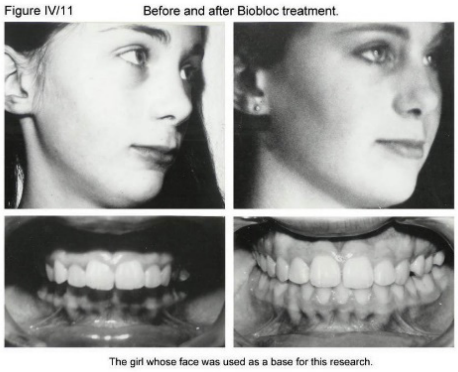

Figure 10

On each occasion a different feature of the facial change was omitted. This provided five different images (Figure 11). Plain line drawings were chosen in preference to photographs or computer generated pictures to eliminate factors such as hair styles or skin blemishes.

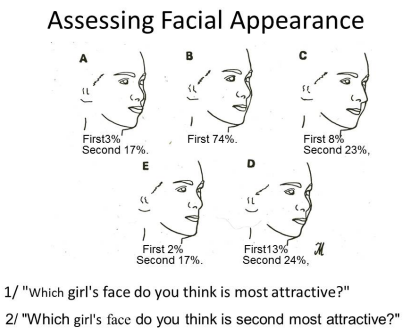

Figure 11

Face 'B' was traced from the treatment result. Each of the other tracings showed one feature. 'A' had fuller lips. 'C' had a large nose, a type of deformity that does not normally exist on its own as 'large' noses are the natural consequence of a 'vertical' growing maxilla but this picture was intended to show the effect of a large nose in isolation. 'E' had a flat mid-face, only the line of her left cheek was changed but her right hand eyes, nose and chin also look different. 'D' had an undersized mandible, which would not normally exist without a 'vertical' growing maxilla but again it was desired to assess this feature on its own.

One hundred and seven adults, selected at random and aged between 16 and 60, were shown the five ¾ view outline drawings (Figure 11) and asked the following two questions.

a) "Which girl's face do you think is most attractive?"

b) Which girl's face do you think is second most attractive?"

Results

Face 'B' was preferred by 74%. 13% preferred face 'D', 8% preferred face 'C', 3% preferred face 'A', and finally 2% preferred face 'E'. When judging the second most attractive face, all but four who did not place 'B' first, placed it second. Face 'D' was selected by 24%, face 'C' by 23%, face 'B' by 19%, and 'A' and 'E' were both selected by 17%.

Discussion

This study showed that most people find good cheek bones most attractive and any tendency to vertical growth is judged harshly. It would also seem that small changes in one feature may alter the appeal of the whole face and that flat cheek bones do most to harm a female face. This is followed in a less damaging sequence by the protrusive lips, large noses, and receding chins. It could be argued that the constructed drawings did not fairly represent realistic variations, however every effort was made to reproduce the before and after changes seen in this girl's face and the near equal distribution of the second preferences would suggest that the facial model was a fair one.[28,29]

The findings support those of Cross and Cross[8] who found that there is close agreement when judging faces which are perceived as attractive, however the present study also suggests that our personal preferences diverge when considering less attractive faces within the general population. Sadly, the majority of the population looks less than ideal, and their individual preferences concerning flat faces, receding chins, large noses and thick lips clearly differ, with an almost equal proportion in favour of each feature. This may explain how the belief that "Beauty lies in the eye of the beholder" has arisen. We all agree about good looking faces but have different preferences when judging the less than perfect faces around us.[30]

The general public seems barely aware of the risk or consequence of downward facial growth and perhaps more attention should be given to counselling parents and their children about the harmful effect of perverse oral habits, particularly mouth open postures. Fortunately it is possible to reverse most of this damage provided treatment is started young, preferably before 8 years of age. Figure 12 shows a patient who was treated by Orthotropics a form of treatment which aims to guide the growth of the face forwards.

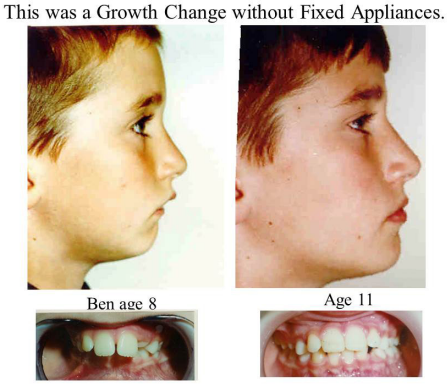

Figure 12

Conclusion

1) The cheek bone is considered the most attractive feature of the face.

2) Downwards growth and flat faces are considered less attractive than forward growth.

3) The public agree about which faces look most attractive.

4) The public express individual preferences about faces those are less than ideal.

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Conflicts of interest

The author declares that there are no conflicts of interest.

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