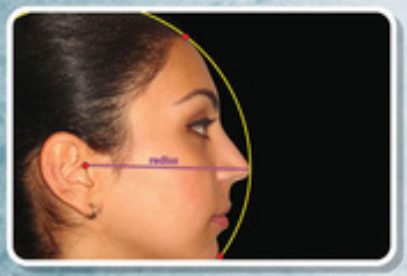
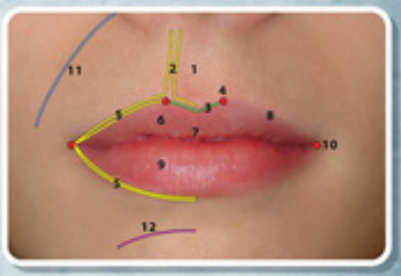
SECOND EDITION

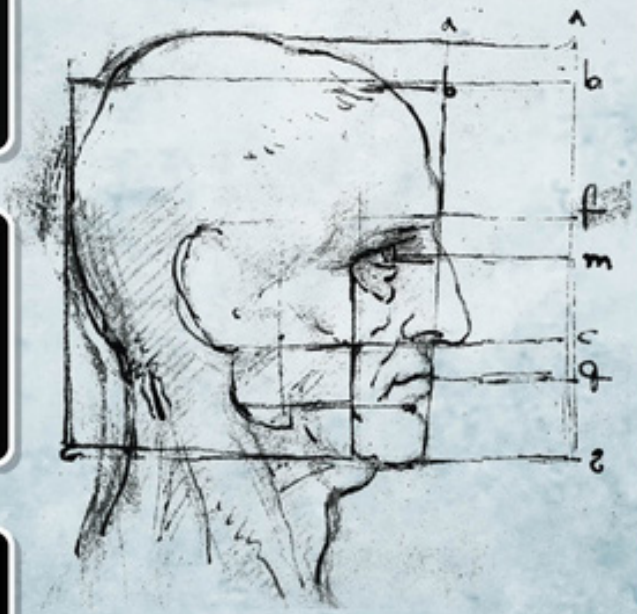
FARHAD B. NAINI

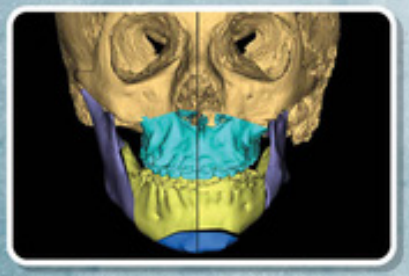
FACIAL AESTHETICS

CONCEPTS & CLINICAL DIAGNOSIS









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Facial Aesthetics
Concepts & Clinical Diagnosis

Second Edition

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Dedication

For my family:

My mother Nasrin, my father Bahram and my brother Jamshid – for your unconditional love, unwavering support and wisdom – words cannot express how much I love you.

My darling wife and soulmate Hengameh – you are quite simply the love of my life.

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Reviews for the First Edition

'Dr Naini, an orthodontist and consultant from the United Kingdom, has conceived a book of ambitious scope that looks at the face in a holistic way, not only in the soft-tissue realm so familiar to plastic surgeons, but also in the relationships of soft and hard tissues of the face. He has largely succeeded in this endeavor … He has a keen eye and the wisdom of years of practice that he shares with us here … I think this a remarkable effort from a single author: it is clearly a labour of love…those serious about understanding the face will find great pleasure and value in this book. Most residents in plastic surgery, facial plastic surgery, or maxillofacial surgery should be exposed to this material in their training, and this is a good place to get that exposure in one place.'

Plastic and Reconstructive Surgery (Official journal of the American Society of Plastic Surgeons, 2012)

'Dr Naini thoughtfully integrates historical, clinical, and surgical perspectives in the medical fields ranging from maxillofacial to plastic and reconstructive surgery. The author elegantly provides the science and art of facial aesthetics with emphasis given to analysis of the craniofacial complex, facial aesthetic units, and clinical evaluation, in addition to smile and dental-occlusal relationships. Furthermore, the author has undertaken a detailed approach in presenting dental aesthetics, which makes this publication rather unique.'

Archives of Facial Plastic Surgery (American Medical Association, 2012)

'Dr Farhad Naini's text is the best analysis I have ever seen of the comprehensive factors involved in establishing exactly what makes a person facially attractive, unattractive, or simply average. I believe *Facial Aesthetics* will find an enthusiastic reception among orthodontists who would like to refine their understanding and appreciation of the human face and to apply the author's practical protocols to their clinical diagnosis and treatment planning.'

Journal of Clinical Orthodontics (2012)

'Excellent standard… This book aims to provide readers with a comprehensive examination of facial aesthetics in the context of dentofacial and craniofacial diagnosis and treatment planning. The book is unique in concept and design. It is the first reference textbook directed at clinical diagnosis for all specialties involved in the treatment of craniofacial deformities… a useful reference in any department dealing with facial aesthetics.'

British Medical Association Book Awards (2012)

'covers the subject comprehensively…The first thing that strikes the reader is how lavishly it is illustrated…All these sections are again beautifully illustrated with numerous clinical examples and schematic diagrams, which support the text. Throughout, Dr Naini goes into exquisite detail so no wrinkle, pore or blemish is left uncovered or indeed, measured … the layout is readily accessible and the index comprehensive. It is an invaluable and possibly definitive text for any orthodontist, surgeon or trainee who wants to broaden their knowledge in this area. And physically it is a lovely book to hold and flick through…[Clinicians] would do well to sit down and read this book.'

Journal of Orthodontics (December 2012) (Official journal of the British Orthodontic Society)

'Farhad Naini is a hospital-based orthodontist with expertise in the diagnosis and treatment of patients with facial deformity. As an academic scholar with a multitude of publications as well as a previous book, and a senior clinician treating many patients with facial deformity, he is particularly experienced and able to write on the subject; but it is his distinct interest and knowledge as an

historian with his artistic passion to write and teach that makes this work so exceptional. His opus 'Facial Aesthetics: Concepts and Clinical Diagnosis' is inimitable in its field; an outstanding composition beginning in Part I with the history of art and science in relation to facial beauty and aesthetics followed in Part II by an in-depth, thoroughly comprehensive arrangement of information to inform, guide, and teach us in the analysis and diagnosis of facial deformity.…beautifully illustrated pages…. The impressive list of museums and libraries in the acknowledgements reveal the sources of the plethora of illustrations….incredibly interesting and painstakingly researched pages….It is in the last 13 chapters on 'regional analysis' that each and every part of the face, with its terminology and detailed anatomy, is fully described to enable us to see and appreciate normal and why normal is beautiful, so that deviation from, or abnormal is correctly diagnosed and grasped. The last three chapters deal entirely with the teeth and dental tissues, the principles of occlusion, the relationships of these tissues to the smile, and dentofacial aesthetics….The book is highly illustrated on every page with facial photographs, clear historic reproductions, and sharp colour graphic illustrations and diagrams drawn by Hengameh Naini…. This is a book that will be of interest to anyone who has an interest in facial aesthetics. From a clinical point of view, this book will interest anyone who looks after patients with dentofacial deformity from maxillofacial and plastic surgeons, orthodontists, to general dentists and any other dental and medical specialists who desire an understanding of the importance of facial aesthetics.'

European Journal of Orthodontics (May 2013) (Official journal of the European Orthodontic Society)

'outstanding…astounding…The research at the core of this text is comprehensive and it is complemented by the generous use of illustrations…highly recommend to anyone with an interest in facial aesthetics and surgery.'

British Dental Journal (2011)

'a comprehensive and fascinating dissertation on the aesthetics that comprise the face … No visit to museums or portrait galleries where faces and statues are displayed will ever be the same. Overall, it is a book that should be in every dental library, as well as every oral and faciomaxillary, orthodontic and restorative department, and it is likely to become a well-thumbed book.'

Primary Dental Care (Royal College of Surgeons of England, 2012)

Preface to Second Edition

'Art *is* a science.'

Leonardo da Vinci (1452–1519)

Clinicians practicing in any specialty concerned with facial aesthetic and reconstructive surgery are in an exceptional position within medicine, as their vocation is a unique blend of art and science. As the aphorism above from Leonardo da Vinci demonstrates, the artistic aspect of such work has to be undertaken with a decidedly scientific approach. An analogy between facial aesthetic and reconstructive treatment and architecture may shed light on this link between art and science:

There is a potentially interesting parallel between the design and creation of a building and clinical practice in craniofacial aesthetic and reconstructive surgery. In architecture, the work requires the skills of the architect and the artisan. The architect needs to design, plan and analyse, and the artisan/builder needs the technical skills of creating the design provided. Clinicians require both sets of skills – the diagnosis, planning and analysis of the craniofacial complex for aesthetic and reconstructive improvement, and the technical skills to achieve the desired result. Both are important. However, an excellent architect working with an average but safe builder will probably be able to create a relatively good building, but a poorly designed architectural plan will never be salvageable, even by the most skilled builder. So it is in clinical practice. If the diagnosis, treatment plan and clinical judgement are wrong, no amount of technical skill by the clinician will salvage the situation. With respect to painting, which Leonardo da Vinci argued was a science, he wrote in his *Trattato della Pittura* (*Treatise on Painting*, published posthumously in 1651): 'To devise is the work of the master, to execute the act of the servant'; that is how much he felt was the importance of devising and planning. This is in no way to negate the importance of clinical and technical skills, but to explain that if you are, metaphorically speaking, travelling in the wrong direction, then no matter your speed, stamina, or technological advances helping you move, you are still travelling in the wrong direction.

'After a certain high level of technical skill is achieved, science and art tend to coalesce in aesthetics, plasticity, and form. The greatest scientists are artists as well.'

Albert Einstein (1879–1955)
Einstein Archives 33–257 (attributed)

It is a shortcoming of modern education that consigns 'art' to the humanities and medicine to the sciences, as though these were polar opposite educational domains. Any clinician, from any of the myriad specialties interested in the form and function of the craniofacial complex, should develop an intense interest in, and appreciation for artistic pursuits. Time spent analysing the works, words and techniques of the great artistic minds of all ages, painters, sculptors and architects, educates the clinician's eyes to observe more clearly, and moulds the mind to better comprehend aesthetic analysis. The art of observation, on which clinical diagnosis is predominantly based, is the most difficult to acquire, and must be cultivated. Just as the 'greatest scientists are artists as well', the best clinicians require a highly developed, wide-ranging interest and immersion in art and artistic analysis.

'We see nothing truly until we understand it.'

John Constable (1776–1837)
Master of English landscape painting
From the lecture entitled: 'The History of Landscape Painting', delivered at The Royal Institution (9 June 1836).

It is vital for clinicians involved in the management of patients requiring alterations in their facial appearance to have an

evidence-based approach to the guidelines they employ in planning the correction of facial discrepancies and disproportions. There are two important questions that require contemplation and research: How do we know what is physically attractive? And, is there any objective evidence? It is important to research, analyse and deliberate about the concepts related to facial beauty and aesthetics, and the evidence for facial attractiveness, which leads to the inevitable question 'what are the clinical implications of this information for the clinician?'

The objectives of facial aesthetic and reconstructive surgery are to improve the form and function of the dentofacial/craniofacial complex in a stable manner. This is similar to the architect's aim of creating 'form and function in harmony.' However, the primary aesthetic objective of such surgery is not to achieve beauty, but 'normality', which, in this clinical context, means in terms of proportions and morphology similar to the *average*, based on representative samples of a population, i.e. a face that does not stand out from the crowd due to a severe dentofacial discrepancy or frank deformity. In addition to modification of form and improvement in function, attention to the psychosocial status of the patient is paramount. The driving force for treatment is *not* the desire to be more beautiful than the average human being, but to be free from deformity and to be inconspicuous. The concomitant improvement in facial aesthetics and cranio-dentofacial function are intimately linked with an improvement in the psychosocial status and thereby social well-being of a patient, all of which are prerequisites to improving the patient's health-related quality of life.

'You appeared to read a good deal upon her which was quite invisible to me.' 'Not invisible but unnoticed, Watson. You did not know where to look, and so you missed all that was important.'

Arthur Conan Doyle (1859–1930),
'A Case of Identity', in *The Adventures of Sherlock Holmes* (1891)

Extensive training in observation is a prerequisite to accurate clinical diagnosis. Qualitative clinical evaluation of the craniofacial complex must be ordered and assiduous, serving to gather and assemble the relevant data. Subsequent quantitative analysis must be accurate and reflective, in order to synthesize the data, leading to the correct clinical diagnosis and treatment plan. The clinician who identifies the problems well, will be able to plan and treat well.

'Perfect diagnosis, perfect treatment.'

Hippocrates (*c.* 460–377 BC)
Attributed by Stephanus of Alexandria, in his *Commentary on the Prognosticon of Hippocrates*

Diagnosis must precede treatment planning and therapy. A significant part of training for any clinician must be in the refinement of the art of diagnosis. The diagnosing clinician should, figuratively speaking, 'disassemble' the patient's craniofacial complex, analyse each unit and subunit in isolation, in relation to its nearest neighbours and to the entire craniofacial complex, in order to form a diagnosis; subsequently, these parts are 'reassembled' in an improved position, forming the basis of the treatment plan. Lack of systematic training in the methods of craniofacial analysis and recognition of the variety of craniofacial deformities can lead to the misapplication of management strategies, unnecessarily lengthy treatment, clinicians going round in circles, and potentially incorrect treatment.

The craniofacial complex is one integrated whole, yet is comprised of myriad individual parts, which are often interdependent based on their function. As form and function work together in harmony, an understanding of facial aesthetic analysis is an integral part of any specialty dealing with reconstruction of the head and neck.

Owing to the success of the First Edition of *Facial Aesthetics: Concepts and Clinical Diagnosis*, this Second Edition was commissioned by the publisher quite a few years ago. However, the publication of two other books intervened. Nevertheless, nearly one and a half decades after its first publication, this new edition has expanded by almost a fifth in size and content, with extensive additions to many of the chapters. Some of these additions have been from new published research, and others on newly discovered information from ages past. The format and flow of the chapters remains unchanged (see Preface to First Edition).

'Surgery calls Art to its aid.'

Sir Harold Delf Gillies (1882–1960)
Plastic Surgery of the Face (1920)

The majority of failures in facial aesthetic and reconstructive treatment are due to diagnostic and treatment planning errors, and are thereby avoidable. Mistakes in diagnosis are predominantly due to insufficient and fragmentary clinical evaluation, invariably leading to illogical treatment planning, with resultant pitfalls and unintended negative consequences. Sir Harold Gillies, credited as the pioneer of modern facial plastic and reconstructive surgery, emphasized the importance of, and the difficulties inherent in accurate diagnosis and logical treatment planning. To overcome such difficulties, he suggested that 'Surgery calls Art to its aid'.

Time spent in diagnosis and treatment planning is never 'lost', but regained many times over in the process of correctly planned treatment that progresses towards a successful outcome.

Preface to the First Edition

'Everything is in the face . . .'

Cicero (106–43 BC), *De Oratore*, Volume III, 55 BC

Nowhere in medicine is the fusion of art and science more important than in the clinical assessment of facial aesthetics.

The Scales of Facial Aesthetics

The separation of art and science has been a relatively recent phenomenon in medicine. In fact, at the highest intellectual levels, the humanities and the sciences merge, forming a symbiotic relationship. Science and art are as closely bound together as the heart and the mind; the mind without the heart cannot survive, and the heart without the mind is of no use.

The greatest artists of the past were also the master scientists of their age. Much of modern scientific methodology has grown out of the notably enquiring minds and investigations of such individuals. The fusion of art and science made extensive progress in the Renaissance, with Leonardo da Vinci emerging as the notable example of the harmonic relationship between science and art. Leonardo did not consider art and science as separate entities, but felt that they were inextricably linked. It was his conviction that the artist had to employ scientific methodology and the scientist the tools and observational ability of the artist.

'The human features and countenance, although composed of but some ten parts or little more, are so fashioned that among so many thousands of men there are no two in existence who cannot be distinguished from one another.'

Pliny the Elder (23–79), *Natural History*, Volume VII

Recognition of the range of normal morphological features of the craniofacial complex is important. A mild or even moderate deviation of any facial parameter from the 'norm' is simply part of individual biological variability – it is what makes each face unique. However, severe deviations from the norm may warrant treatment, due to both a patient's aesthetic concern, their want to look 'normal' and the often-associated functional problems.

'Neither natural ability without instruction nor instruction without natural ability can make the perfect artist.'

Vitruvius (first century BC), *De Architectura* ('On Architecture'), Chapter 1: The Education of the Architect

Throughout medicine, clinical diagnosis remains the most important step in the management of patients. Technical skill without diagnostic ability is fruitless. The modern fixation on techniques and technical modalities cannot afford to be at the cost of

reduced emphasis on diagnostic ability. Just as a physician equipped with more and more drugs cannot treat a patient unless the original diagnosis is correct, a clinician involved in the management of facial deformities cannot provide the correct treatment unless the diagnostic process is logical and the diagnosis accurate.

The purpose of this book is to present and provide practical order to the encyclopaedic information available from the arts and the sciences in order to set the foundations of clinical diagnosis in facial aesthetics and the management of facial deformities. As such, the book is divided into two parts:

- **Part I – Concepts:** The background knowledge required for a well-informed clinician is covered in Chapters 1–4.
- **Part II – Clinical Diagnosis:** The ability and discipline to conduct a systematic (methodical), accurate and thorough clinical evaluation constitutes the most difficult step in the management of patients with facial deformities. Patient evaluation required for clinical diagnosis is covered in four sections, divided into Chapters 5–24.

The clinician should develop the ability to detect details that are not readily apparent to the untrained eye. The only way to master clinical evaluation is by judicious and continuous practice; analysing normal faces, beautiful faces, patients with dentofacial and craniofacial deformities, comparison of patients before and after treatment. If treatment results are good, why are they good? If the results are not as good as expected, why?

Only having mastered clinical diagnosis will the clinician be able to apply and develop the technical expertise and surgical finesse required to provide patients with the highest possible level of care.

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I would like to thank the museums, libraries, archives and medical journals for permission to reproduce and redraw some of the figures in this book. Individual credits are provided in the respective figure legends throughout the book.

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superlative may be applied to him as a clinician, researcher and educator.

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I must express my deep gratitude to my teachers during higher training, particularly the late Professor James 'Jim' Moss, and many others. I must make special mention of the late Mr Raymond Edler, Consultant Orthodontist, whose unsurpassed clinical ability, pursuit of academic and educational excellence and care for patients with dentofacial and craniofacial deformities was second to none – a true gentleman whose example taught me the value of a great teacher. As a young House Surgeon, it was on the joint orthognathic surgery clinics between Ray Edler and Peter Blenkinsopp (consultant maxillofacial surgeon and Head of the former Norman Rowe Maxillofacial Unit, now retired), that my interest in orthognathic surgery began.

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Chapter 1 Facial Beauty

'Beauty itself doth of itself persuade
The eyes of men without an orator'.

William Shakespeare (1564–1616)
The Rape of Lucrece (1594)[1]

Definition of beauty and aesthetics

It is almost impossible to clearly and accurately define 'beauty'. Throughout history, philosophers have remained perplexed and bewildered, demonstrating greater uncertainty and hesitation in attempting to define beauty than almost any other concept. Nevertheless, a multitude of definitions have been provided, but these often do not and cannot elucidate the full significance of the concept of beauty. Beauty may be defined as 'a combination of qualities that give pleasure to the senses or to the mind'.[2] The *Oxford English Dictionary* defines beauty as:

> 'A combination of qualities, such as shape, colour, or form, which pleases the aesthetic senses, especially the sight'.

The Renaissance artist and thinker **Leon Battista Alberti** (1404–72) defined beauty as:

> 'The summation of the parts working together in such a way that nothing needs to be added, taken away or altered'.[3]

The philosopher George Santayana wrote:

'Beauty as we feel it is something indescribable:
what it is or what it means can never be said'.

George Santayana (1863–1952)
The Sense of Beauty (1896)[4]

Santayana's definition describes the perception of beauty as the transmission of a feeling, and thereby difficult to describe in words; much in the same way as humans know what it is like to feel love or fear, but if asked to describe the feelings, it becomes evident that they are difficult to articulate. Such definitions are interesting, but they are philosophical and non-specific for clinical purposes.

A potentially useful definition of beauty and facial beauty is the following:

> 'The assemblage of graceful features that pleases the eye and mind of an observer'.

This definition contains the four variables that are required in the definition of facial beauty:

- **The features:** Each human face is comprised of a number of 'features', e.g. the forehead, eyes, nose, lips, chin, cheekbones, etc., with a wide array of sizes, shapes, and colours.
- **Their assemblage:** This describes how these various component parts fit together, like a mosaic, to create each face, and it is this 'relativity of parts' that makes each face unique. The question is which components of which features and in which combinations result in a beautiful face.
- **Graceful:** In this context, the term 'graceful' refers to the elegance and harmony of movement. (See Note* below).
- **The observer:** Does each observer see and sense the same beauty? (see Note** below).

Facial Aesthetics: Concepts & Clinical Diagnosis, Second Edition. Farhad B. Naini.

Note*

The etymology of the term 'grace' is from the Latin *gratia*, which meant a pleasing quality. The meaning of beauty of form, movement or manner is first recorded in the early fourteenth century.

In the context of the 'graceful features' of the face, the term 'grace' refers to beauty in the motion of the face, rather than just static beauty. This is particularly pertinent to facial expressions of emotion, but also to the subject's behaviour and personality. Grace provides the difference between viewing a beautiful face on a two-dimensional canvas or photograph, compared with a three-dimensional statue, which may be viewed from different angles by an observer, and more so to a living human face with its movements and expressions.

Beauty and grace together result in attractiveness. It may be argued that one can be beautiful but not graceful (e.g. an individual may have attractive features but lack expression, exhibit unseemly behaviour or have an unappealing personality), but one does not have to be beautiful to be graceful (e.g. a face may not be classically beautiful, but have grace through attributes such as personable behaviour, a pleasant personality, charisma, kindness, etc.). However, grace presupposes some degree of proportionality and symmetry in the structure of the face, permitting necessary expressions, postures and movements.

One of the problems with facial anti-ageing treatments is that although statically wrinkles may be reduced and skin tightened, etc., the face can lose its grace due to difficulties with the conveyance of expressions and facial movements. One of the objectives of treatment should be the preservation of correct facial expressions, and the restoration of such expressions when achievable.

Note**

In quantum physics, Heisenberg's uncertainty principle (or principle of indetermination) proposed that the presence of an observer alters the observed. However, prior to Heisenberg, this principle had been discussed by Immanuel Kant in the field of philosophy. In the context of facial aesthetics, this principle relates to how the position and distance of an observer from the subject, as well as the personal, subjective biases and interpretations of each observer may influence their judgement when evaluating a human face.

The number of variables in the definition of beauty described makes it clear that the concept of beauty is difficult to explain with complete clarity. In *Dreams of a Final Theory: The Search for the Fundamental Laws of Nature* (1993), the Nobel prize-winning theoretical physicist Steven Weinberg eloquently writes:

> 'I will not try to define beauty, any more than I would try to define love or fear. You do not define these things; you know them when you feel them.'[5]

Aesthetics is the study of beauty and, to a lesser extent, its opposite, the ugly. The eighteenth-century German philosopher **Alexander Baumgarten** (1714–62) established aesthetics as a distinct field of philosophy with the publication of his treatise *Aesthetica* (*c.* 1750) (Figure 1.1).[6] Baumgarten re-coined the term 'aesthetics' to mean 'taste' or 'sense' of beauty, thereby inventing its modern usage; the term 'aesthetics' is derived from the Greek word for *sensory perception* (*aisthētikos*). Baumgarten defined aesthetics as 'the science of sensual cognition'.[6] In effect, Baumgarten separated the concept of beauty from its ancient link related to 'goodness'.

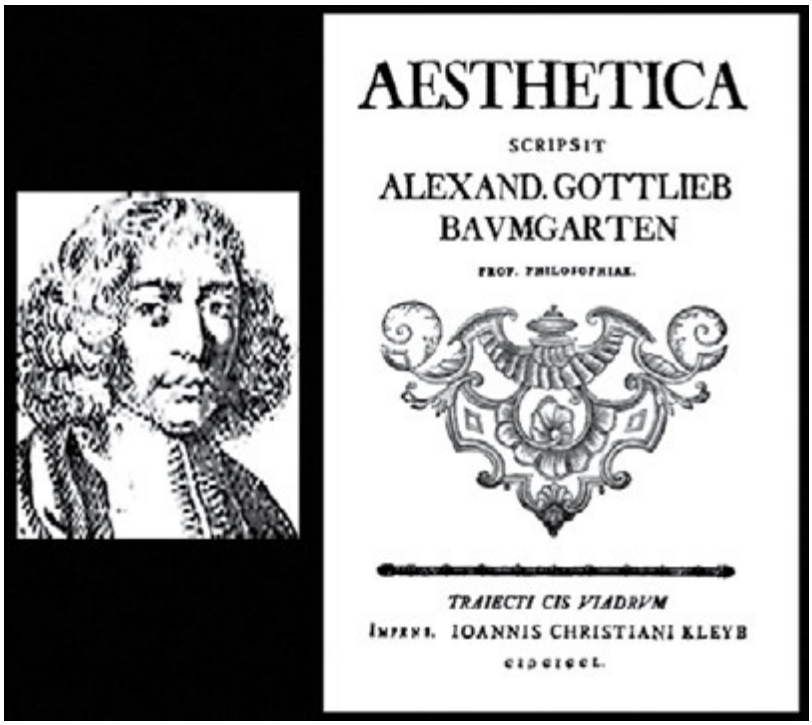

Figure 1.1 Alexander Gottlieb Baumgarten established aesthetics as a distinct field of philosophy with the publication of his treatise **Aesthetica** (*c.* 1750).

Baumgarten defined 'taste' as the ability to judge according to the senses, instead of according to the intellect; such a judgement of taste is based on feelings of pleasure or displeasure.

Is beauty 'in the eye of the beholder'?

'Look in mine eye-balls, there thy beauty lies'.

William Shakespeare (1564–1616)
Venus and Adonis (1593)[7]

A longstanding debate revolves round the question of the subjectivity–objectivity of beauty. Beauty may be considered a mystifying quality that some faces have, or may be 'in the eye of the beholder'. Does a face, which one person finds 'beautiful', appeal to another person in the same way? Is the 'beauty' of a face due to some *objective quality inherent in the face* or is it *subjectively determined by each individual* with their sensory enjoyment depending on their own ideas, feelings and judgements, which themselves have a direct relation to sensory enjoyment?

The idea that one individual's aesthetic sensibilities may differ from another's has a long tradition. **Plato** (428–348 BC) alluded to this concept in his *Symposium*, where he described 'Beholding beauty with the eye of the mind'.[8] In the third century BC, the Greek poet **Theocritus** wrote: 'Beauty is not judged objectively, but according to the beholder's estimation' (*The Idylls*).[9] **Shakespeare** (Figure 1.2) re-iterated this view in *Love's Labour's Lost* (1595), saying, 'Beauty is bought by judgement of the eye'.[10] In his *Essays, Literary, Moral and Political* (1742) the philosopher **David Hume** wrote: 'Beauty, properly speaking, lies . . . in the sentiment or taste of the reader'.[11] In *Jane Eyre* (1847) **Charlotte Brontë** wrote: 'Most true is it that 'beauty is in the eye of the gazer.'[12] Yet the idea that beauty is according to the observer's estimation became an adage when the writer **Margaret Wolfe Hungerford** in *Molly Bawn* (1878) famously coined the expression: 'Beauty is in the eye of the beholder'.[13] In *The Prince of India* (1893), the novelist Lew Wallace repeated the adage as: 'Beauty is altogether in the eye of the beholder'.[14]

The question to consider is one that remains difficult to answer: Is the origin of the human perception of facial beauty dependent on each individual's own sense perception, or is this 'sense' common to all men and women? The above quotations, and their respective philosophical ideology, assume that the 'sense' is subjective to each individual. However, the eighteenth-century philosopher **Francis Hutcheson** (1694–1746) (Figure 1.3) said:

> 'Aesthetic judgements are perceptual and take their authority from a sense that is common to all who make them',[15]

and he went on to say that

> 'The origin of our perceptions of beauty and harmony is justly called a "sense" because it involves no intellectual element, no reflection on principles and causes'.[15]

Therefore, if a beautiful face 'pleases universally' then some part of our 'sense' perception must be common to all men and women. After all, when we describe a face as beautiful, we do not merely mean that it pleases us. We are describing the face, not

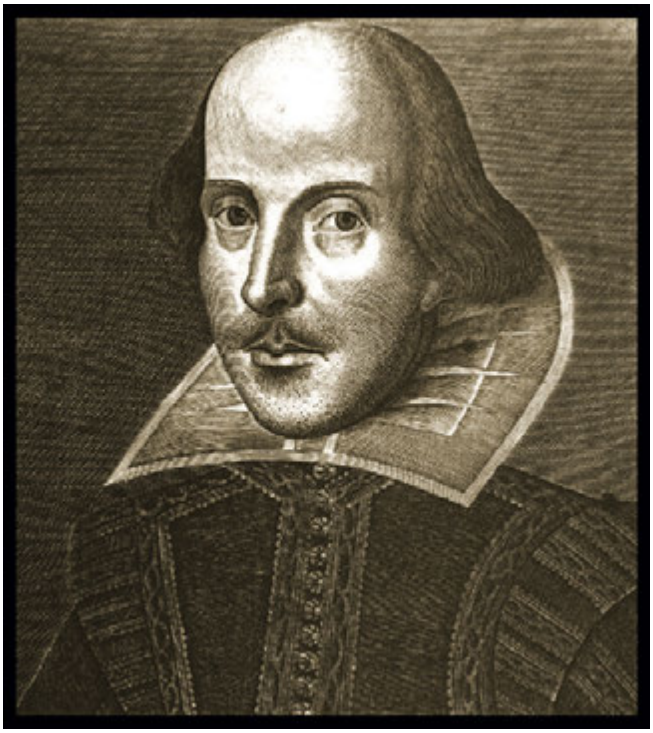

Figure 1.2 William Shakespeare – this copper-engraved image from the title page of the First Folio (1623) was made by the young English engraver Martin Droeshout from another drawing or painting now lost; it is the only reasonably authentic portrait of the Great Bard of Avon.

Figure 1.3 Francis Hutcheson.

our judgement. We will often point to features of the face to back up our statement. A paradox therefore emerges. Obviously, one cannot make a judgement regarding the beauty of a face one has never encountered. Therefore, facial beauty is related to some quality of the observed face, which may be 'universally' accepted. However, each individual's own ideas and feelings, like a conditioned response, also have a direct relationship to their judgement, hence the difference in the extent of rating a face as beautiful depending on the 'eye of the beholder'.[2]

It is important to bear in mind that any theory that cannot be directly and physically tested remains a philosophy, not a science. Therefore, the answer to the objectivity–subjectivity debate of facial beauty remains unanswered. *Perhaps beauty as a concept can be perceived but not fully explained*. This debate will no doubt continue.

Note

There is a plethora of evidence in the psychology literature which negates the statement that 'beauty is in the eye of the beholder' and supports the view that judgements of attractiveness are universal.[16] Yet, most individuals will still admit that judgements of attractiveness differ. There is perhaps an explanation that may have been overlooked: different individuals will find different types of faces 'very attractive', e.g. one individual may find a certain actor to be extremely beautiful whereas another may find them rather 'average'. The point is that neither will find the actor 'deformed'. It is only with faces within normal limits that arguments occur as to the level of attractiveness, and such judgements may often also be affected by factors other than beauty, e.g. the actor's talent or charisma. In other words, for faces with features that are 'within normal limits', beauty may be, to some extent, 'in the eye of the beholder'. Yet, if a patient with a facial deformity is observed, almost all individuals will agree that the face is deformed and not *physically* beautiful, i.e. *where deformity is concerned, beauty is no longer in the eye of the beholder*.

The enigma of facial beauty

Why is one face seen as beautiful and another as unattractive?

What guides and validates our judgement?

> 'Some day, I doubt not, we shall arrive at an understanding of the evolution of the aesthetic faculty; but all the understanding in the world will neither increase nor diminish the force of the intuition that *this* is beautiful and *that* is ugly'. [emphasis added]
>
> Thomas Henry Huxley (1825–95)
> *Evolution and Ethics* (1893)[17]

The 'intuition' to which the British biologist Huxley is referring is the human ability to understand something *instinctively*; a thing that one knows from instinctive feeling, without the need for conscious reasoning. It is therefore possible that the human perception of beauty and the preference for one face over another is intuitive, for which there is no one clear explanation.

There are a variety of qualities and characteristics of a human face, which may be responsible for it being perceived as beautiful. These include 'ideal' proportions, bilateral symmetry, averageness, youthfulness and sexual dimorphism. Hereditary factors and cultural influences also play an important part. Any or all may have an effect on the human conception of the beautiful, but none fully explains *why* one face is seen as beautiful and another as unattractive. The true answer seems destined to remain an enigma.

Nevertheless, a number of explanations and hypotheses have been used in the attempt to explain why a face may be perceived as beautiful and another as unattractive:

'Ideal' proportions

The concept that 'ideal' proportions are the secret of beauty is perhaps the oldest idea regarding the nature of beauty. This subject will be discussed in detail in Chapter 2.

Symmetry

Facial symmetry also seems to be an important aspect of facial beauty, although mild asymmetry is essentially normal.[18] In fact, image manipulation techniques used to create perfectly symmetrical facial images of the same individual have found the original to be more attractive than the created perfectly symmetrical image (Figure 1.4), i.e. 'normal' asymmetry is preferred to perfect bilateral facial symmetry.[19] Rhodes et al.[20] found that symmetry was an important factor in facial attractiveness, but 'averageness' appears to be more important. Rubenstein et al.[16] concurred, that no matter how symmetrical a face, 'averageness is the only characteristic discovered to date that is both necessary and sufficient to ensure facial attractiveness … without a facial configuration close to the average of the population, a face will not be attractive'.

Averageness

Studies in the late 1800s by Sir Francis Galton (1822–1911) (Figure 1.5), the cousin of Charles Darwin, accidentally found evidence to support what came to be known as the **averageness hypothesis** of facial beauty.[21] Galton was in fact trying to find *typical faces*, e.g. the typical 'criminal face'. He created composite faces by overlying multiple images of prisoners and criminals (Figure 1.6A) or a variety of other subjects (Figure 1.6B–D) onto a photographic plate. Not only was Galton's original theory of 'typical faces' incorrect, but he found that the composite faces became more attractive than any of the individual faces. Further research has verified that composite facial photographs gain higher attractiveness ratings than their individual facial photographs.[22] However, Perrett et al.[23] have shown that attractive composite faces were made more attractive by exaggerating the shape differences from the sample mean. Therefore, an average face shape is attractive but may not be optimally attractive.

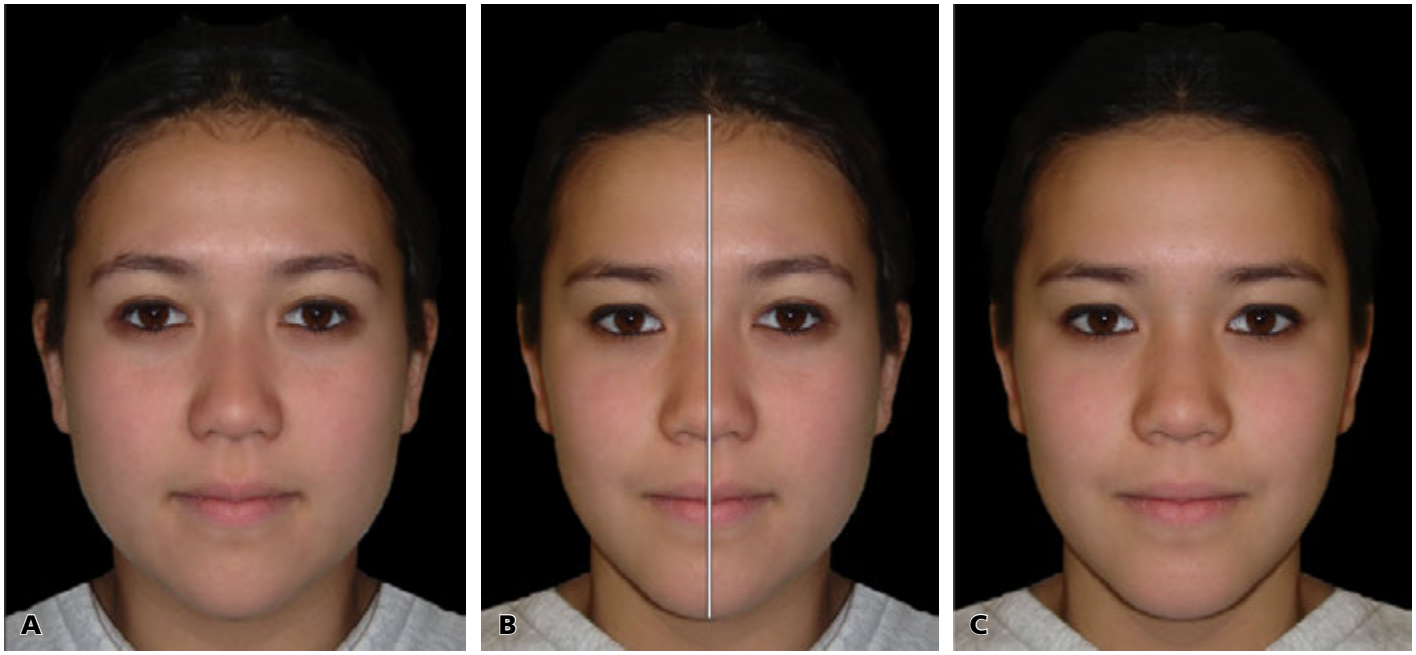

Figure 1.4 (**A**) Constructed composite image, in which the subject's left facial hemisphere has been mirrored on the right to create a symmetrical image. (**B**) Original true image. (**C**) Constructed composite image, in which the subject's right facial hemisphere has been mirrored on the left to create a symmetrical image. This technique illustrates the difference in the two sides of the face and that mild facial asymmetry is essentially normal.

Note

The term **koinophilia** ('love of the average'), derived from the Greek, *koinos* ('common' or 'average'), and *philos* ('love'), means when seeking a mate, sexual creatures prefer that mate to have a preponderance of average or common physical features, i.e. not to exhibit any unusual or peculiar features. The argument is that *natural selection* leads to beneficial physical features becoming increasingly more common with each generation, while the disadvantageous features become increasingly rare. Thus, sexual creatures wishing to mate with a 'fit' partner (in evolutionary terms, 'fit' means 'best able to adapt to the environment', and thereby have a better chance of bearing healthy offspring), would be expected to avoid individuals with unusual features, while being attracted to those displaying 'average' features. This *mating strategy* was first referred to as koinophilia by the biologist Johan Koeslag.[24] In humans, this concept may be linked to the 'averageness hypothesis'.[19,22]

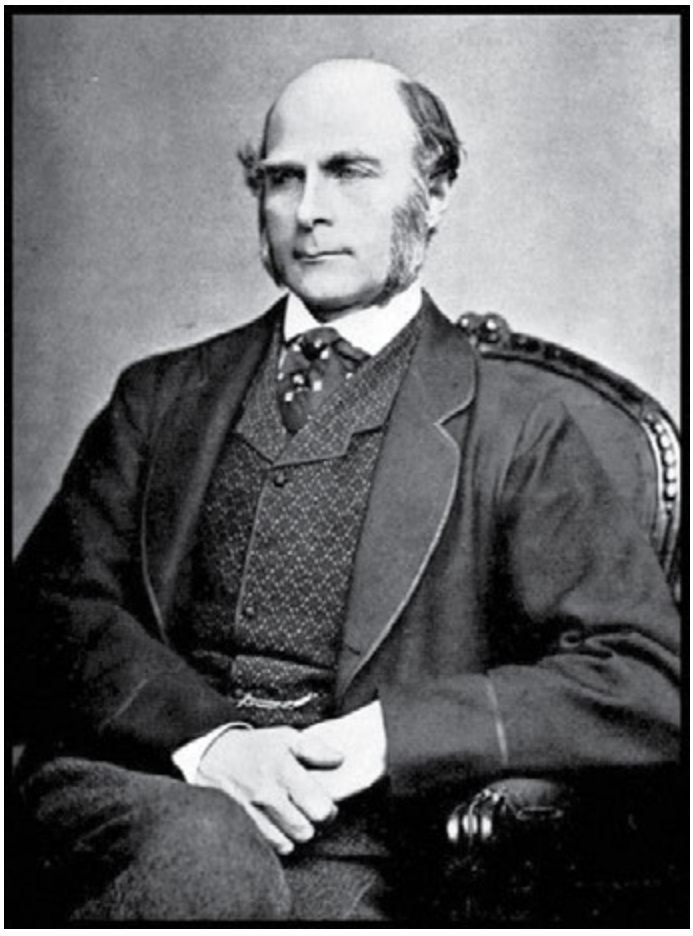

Figure 1.5 Sir Francis Galton.

The term 'averageness' implies proximity to the population mean, i.e. the use of **normative data** from population samples is often used by orthodontists and facial aesthetic surgeons, in the form of cephalometric and anthropometric data, for diagnosis and treatment planning. It is important to note that the scientific basis for comparing a patient's cephalometric or anthropometric craniofacial measurements with normative data for a population is the averageness hypothesis.

Figure 1.6 (**A–D**) Galton created composite faces by overlying multiple images of groups of individuals onto a photographic plate in the attempt to find 'typical faces'. Not only was Galton's original theory of 'typical faces' incorrect, but he found that the composite faces became more attractive than any of the individual faces.

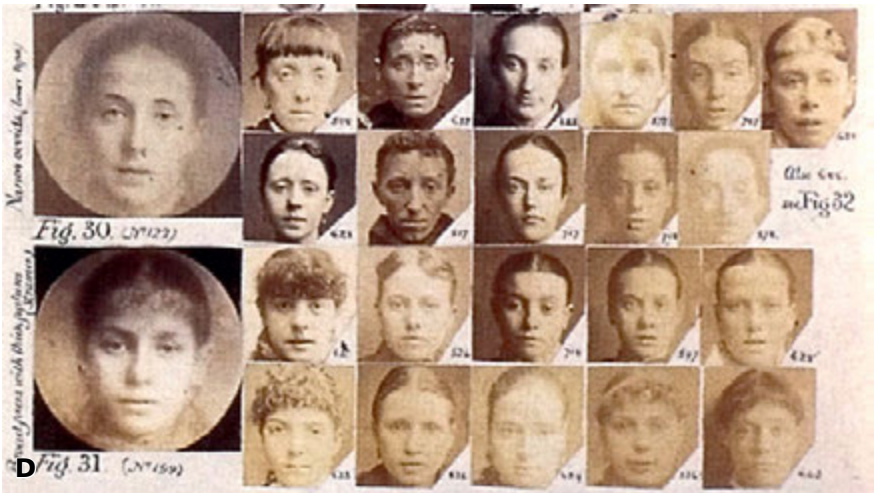

Figure 1.6 (Continued).

Facial neoteny

The term **neoteny** refers to the retention of juvenile features in the adult, alternatively termed **paedomorphosis**. The retention of neotenous *facial* features in adult humans is also termed **babyfaceness**. Childlike facial features, such as relatively larger eyes, small nose, full lips and a round face have been found to correlate with attractiveness, particularly for women. This may be due to the natural human tendency to nurture a baby.[25] Nevertheless, there is also evidence that women find a combination of masculine and babyface (more feminine) features in men attractive, and that their preference for more masculine features increases during the menstruation phase, which is most likely to result in successful conception.[26]

Sexual dimorphism (secondary sexual characteristics)

Male and female faces diverge at puberty.[27] In males, testosterone stimulates the growth of the jaws, cheekbones, brow ridges and facial hair. In females, growth of these regions is inhibited by oestrogen, which may also increase lip size.[28] As sexual dimorphism increases at puberty, sexually dimorphic traits signal sexual maturity and reproductive potential.[27] Gillian Rhodes, one of the leading researchers in the field of psychology in relation to facial attractiveness, explains that current evidence suggests that femininity is attractive in female faces and is preferred to averageness; masculinity is also attractive in male faces,

though the effect is smaller than for female faces. She concludes that the 'evolutionary psychology of facial attractiveness is just beginning!'[27]

Heredity

The human perception of facial beauty may have its foundation in our heredity, environment, or perhaps both. Langlois et al.[29] found that infants as young as three months of age have the ability to distinguish between attractive and unattractive faces, showing signs of preference for the former. It is unlikely that by three months of age, an infant will have been subjected to or responded to any cultural or environmental influences; therefore, this is evidence to support a genetic theory. The evolutionary basis is that facial beauty, including facial symmetry and secondary sexual characteristics, is a requirement for sexual selection, leading to improved chances for successful reproduction.[30]

Cultural influences on the perception of facial beauty

> 'Ask a toad what is beauty? … he will answer that it is a female with two great round eyes coming out of her little head, a large flat mouth, a yellow belly and a brown back'.
>
> Voltaire (1694–1778), *'Beauty'* (1764)[31]

The physician **Sinuhe** (*c*. twentieth century BC) informs us that in ancient Egypt women shaved their heads as a sign of beauty, and men found the bare female head 'most beautiful'. Yet, when he describes his beloved Mina, he recounts her 'long, beautiful flowing hair'.[32] In seventeenth-century Europe, particularly France, iodine was removed from the female diet in order for women to develop the 'goitre neck' appearance, then deemed a mark of attractiveness. The Mentawai tribe of Indonesia sharpen their anterior teeth to look like fangs using metal instruments like chisels; within their culture this is perceived as a sign of beauty. In *The Descent of Man* (1871), the English naturalist **Charles Darwin** (1809–82) (Figure 1.7) observed and described large cultural differences in the beautification practices of peoples around the world.[33] There are many such examples of cultural factors, which undoubtedly have some considerable influence on our perception of beauty.

Martin[34] found that both white and black American males preferred black female faces with Caucasian features, whereas black African men showed a preference for black female faces with Negroid features. This lends evidence to support environmental/cultural reasons for the human perception of facial beauty. However, Perrett et al.[23] found that both Caucasian and Japanese men and women ranked female faces as most attractive when youthful facial features, such as large eyes, high cheekbones and a narrow jaw were evident. Aesthetic judgements therefore seemed to be similar across different cultural backgrounds.

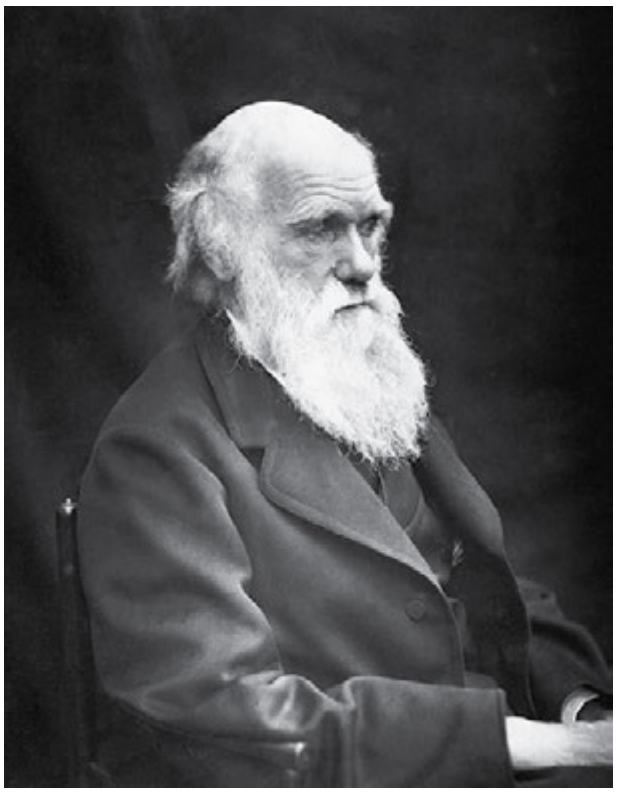

Figure 1.7 Charles Darwin age 65 (*c*.1874).

A meta-analysis undertaken by Langlois et al.[35] seems to confirm that there is cross-cultural agreement regarding facial attractiveness. However, the influence of an international media cannot be discounted.

Note

The significance of cultural influences and the pressures of conforming to societal 'standards' cannot be underestimated. Individuals have worn prescription spectacles in order to improve eyesight for many years. Initial public opinion was rather unflattering, which led the US critic and humorist Dorothy Parker to write (in 1926), albeit in jest, 'Men seldom make passes, at girls who wear glasses'. However, the era of modern 'designer' glasses has changed the image of the spectacle wearer. Conversely, hearing aids are still predominantly anathema to most individuals. The difference between the acceptance of glasses to improve vision and hearing aids to improve hearing is a prime example of cultural and societal influences on public perception.

It is likely that there is simply no one answer to why a face is perceived as beautiful or unattractive. Beauty cannot be explained by any single principle. The human perception of what constitutes facial beauty seems to be **multifactorial**, with genetic

and environmental/cultural foundations. In *An Essay on Criticism* (1711)[36] Alexander Pope provides an explanation:

'In wit, as Nature, what affects our hearts
Is not th' exactness of peculiar parts;
Tis not a lip, or eye, we beauty call,
But the joint force and full result of all.
Thus when we view some well-proportion'd dome
. . . No single parts unequally surprise,
All comes united to th' admiring eyes'.

Alexander Pope (1688–1744)

It is the **joint force** so eloquently described by the English poet Pope that is not fully understood – thus remains the enigma of facial beauty.

Beauty and facial beauty: historical and philosophical perspectives

Throughout history, each age seems to have provided somewhat different explanations for the concept of human beauty and its proposed merits. The opinions of some individuals have echoed one another, whereas others have vehemently disagreed.

Socrates and Plato

Plato (429–347 BC) (Figure 1.8) described beauty as goodness, but felt that physical beauty was inferior to spiritual beauty, i.e. he described physical and metaphysical beauty (*Symposium*).[8] In *Phaedo*, Plato informs us that **Socrates** (469–399 BC) (Figure 1.9) felt that the human body and physical beauty was an 'impediment … distracting us from getting a glimpse of the truth', and that the beauty of the soul was far superior.[37] Socrates advises: 'let us seek the *true* beauty, not asking whether a face is beautiful … for such things are always in flux'; he continues: 'grant that I may become beautiful *within*'.[37] The ideas of Socrates proved unpopular, to say the least, with the Greek masses' love of physical beauty.

What Is Beauty? The *Hippias Major* and *Phaedo*

Attempts to find a definition of beauty may be found in two of Plato's dialogues, the *Hippias Major* and *Phaedo*. The *Hippias Major* (*c.* 390 BC) is a detailed exposition of the salient points required in the attempt to define beauty.[38,39] Though written almost two-and-a-half millennia ago, the arguments do not appear antiquated.

As far as we know, Socrates left no writings, and is known predominantly through the dialogues of his student Plato. Plato (429–347 BC), born to nobility, initially contemplated a life in politics, but became distressed and disillusioned with corruption in Athenian democracy (Plato believed that without a broadly educated and enlightened populace, democracy would develop into mob rule), particularly after their execution of Socrates, and thereby turned to philosophy in order to seek for alternatives to what he felt were the injustices of Athenian society. In the Academy, which Plato founded in Athens in order to stimulate

Figure 1.8 Plato and Aristotle. (Detail, The School of Athens c. 1509, Raphael; Stanza della Segnatura, Rome.)

critical thinking, one of the most significant areas of work was the task of providing accurate definitions.

According to Plato's dialogues, Socrates would debate the people of Athens regarding ethical issues, and through questioning and critical scrutiny, would demonstrate their weakness. This Socratic method, or elenchus (roughly translates as 'cross-examination'), often begins with Socrates asking for a definition, which the responder provides, only to hit a metaphorical brick wall, with Socrates finding inconsistencies, inadequacies and contradictions in the definition, exposing the debater as ignorant and arrogant and eliciting deeper inquiry.

To the classical Greeks there was an integral connection between a beautiful outward appearance and inner ethical goodness, i.e. to be beautiful was to be ethically good. However, Socrates felt that it was not enough to be outwardly beautiful, but, to be truly beautiful each individual had an obligation to develop a virtuous mind. Therefore, defining beauty became very important, and thereby became the subject of the *Hippias Major*. The dialectic is between Socrates, whose only claim to knowledge was that he was aware of his own lack of knowledge, and Hippias of Elis, a sophist, a school whose role was teaching rhetoric and persuasive public speaking to rich men with political ambition – which partly explains Plato's disdain for them. Hippias is presented as ignorant and

Figure 1.9 The Death of Socrates. (1787, Jacques-Louis David, Metropolitan Museum of Art, New York.)

self-satisfied, which provides the humorous effect of the dialogue. After some initial waxing and waning, Socrates begins by saying that he was talking recently to a hypercritical friend (whenever Socrates refers to his 'friend', the reader knows that he is referring to himself) about the question 'what is beauty?' and he feels that Hippias may be able to help. He coaxes Hippias into offering definitions of beauty, then responds by explaining how his 'obnoxious friend' would likely critique each potential definition provided by Hippias. Hippias' first effort is to say that 'a beautiful maiden is beautiful'. Socrates, with his usual irony, commends Hippias, but suggests the question is not what is beautiful, but what is it that makes a thing beautiful? Otherwise, one could say 'a horse, or man-made objects such a lyre or a vase, are beautiful'. Hippias tries again, saying that 'gold makes a thing beautiful', then again that 'wealth and respect make a man beautiful', to which Socrates jokingly responds that his friend would have beaten him with a stick had he provided such a ludicrous definition. Socrates then suggests some of his own definitions. Firstly, perhaps beauty is that which is appropriate, or that which is useful? For a clinician, the term 'useful' may be related to function, yet we know that ideal functioning of an anatomical part does not necessarily equate with beauty. Identifying that these cannot be enough, Socrates suggests perhaps that beauty is that which is pleasing through our senses of sight and hearing? Interestingly, this is very close to the modern definition of beauty in most standard dictionaries. However, Socrates provides his own rebuttal in that many things provide sensory pleasure but are not necessarily beautiful (e.g. eating), or may be even 'repulsive to view' (Socrates, somewhat tongue in cheek, gives the example of carnal relations).

The conclusion of the *Hippias Major* dialogue appears to be that when Socrates attempted to define beauty, he could find no common quality and eventually concluded simply that it was difficult to define.

Phaedo is the fourth dialogue of Plato's *The Trial and Death of Socrates*. The discussion takes place in the prison where Socrates is being held prior to his execution. During the conversation, the concept of beauty is discussed. Socrates explains that he knows and understands nothing about the causes or sources of beauty, be it form or colour or any other parameter. 'I leave all that' he says, 'which is only confusing to me, and simply and singly, and perhaps foolishly, hold and am assured in my own mind that nothing makes a thing beautiful but the presence and participation of beauty in whatever way or manner obtained; for *as to the manner I am uncertain*, but I stoutly contend that *by beauty all beautiful things become beautiful*. That appears to be the only safe answer that I can give…'. [emphasis added].

From Aristotle to Montaigne

Aristotle (384–322 BC) did not develop Plato's theory of 'beauty as goodness'. In fact, he distinguished between them, for 'goodness implied conduct as its subject, whereas beauty is found in motionless objects'. In his *Metaphysics*, Aristotle gave the following definition of beauty: 'The chief forms of beauty are order and symmetry and definiteness'; this is the idea of *beauty as proportion*.[40] Aristotle felt that beauty was a purely physical phenomenon and emphasized proportionality as the basis of human beauty, i.e. he denied the existence of metaphysical beauty. In his *Poetics*, Aristotle defined beauty as 'that which is desirable for its own sake and also worthy of praise'.[41] For the Greeks the concept of physical beauty was linked to their gods, i.e. 'ideal' proportions and symmetry provided physical beauty to man, but this 'beauty' brought man closer to resembling the gods.

Saint Thomas Aquinas (1225–74) separated physical and metaphysical beauty, but believed that both existed (*Summa Theologiae*)[42]:

> 'Beauty of body consists in shapely limbs and features … beauty of spirit consists in conversations and actions that are well-formed and suffused with intelligence'.

Aquinas believed spiritual beauty to be of a far 'higher order' than physical beauty. Despite Aquinas clearly separating spiritual and physical beauty, to the unenlightened medieval minds physical beauty and morality were inextricably linked, i.e. physical beauty was thought to be linked to goodness and physical ugliness to moral degradation.

The separation of the concept of beauty into a secular, non-spiritual, 'earthly' concept began with the **Renaissance** in the fourteenth to sixteenth centuries. The highly significant contributions of **Leon Battista Alberti**, **Leonardo da Vinci** and **Albrecht Dürer** to the understanding of beauty in art will be discussed in detail in Chapter 2.

The essayist **Michel de Montaigne** (1533–92) (Figure 1.10), and one of the most significant figures of the European intellectual movement of the seventeenth and eighteenth centuries known as the **Enlightenment**, the philosopher **Voltaire** (1694–1778) (Figure 1.11), described human beauty as *culturally determined*, with no objective existence, i.e. beauty is in the 'culture' of the beholder. Montaigne wrote of beauty:

> 'We imagine its form to suit our fancy … In Peru, the biggest ears are the fairest, and they stretch them artificially. … Elsewhere there are nations that blacken their teeth with great care, and scorn to see white teeth'.[43]

Figure 1.11 Voltaire.

Figure 1.10 Michel de Montaigne (portrait *c.* 1590, artist unknown.)

From Hume to Darwin

David Hume (1711–76) (Figure 1.12) felt that beauty was not only culturally determined but also *individually subjective*, i.e. the idea that 'beauty is in the eye of the beholder'. In his essay *Of the Standard of Taste* (1757), Hume wrote[44]:

> 'Beauty is no quality in things themselves: It exists merely in the mind which contemplates them; and each mind perceives a different beauty. One person may even perceive deformity, where another is sensible of beauty; and every individual ought to acquiesce in his own sentiment, without pretending to regulate those of others'.

Hume felt that beauty was a *socially constructed phenomenon*. In *The Sceptic* he wrote:

> 'Beauty is not a quality of the circle … it is only the effect, which that figure produces upon a mind, whose particular fabric or structure renders it susceptible of such sentiments'.[45]

Figure 1.12 David Hume.

Figure 1.13 Immanuel Kant.

In *A Treatise on Human Nature* (1738) Hume wrote[46]:

> 'Beauty is such an order and construction of parts, as … to give a pleasure and satisfaction to the soul. This is the distinguishing character of beauty, and forms all the difference betwixt it and deformity, whose natural tendency is to produce uneasiness. Pleasure and pain, therefore, are not only necessary attendants of beauty and deformity, but constitute their very essence'.

Immanuel Kant (1724–1804) (Figure 1.13), in his *Critique of Judgement* (1790), rejected Hume and returned to Plato: 'The beautiful is the symbol of the morally good'.[47] Tolstoy, in *The Kreutzer Sonata* (1890), opposed Kant, writing: 'It is amazing how complete is the delusion that beauty is goodness'.[48] Another view expressed by Kant was that 'the beautiful is that which pleases universally without a concept'.[47] **Friedrich Schiller** (1759–1805) (Figure 1.14) was a follower of Kant; he felt that beauty provided 'pleasure without practical advantage'.[49] Philosophers and their opinions continued to wax and wane.

In *The Origin of Species* (1859), **Charles Darwin** discussed the sense of beauty as follows[50]:

> 'the sense of beauty obviously depends on the nature of the mind, irrespective of any real quality in the admired object; and that the idea of what is beautiful, is not innate or unalterable'.

He provides the example from his own experience of travelling round many parts of the world, of men from different geographical regions 'admiring an entirely different standard of

Figure 1.14 Friedrich Schiller.

beauty' in women. The difficulty with understanding the concept of beauty remained, and Darwin conceded:

> 'How the sense of beauty in its simplest form – that is, the reception of a particular kind of pleasure from certain colours, forms, and sounds – was first developed in the mind of man and of the lower animals, is a very obscure subject'.
>
> Charles Darwin (1809–82)
> *The Origin of Species* (1859)[50]

In *The Descent of Man* (1871), Darwin again described the cultural differences in the standards of human beauty, writing[33]:

> 'It is certainly not true that there is in the mind of man any universal standard of beauty with respect to the human body'.

Darwin believed that the perception of beauty is a feeling natural to man and to animals, and consequently to the ancestors of man. He also felt that beauty had an array of diverse conceptions and could not be easily explained. The evolutionary basis appears to be that facial beauty makes a particularly significant contribution to sexual selection, leading to improved opportunity for reproduction.

Keats and the eternal beauty of the nightingale's song

John Keats (1795–1821) is considered one of the greatest of English romantic poets, together with his friend Percy Bysshe Shelley and Lord Byron. Though barely recognized during his short life, his fame grew after his death, particularly with the adoration showed to him by Shelley, who memorialized Keats in his poem *Adonais* just a few weeks after Keats' death from tuberculosis. Keats wrote, 'I have loved the principle of beauty in all things . . .', and the concept of beauty runs through much of Keats' poetry. In *Endymion* (1818), he wrote[51]:

> 'A thing of beauty is a joy for ever:
> Its loveliness increases; it will never
> Pass into nothingness; but still will keep
> A bower quiet for us, and a sleep
> Full of dreams, and health, and quiet breathing'.

In his *Ode to a Grecian Urn* (1820), describing how a beautiful object remains over time and its beauty continues to delight, he wrote[51]:

> 'When old age shall this generation waste,
> Thou shalt remain, in midst of other woe
> Than ours, a friend to man, to whom thou say'st,
> "Beauty is truth, truth beauty." – that is all
> Ye know on earth, and all ye need to know'.

The song of the nightingale is widely regarded as one of the most beautiful in the animal kingdom, and has been figuratively associated with the love of beauty and as a bringer of joy throughout Persian poetry for well over a millennium. Keats' friend, Charles Brown, with whom Keats lived for a time in Hampstead in London, wrote:

Figure 1.15 John Keats, listening to the song of the nightingale.

> 'In the spring of 1819 a nightingale had built her nest near my house. Keats felt a tranquil and continual joy in her song; and one morning he took his chair from the breakfast table to the grass plot under a plum tree, where he sat for two to three hours. When he came into the house, I perceived he had some scraps of paper in his hand, and these he was quietly thrusting behind the books. On inquiry, I found those scraps, four or five in number, contained his poetic feeling on the song of our nightingale' (Figure 1.15).[51]

In his *Ode to a Nightingale* (1820) Keats wrote[51]:

> 'Thou wast not born for death, immortal Bird!
> No hungry generations tread thee down;
> The voice I hear this passing night was heard
> In ancient days by emperor and clown:
> Perhaps the self-same song that found a path
> Through the sad heart of Ruth, when, sick for home,
> She stood in tears amid the alien corn . . .'

With this poem, Keats is explaining his concept of beauty and its importance through its permanence in nature. There is something that can outlive death; that is beauty. The song of the nightingale heard by Ruth in the *Old Testament* is the 'self-same song' heard today. The nightingale is the traditional figure of the poet, of art and music. The poet dies, but the poetry and its beauty live on.

This conception of beauty was immortalized by Shakespeare in Sonnet 18, one of his most famous, which begins, 'Shall I compare thee to a summer's day?'[52] In this Sonnet, Shakespeare is describing a beautiful and adored love, but initially lamenting that everything beautiful eventually stops being beautiful, either by chance or in the course of nature. But, he explains to his love, 'thy eternal summer shall not fade', and you will not lose possession of your beauty, not even by death, because you have been captured by my eternal verse.

'So long as men can breathe or eyes can see,

So long lives this, and this gives life to thee'.

As with Keats and his nightingale, Shakespeare says that the poet dies, but the poem remains alive. Therefore, beauty can outlive death.

Shelley and the appreciation of beauty

'Anyone whose character has an ugly disposition
Sees not in the peacock anything but his ugly feet'.

Sa'di (*c.* 1213–91)

The above is a prose translation of a poetic couplet in the book the *Bustan* ('The Orchard'). With these lines, the Persian poet Sa'di explicates the concept of the appreciation of beauty and **aesthetic judgement**, figuratively using the peacock with its exceptionally beautiful tail and rather ordinary legs. The peacock is distinguished by its brilliantly coloured, long tail feathers, called the train, which are marked with eyelike, iridescent spots. This train can be lifted and spread into a majestic fan by the male during courtship, creating one of the most beautiful spectacles in nature. The sight of a peacock with its tail open in its glorious majesty is something that most find exceptionally beautiful. But, Sa'di reasons, there will always be those whose character and disposition is such that they will only focus on the negative, and will not see such beauty.

Percy Bysshe Shelley (1792–1822) (Figure 1.16) is not only considered one of the greatest poets of the English language, but as an intellectual and moral giant, yet he drowned off the coast of Italy at the age of just 29. His wife was Mary Shelley, the author of *Frankenstein* and the daughter of Mary Wollstonecraft, author of *A Vindication of the Rights of Woman*. In one of his most famous essays, 'A Defence of Poetry', written just a year before his death, one of the issues which Shelley tackles is the concept of aesthetic judgement. The essay is a rebuttal against an accusation that poetry had become valueless and redundant in the age of science and technology. Shelley argues that it is through reason and logical thought combined with perceptive imagination that humans recognize beauty, and that it is through beauty that humans achieve civilization. He argues that poetry 'lifts the veil from the hidden beauty of the world'. He concludes with one of the most famous lines in literature, that 'Poets are the unacknowledged legislators of the world'. This appears to be true of all genuine artists and their art, whether poetry, literature, painting or music.

It is often said that the appreciation of art is an art itself. Based on the idea expounded by Sa'di and Shelley, in some respects, so it may be with the appreciation of beauty.

Emerson on 'beauty'

In the nineteenth century, the American writer and thinker **Ralph Waldo Emerson** (1803–82) (Figure 1.17) wrote two essays entitled 'Beauty', in *Nature* (1836)[53] and in *The Conduct of Life* (1860).[54] In the former essay, Emerson explained that true beauty is inherent in Nature and the 'simple perception of natural forms is a delight'. Yet he felt that the appreciation of such beauty required 'virtue' and 'intellect' on the part of the observer. He wrote: 'No reason can be asked or given why the soul seeks beauty. Beauty, in its largest and profoundest sense, is one expression of the universe'.[53] In the latter essay, Emerson wrote: 'Beauty is the form under which the intellect prefers to study the world. All privilege is that of beauty; for there are many beauties; as, of general nature, of the human face and form, of manners, of brain, or method, moral beauty, or beauty of the soul'. In terms of physical

Figure 1.16 Percy Bysshe Shelley.

Figure 1.17 Ralph Waldo Emerson.

beauty, he wrote: 'Any fixedness, heaping, or concentration on one feature – a long nose, a sharp chin, a hump-back – is the reverse of the flowing, and therefore deformed'.[54]

Beauty and mathematics

It is not unusual for mathematicians, astronomers and astrophysicists to speak of the beauty of mathematics. The English philosopher and mathematician **Bertrand Russell** (1872–1970) described how, in a difficult world, mathematics 'possesses not only truth, but supreme beauty – a beauty cold and austere, like that of sculpture … capable of a stern perfection such as only the greatest art can show. The true spirit of delight … is to be found in mathematics as surely as in poetry'.[55] Another English mathematician, **GH Hardy** (1877–1947) wrote, 'The mathematician's patterns, like the painter's or the poet's, must be *beautiful*; the ideas, like the colours or the words, must fit together in a harmonious way. Beauty is the first test'.[56] In the twentieth century, in a published lecture entitled *Truth and Beauty* (1987), the distinguished Indian-born American astrophysicist and Nobel laureate **Subrahmanyan Chandrasekhar** (1910–95) explained that the quest of the arts and sciences is after 'the same elusive quality: beauty'.[57] He described a 'shuddering before the beautiful' on the realization that an exact solution of Einstein's equations of general relativity provides exact representation of untold numbers of black holes in the universe, a 'discovery motivated by a search after the beautiful in mathematics'.[57] He went on to define beauty as 'that to which the human mind responds at its deepest and most profound'.[57]

Facial Beauty: Scientific perspectives

Facial attractiveness research

> 'Make an effort to collect the good features from many beautiful faces, *but let their beauty be confirmed rather by public renown than by your own judgement*'.[58]
> [emphasis added]
>
> Leonardo da Vinci (Figure 1.18)

The scientific studies of the possible proposed explanations for facial beauty in terms of 'ideal' proportions, bilateral symmetry, averageness, babyfaceness and sexual dimorphism have been described above. The other area of scientific research in the understanding of facial beauty is termed **facial attractiveness research**, which may be defined as the scientific study of facial beauty and physical attractiveness. The purpose of such research is to find quantifiable evidence for the attractiveness of various facial parameters using contemporary layperson and patient population survey preferences rather than subjective interpretations or observations made by artists or clinicians. The results of such studies are, where available, presented throughout Part 2 of this book.

It is, however, important to know that the first scientific study of attractiveness appears to have been undertaken in England by the artist **William Hogarth** (1697–1764) (Figure 1.19), published in a work entitled *The Analysis of Beauty* (1753) (Figure 1.20).[59] Hogarth drew images of various objects, e.g. a woman's corset, and then proceeded to create variations of the same image while incrementally altering a certain aspect of the object in each image (Figure 1.21). It is speculated that he subsequently invited members of the public to choose their favourite image, although, in the interest of accuracy, it should be noted that this is not explicitly stated in his book. The experiment may have been repeated using images of various objects (Figure 1.22). The originality of the experiment was that each set of images varied only in one respect and *the variation was graded*. Hogarth felt that this would allow him to better understand *why* one image was preferred to another.

Figure 1.18 Portrait of Leonardo da Vinci, by Francesco Melzi, c. 1510, Royal Library, Windsor. This drawing is thought to depict Leonardo in the last decade of his life. It is likely to have been drawn by his student Francesco Melzi. (With permission of The Royal Collection Trust/© His Majesty King Charles III 2024.)

Attractiveness research: the experimental method

As already described, it is speculated that Hogarth asked members of the public to choose their favourite image from the range of images he created, but this is not explicitly stated in his book. In the century after Hogarth, the German psychologist **Gustav Theodor Fechner** (1801–87) (Figure 1.23), constructed 10 rectangles with different ratios of width to length and asked numerous observers to choose the 'best' and 'worst' rectangle shape, in order to compare the visual appeal of rectangles with different proportions.[60,61] In psychology, Fechner is regarded as the founder of the field of **experimental/empirical aesthetics**. It is apparent that the work of both Hogarth and Fechner laid the foundation for attractiveness research in clinical practice.

The results of relevant attractiveness research studies will be described throughout the chapters in Sections 2–4 of this book.

Figure 1.19 (**A**) William Hogarth's Painter and his Pug. Hogarth has drawn his own image on an oval canvas, which appears propped up on volumes by Shakespeare, Swift and Milton. Though often described as a self-portrait, this is more accurately a portrait of his Pug dog; Hogarth was an ardent supporter of animal rights and worked tirelessly to educate the public and help to improve animal welfare standards in Britain. (**B**) Careful examination of the painting reveals that he has drawn his 'S' shaped 'serpentine line' on his palette, on which reads 'The LINE of BEAUTY And GRACE – W.H'. (1745, Tate Gallery, London). (With kind permission of the Tate Gallery, © Tate, London 2024.)

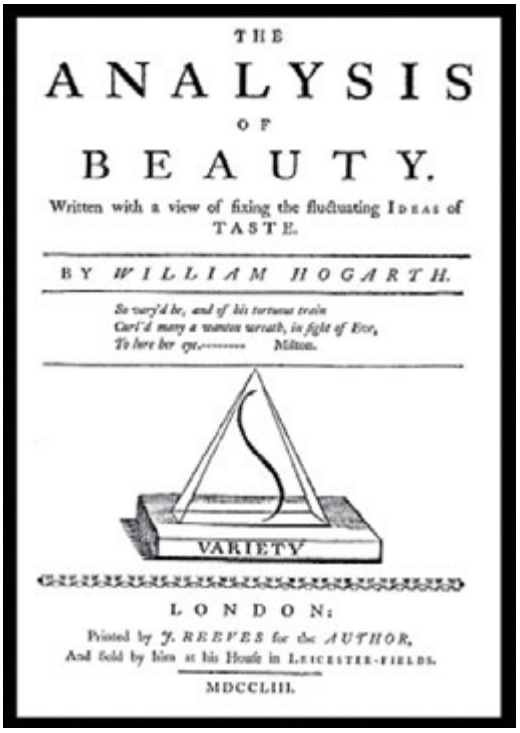
THE
ANALYSIS
OF
BEAUTY.
Written with a view of fixing the fluctuating IDEAS of TASTE.
BY WILLIAM HOGARTH.
So vary'd he, and of his tortuous train
Curl'd many a wanton wreath, in sight of Eve,
To lure her eye..... Milton.
VARIETY
LONDON:
Printed by J. REEVES for the AUTHOR,
And sold by him at his House in LEICESTER-FIELDS.
MDCCLIII.

Figure 1.20 Hogarth's *The Analysis of Beauty* (1753) (book cover).

Attractiveness research: threshold values

'Measure what is measurable, and make measurable what is not so.'

Galileo Galilei (1564–1642), attributed.

When undertaking attractiveness research, we are looking for **discriminative threshold values**, both in terms of observer ratings of attractiveness, to tell us when observers begin to perceive a facial parameter as attractive or unattractive, and also in terms of desire for surgery. However, although for the facial parameter being investigated, e.g. chin prominence, lower face height, or nasolabial angle, such research often provides linear or angular measurements as threshold values/cut-off points, it is important to bear in mind that these cut-off points cannot in reality actually be 'points' (i.e. specific numbers), but will be *ranges*.

Note: The sorites paradox (or paradox of the heap)

This paradox is attributed to the Greek thinker and dialectician Eubulides of Miletus (mid fourth century BC). The term sorites is derived from the Greek *sōros* (heap or mound). The paradox is as follows: If a heap of sand is reduced by a single grain at a time, at what exact point does it cease to be considered a heap? Alternative examples exist, e.g. at what exact number of rocks does a group of rocks constitute a 'pile' of rocks. Are two rocks a pile of rocks, or three rocks, or four, etc. The purpose of this paradox is to explain that in some circumstances, which includes data from facial attractiveness research studies, there is no exact cut-off point at which a facial parameter becomes considered attractive or unattractive by observers, and there is no exact cut-off point at which surgery is desired, but discriminative thresholds will be over certain ranges.

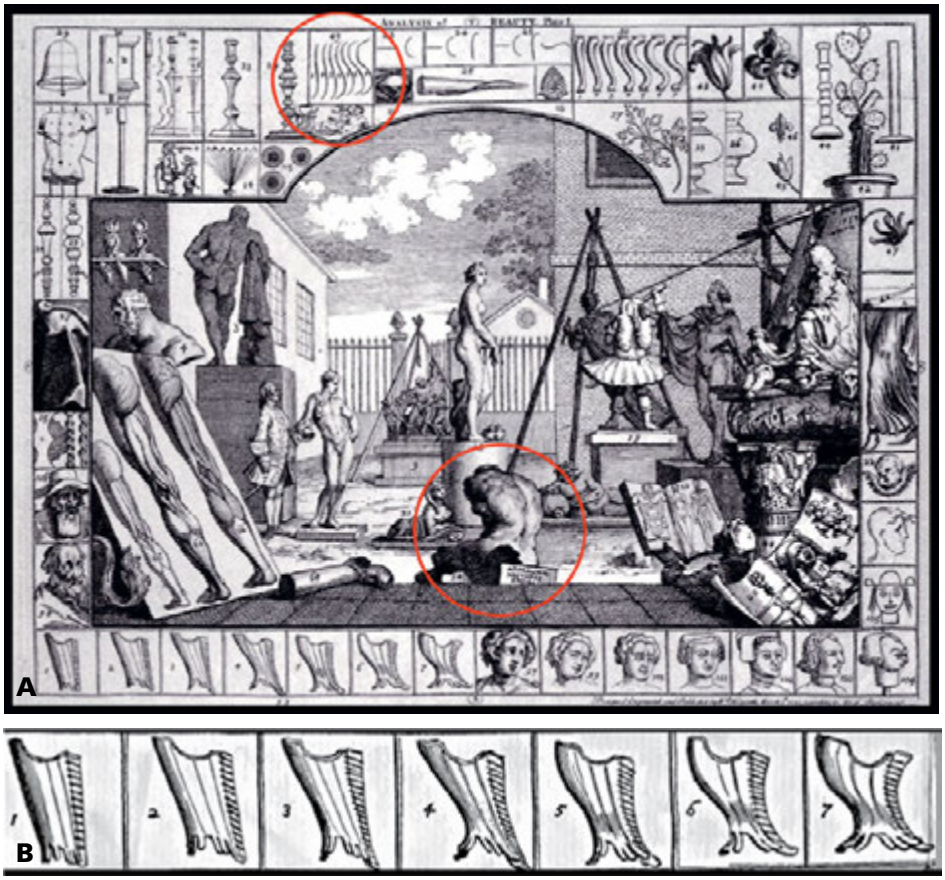

Figure 1.21 (**A**) Plate I from Hogarth's *The Analysis of Beauty* (1753). (**B**) Hogarth drew the image of a woman's corset, and then proceeded to create variations of the same image while incrementally altering a certain aspect of the corset in each image.

Figure 1.22 Plate II from Hogarth's *The Analysis of Beauty* (1753).

Figure 1.23 Gustav Theodor Fechner.

Therefore, for any dentofacial parameter being investigated, e.g. nasal prominence, *there is no precise boundary or exact numerical demarcation between the attractive or unattractive perception of that parameter*. We are not dealing with exact numbers or points, but with ranges, which provide guidelines for aesthetic analysis and treatment planning. For any facial parameter, if a range of images are created, varying incrementally only in one aspect, e.g. chin prominence, the images may then be shown to groups of observers to rate the attractiveness and to state for which images they would suggest or consider treatment or surgical correction. With this method one can find **ranges of normal variability** both in terms of ratings of attractiveness and approximate threshold values in terms of desire for surgical correction. Such data can provide useful guidelines in clinical practice.

Note: What is 'normal'?

The term 'normal' in lay parlance and society in general is often problematic. It indicates that which is expected because it conforms to some usual, required or acceptable standard, which is often set arbitrarily by any group. In this context, it is understandable why the term may be damaging. The use of the term in a scientific context can thereby be easily misconstrued outside of the scientific arena.

In scientific terminology related to facial attractiveness research, the terms 'normal', 'norm' and 'normative' just mean 'average' for a population. The concept of an exact or 'ideal' normal does not and cannot exist in human anatomy or physiology; variation is part of nature. Deviations from the average for any facial parameter are part of what makes each face unique. However, *severe* deviations from the average for a facial parameter often lead to appearance concerns for the individual concerned, sometimes combined with functional problems, as function is often dependent on structure. Needless to say, the terms 'normal' or 'abnormal' should never be used in the presence of patients.

The Line of Beauty (serpentine line)

Based on his investigations, Hogarth's conclusion was that the most beautiful images were composed of *gently curving lines*. This led to Hogarth's concept of the **Line of Beauty**, a term used to describe an **S-shaped curved line**, or **serpentine line,** appearing within an object, as the boundary line of an object, or as a virtual boundary line formed by the composition of several objects (Figure 1.24). According to this theory, S-shaped curved lines signify liveliness and activity and excite the attention of the observer as contrasted with straight lines, parallel lines, or right-angled intersecting lines, which signify inanimate, unattractive objects. In Chapter IX (entitled 'Of composition with the waving-line') of *The Analysis of Beauty*, Hogarth explained that the degree of curvature of the line is important, with a specific curve being the most attractive. He wrote: 'strictly speaking, there is but one precise line, properly to be called the line of *beauty*, which … is number 4'.[59] He felt that deviations from the curvature of this line in either direction become less attractive (Figure 1.25).

The idea that gently curving lines are important in beauty was not new; the concept runs through much of the poetry of the fourteenth century Persian poet-scholar **Hafez of Shiraz**. Hogarth credits the Renaissance artist Michelangelo Buonarroti (1475–1564) (Figure 1.26) as having discovered this concept in relation to art and sculpture when he was analysing a famous classical sculpture of a male trunk, known as the Belvedere Torso (Figure 1.27).

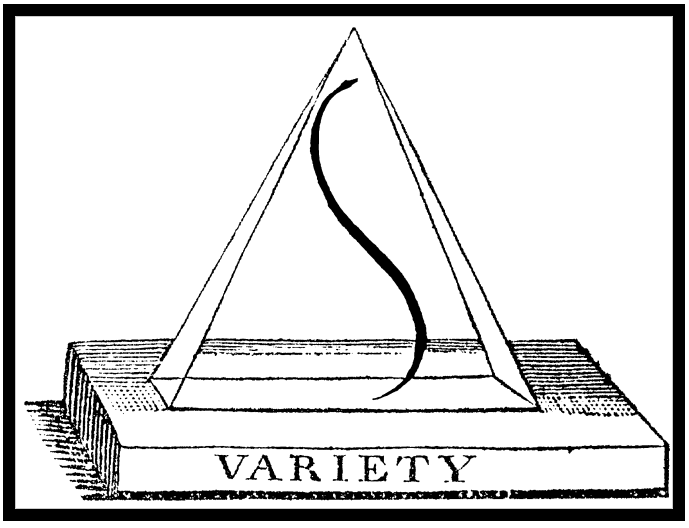

Figure 1.24 Hogarth's serpentine line.

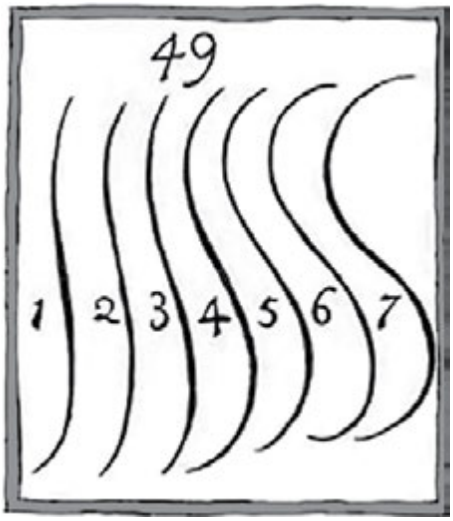

Figure 1.25 Illustration 49 from Plate I of Hogarth's *The Analysis of Beauty* (1753) (see top of Figure 1.20A). Hogarth explained that the degree of the curve of the line is important, with the specific curve of line number 4, a slender, elongated S-shape, being the most attractive. He wrote: 'lines 5, 6, 7, by their bulging too much in their curvature becoming gross and clumsy; and, on the contrary, 3, 2, 1, as they straighten, becoming mean and poor'.[59]

Figure 1.26 Michelangelo Buonarotti.

The term used to describe the attractive incurvation formed by the spine and the body, particularly in nude paintings and sculptures by Michelangelo, is **ensellure**, derived from the French.

In support of this assertion, Hogarth quotes from the artist and art theorist Giovanni Paolo Lomazzo (1538–92), a contemporary of Michelangelo. In his *Trattato dell'arte della pittura, scoltura et architettura*, published in 1584, just two decades after Michelangelo, Lomazzo suggested that Michelangelo had observed that figures should be flame or serpent-like:

Figure 1.27 The Belvedere Torso. (See lower part of Figure 1.21A for Hogarth's drawing of this statue.)

> 'For the greatest grace and life that a picture can have is that it express *motion*, which the Painters call the *spirit* of the picture. Now there is no form so fit to express this motion as that of the flame of fire … So that a picture having this form will be most beautiful'.[62]

In his *De Arte Graphica*, published in 1668, the French artist and art theorist Charles Alfonse Du Fresnoy (1611–68) supported this concept, writing:

> 'flowing, gliding outlines which are in waves, give not only a grace to the part, but to the whole body; as we see in the *Antinous*, and in many other of the antique figures; a fine figure and its parts ought always to have a serpent-like and flaming form: naturally those sort of lines have I know not what of life and seeming motion in them, which very much resembles the activity of the flame and of the serpent'.[63]

For Hogarth, the most beautiful forms had in their outline the Line of Beauty, which resembles the activity of the flame and the serpent (Figure 1.28).

It is clear that the serpentine line cannot be the only explanation of beauty, as was quickly pointed out by Hogarth's friend and critic, the actor and playwright David Garrick (1717–79). Garrick explained that a shape that is attractive in one object may be rather unattractive in another, e.g. a gentle curve on the side of a vase is not so attractive in a protruding belly! There is simply no one factor that creates beauty. Yet the concept of the Line of Beauty deserves further investigation, and the experimental method chosen by Hogarth seems to be original, perhaps making him, together with Fechner, the pioneers of the modern attractiveness research design.