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The malleability of beauty: perceptual adaptation

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Abstract Beauty has many facets, and research shows that there are many biologic, psychologic, cultural, and social aspects that influence how beauty and attractiveness are perceived. Beauty preferences are, in part, an effect of a rudimentary cognitive process that appears quite early in life, with humans having a seemingly automatic ability to categorize a person as beautiful or not. This instantaneous capability of human beauty categorization is partially determined by a function of physical features, such as facial averageness, symmetry, and skin homogeneity. For decades, the mass media platform has introduced certain criteria to what establishes beauty, and more recently, social media, instant photo sharing, and editing apps have further influenced how society adapts to beauty principles.
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Introduction

The appreciation for human esthetics date back to early Greek civilization. In fact, beauty, good health, and riches were described by Plato to be the three wishes of every man.[1] The sight of an attractive face has even been found to activate certain reward centers in the brain,[2] and, although there lies variation with personal preferences and cultural standards within a society at any given point of time, there is a remarkable and substantial agreement as to what constitutes human beauty.[2]

The mass media platform has for years introduced to our minds certain criteria about what establishes beauty. Today, social media, instant photo sharing, and editing apps that allow patients to post their best "selfie" have further influenced how beauty is perceived. Unfortunately, a selfie, filtered or not, may not correspond to a patient's reflection in the mirror, and may lead to an unrealistic and unattainable perfect beauty sought through cosmetic surgery and procedures.

My selfies after the lip filler?

A 38-year-old woman went to Dr. Kiss's office for soft-tissue augmentation of her lips, 8 months after her last lip procedure. The patient had been seeing Dr. Kiss for several years, and this was her third procedure. At this visit, she had 0.6 cc of hyaluronic acid filler injected into the upper and

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lower lips without any complications. Three weeks later, she returned to the clinic to show Dr. Kiss a selfie she took of her newly enhanced lips, and reported that she has noticed a divot near her left upper lip. She had never noticed the divot before. Dr. Kiss carefully examined the picture, which was taken in poor lighting that made it difficult to say if there was a divot or if it was a photographic artifact. Next, Dr. Kiss asked the patient to point out the divot in the clinic's hand mirror. The patient carefully examined her upper lip and replied, "I can't see it now, but I can definitely see it on my selfie."

What is beauty?

Defining beauty standards has long been thought to be a gradually learned process and product of the media; however, research conducted over the past decades provides contradicting information regarding these widely held beliefs, showing that there are many biologic indicators that account for the perception of attractiveness. In fact, humans have an innate, near automatic capacity to categorize a person as attractive or unattractive. This automatic ability to categorize human beauty is partially determined by a function of physical features, such as facial averageness, symmetry, skin homogeneity, and sexual dimorphism.[3] Scientific literature supports such physical features as universal criteria for human attractiveness; however, the perception of attractiveness is also influenced by more information than these universal criteria alone can convey, and some concepts of human beauty have fluctuated drastically over time. For example, a review of widely viewed images in Western culture over the course of the 20th century provides an example of the evolution of the beautiful female body.[4] Although a waist-to-hip ratio has stayed relatively constant, there have been wide variations of body mass index across cultures and periods. The multifaceted concept of beauty shows us that perception can change depending on the individual, society, or historical period.

Averageness and symmetry

Deemed to be the most important attribute to facial attractiveness, the concept of averageness has continuously been found to be a time-constant predictor of beauty. The term averageness relates to a mathematic mean in which a composite of several faces is compared with each individual constituent face. The average, composite, face has repeatedly been found to be more attractive than each individual face, and the more faces that are averaged into a composite, the more beautiful it is found to be. The concept of symmetry pertains to how closely two halves of a whole resemble each other. The extent to which symmetry influences the perception of beauty and attractiveness remains under debate. Earlier studies suggested that attractiveness increases with levels of bilateral facial symmetry[5]; however, more recent studies reported that symmetry may not appear to affect attractiveness as once was thought.[6] Although symmetry may reflect a perfect beauty, the presence of asymmetry conveys an innate charm, and it is possible that beauty may result from proportional facial units rather than symmetry alone.[6]

Skin and beauty

In today's multicultural society, we see other shifting American trends, possibly mimicking societal genetic drifts. In contrast to a static, biologic component of beauty, skin color is thought to be a dynamic trait of beauty. Historically, many cultures have considered fair skin to be the more esthetically pleasing tone compared with darker hues.[7] In fact, in certain communities, skin lightening creams and lotions are used by individuals with darker skin types to improve overall appearance, portray a higher social level, satisfy a spouse, or increase marital prospects.[8]

In contrast, an even distribution of skin color and texture, referred to as skin homogeneity, is considered to be a static characteristic of beauty, invariant cross-culturally and across different types of faces. Research supports theories of the universality of skin homogeneity's relation to beauty, with visible skin condition, skin surface topography, and coloration being found to independently signal attractiveness, youth, and health.[9] This is true in both sexes, and many studies have reported a link between texture and color surface signs with facial attractiveness in both men and women.[10]

Age

Although concepts of ideal beauty may change over time, it is generally accepted that a youthful look remains an influential component of facial attractiveness.[11] A neotenous, or youthful, face is generally one that combines a high ratio of neurocranial-to-lower facial features (eg, those with large eyes, small nose and ears, and full lips). In literature, women, more so than men, who possess youthful features are repeatedly and reliably rated as more attractive than older-appearing women;[12] however, as some authors argue that a youthful appearance may not be a requirement for attractiveness, the true importance of youthfulness remains under debate.[13] Age concepts have special significance in today's aging society, which by 2050, persons aged 65 years or more will comprise over 20% of the US population.[14]

Perceptual adaptation

Previous studies attributed beauty and attractiveness to relatively stable face and body characteristics such as shape and symmetry.[15] However, recent studies suggest that what

each person perceives as beautiful stems from a complicated process influenced by both their environment and their perceptual adaptation.[16] Perceptual adaptation is an experience-based process that reshapes how we perceive our environment. In fact, studies have shown that even very small experiences (minutes of exposure) can shift a person's perception of attractiveness.[17] One such study[16] exposed participants to distorted face shapes, causing them to shift their preference toward the distortion. Theories behind this mechanism suggest that people may have a preference for familiarity and thus, certain and repeated experiences that familiarize people with particular facial and body characteristics, or even a distortion, can shape what they find attractive.

It is thought that the concept of averageness as it relates to attractiveness stems from an evolutionary bias where average faces may indicate reproductive success;[18] however, it is important to note that what each person considers to be "average" is constantly being updated by his or her own experiences, thus contributing to a mental depiction of what attractiveness means to that particular individual. Studies have shown that a significant component of perceptual adaptation that shapes attractiveness is an automatic process that occurs rapidly and unconsciously.[19] Together, these theories explain the major influence that a person's sociocultural environment can have on his or her perceived attractiveness and body image. Multiple studies have shown that repeat exposure to thin bodies shifted the participant's ideal body and judgment of attractiveness to be thinner and may even have changed the participant's perceived "normal body weight."[20] Similar to facial and body attractiveness, preferences for faces can differ across cultures based on the relative exposure to various ethnic groups.[21] Likely due to the increased diversity and the aging population seen in the United States, one study found that what is deemed most beautiful (per *People* magazine's "World's Most Beautiful" list) has shifted to include a more racially diverse, older group of individuals.[22]

The social media influence on perceived beauty

The concept of perceptual adaptation is especially important today, when television and social media have infiltrated so much of people's lives. Use of social media has grown enormously over the past decades. On one side, the benefits of social media are great, allowing users to connect with each other, share ideas, and create jobs; however, social media is also full of appearance-focused posts, idealized-body types, and filtered self-images. In fact, popular social media platforms including Twitter, Tumblr, Instagram, and Pinterest have a large subset of images dedicated to health and fitness, fitness inspiration, and body image (termed "thinspiration").[23] Although many people describe their time spent on social media as mindlessly scrolling through thousands of images, actually, our subconscious mind is busy registering these images and adapting our perception of beauty based on these visualized experiences. The repeat exposure of an individual to these images is so strong that in today's "selfie-culture," people tend to prefer their mirror image corresponding to what they see in their selfie, rather than their true image;[24] thus, it is easy to see that repeat exposure of a particular ideal of beauty through social media can produce a completely new standard of beauty. As much of what is posted on social media depicts filtered and potentially photoshopped images of ultrathin women, this newly perceived ideal of beauty is likely unrealistic for the vast majority of women.[25] Not only can social media affect perceived beauty standards, but it can also alter appearance-related dissatisfaction. One study showed that women link looking like a media-supported female beauty ideal with positive life expectations and changes.[26] Other studies have shown that increased exposure to thin, idealized body images translates to increased body dissatisfaction and appearance based social comparison.[27]

Conclusions

One of the most controversial aspects in the theory of beauty has historically been whether it is completely objective and set in innate standards, or subjective and "located in the eyes of the beholder." True beauty is likely an evolving interplay between time-constant biologic traits and the continuous molding that occurs through exposures in our environment. The highly connected world and strong social media exposure has influenced what constitutes beauty and how it is perceived, possibly changing beauty ideals toward unnatural features created by selfies and filtered images. Clinicians should counsel patients on the importance of understanding that each individual has his or her own beauty and unique features, and that an individualized and natural approach to cosmetic procedures are key to beauty enhancing procedures.

References

1. Alam M, Dover JS. On beauty: evolution, psychosocial considerations, and surgical enhancement. *Arch Dermatol* 2001;137:795-807.
2. Hamermesh DS. *Beauty Pays: Why Attractive People are More Successful.* Princeton, New Jersey: Princeton University Press. 2011:232.
3. Vashi N. *Beauty and Body Dysmorphic Disorder: A Clinician's Guide. 1st ed.* New York: Springer Science. 2015.
4. Mazur A. U.S. trends in feminine beauty and overadaptation. *J Sex Res* 1986;22:281-330.
5. Rhodes G, Yoshikawa S, Clark A, et al. Attractiveness of facial averageness and symmetry in non-western cultures: in search of biologically based standards of beauty. *Perception* 2001;30:611-625.
6. Harrar H, Myers S, Ghanem AM. Art or science? An evidence-based approach to human facial beauty a quantitative analysis toward an informed clinical aesthetic practice. *Aesthet Plast Surg* 2018;42:137-146.
7. Said C, Todorov A. A statistical model of facial attractiveness. *Psychol Sci* 2011;22:1183-1190.
8. del Giudice P, Yves P. The widespread use of skin lightening creams in Senegal: a persistent public health problem in West Africa. *Int J Dermatol* 2002;41:69-72.

9. Samson N, Fink B, Matts P. Visible skin condition and perception of human facial appearance. *Int J Cosmet Sci* 2010;32:167-184.
10. Matts PJ, Fink B, Grammer K, et al. Color homogeneity and visual perception of age, health, and attractiveness of female facial skin. *J Am Acad Dermatol* 2007;57:977-984.
11. Bashour M. History and current concepts in the analysis of facial attractiveness. *Plast Reconstr Surg* 2006;118:741-756.
12. Maestripieri D, Klimczuk AC, Traficonte DM, et al. A greater decline in female facial attractiveness during middle age reflects women's loss of reproductive value. *Front Psychol* 2014;5:179.
13. Jones D, Brace CL, Jankowiak W, et al. Sexual selection, physical attractiveness, and facial neoteny: cross-cultural evidence and implication. *Curr Anthropol* 1995;36:723-748.
14. Ortman J, Velkoff V, Hogan H. An aging nation: the older population in the United States—population estimates and projection. *US Census Bureau* 2014:1-28.
15. Rhodes G, Proffitt F, Grady JM, et al. Facial symmetry and the perception of beauty. *Psychon Bull Rev* 1998;5:659-669.
16. Rhodes G, Jeffery L, Watson TL, et al. Fitting the mind to the world: face adaptation and attractiveness aftereffects. *Psychol Sci* 2003;14:558-566.
17. Cooper PA, Maurer D. The influence of recent experience on perceptions of attractiveness. *Perception* 2008;37:1216-1226.
18. Langlois JH, Roggman LA, Musselman L. What is average and what is not average about attractive faces? *Psychol Sci* 1994;5:214-220.
19. Jung K, Ruthruff E, Tybur JM, et al. Perception of facial attractiveness requires some attentional resources: implications for the "automaticity" of psychological adaptations. *Evol Hum Behav* 2012;33:241-250.
20. Mele S, Cazzato V, Urgesi C. The importance of perceptual experience in the esthetic appreciation of the body. *PLoS One* 2013;8, e81378.
21. Tovée MJ, Swami V, Furnham A, et al. Changing perceptions of attractiveness as observers are exposed to a different culture. *Evol Hum Behav* 2006;27:443-456.
22. Maymone MB, Neamah HH, Secemsky EA, et al. The most beautiful people: evolving standards of beauty. *JAMA Dermatol* 2017;153:1327-1329.
23. Lewallen J, Behm-Morawitz E. Pinterest or thinterest?: social comparison and body image on social media. *SM + S* 2016;2:1-9.
24. Mita TH, Dermer M, Knight J. Reversed facial images and the mere-exposure hypothesis. *J Pers Soc Psychol* 1977;35:597-601.
25. Ghaznavi J, Taylor LD. Bones, body parts, and sex appeal: an analysis of #thinspiration images on popular social media. *Body Image* 2015;14:54-61.
26. Engeln-Maddox R. Buying a beauty standard or dreaming of a new life? Expectations associated with media ideals. *Psychol Women Q* 2006;30:258-266.
27. Tiggemann M, Polivy J. Upward and downward: social comparison processing of thin idealized media images. *Psychol Women Q* 2010;34:356-364.

Dr. Mayra B. Maymone is a dentist and physician and received her doctorate in dermatology in 2016. She attended dental and medical school in Campo Grande, a city located in the central-west of Brazil. After medical school, she completed her master's degree and Doctorate in Dermatology at Boston University, where she later joined Neelam Vashi's research laboratory. Her primary research interests focus on hyperpigmentation disorders, including the effect of those disorders on quality of life and potential novel therapies. With a background in dentistry, she also has a special interest in mucosal diseases. She has published several medical contributions in prestigious journals such as the *Journal of Investigative Dermatology*, *Journal of the American Academy of Dermatology*, and *JAMA Dermatology*. She has also coauthored several book chapters and has had the opportunity to present her work in national dermatology meetings (Summer Meeting—American Academy of Dermatology). Currently she is collaborating on several research projects on a diversity of relevant topics including sun protection, social media, beauty standards, bibliometric analysis, pediatric dermatology, lightening agents, tropical diseases, and teledermatology with the dermatology department of both the University of Colorado, Denver and Boston University. She is passionate about research. Her plans for the future include becoming an academic dermatologist, to teach and make sure that the future generation of dermatologists continues to have outstanding educational training, and to give back to underserved communities in the United States and abroad. She is married to Dr. Alexandre Maymone and has two beautiful daughters, Maria Julia and Maya.

Melissa Laughter is a third year medical student at the University of Colorado Anschutz Medical Campus. She attended the University of Colorado, Boulder, where she received a BS in Chemical and Biological Engineering. She then attended the University of Colorado, Denver, where she joined a biomaterials and tissue engineering laboratory and received her MS in Bioengineering. She went on to receive her PhD in Bioengineering with a focus on stem cell microenvironments, stem cell transplant, and cellular scaffolding. She has multiple peer-reviewed publications in top engineering journals and has presented her research at nationally recognized conferences. In addition, she has taught numerous seminars at the graduate level with a focus on polymers in bioengineering. Her love for science and teaching led her to serve as an officer for a Women in Science, Technology, Engineering, and Mathematics (STEM) outreach program where she mentors and encourages young women interested in STEM careers. More recently, she has become involved in dermatoepidemiology research. This research focuses on important social and clinical issues including gender studies and changing beauty standards, something that Melissa is extremely passionate about. Her future goals include pursuing her career as a dermatologist and developing her teaching and research skills with the hopes of one day teaching and leading her own laboratory.

Dr. Jeffrey S. Dover graduated as the silver medalist, *magna cum laude* from the University of Ottawa. His dermatology training was received at the University of Toronto followed by research fellowships at St. John's Hospital for Diseases of the Skin at the University of London in London, England, and a 2-year photomedicine fellowship at Harvard Medical School. Dr. Dover is a former Associate Professor of Dermatology at Harvard Medical School, was Chief of Dermatology at the New England Deaconess Hospital for more than 10 years, and also Associate Chairman of Dermatology at Beth Israel Deaconess Medical Center. He is Associate Clinical Professor of Dermatology at Yale University School of Medicine, and Associate Professor of Dermatology at Brown Medical School. Dr. Dover is a director of SkinCare Physicians in Chestnut Hill, Massachusetts.

Dr. Dover is the author of over 450 scientific publications, and he has coauthored and edited over 45 textbooks. He is the founding editor of *Journal Watch for Dermatology*. Dr. Dover has received many honors, including repeated nominations for "Teacher of the Year" at Harvard Medical School. He received the prestigious Leon Goldman Award as well as the Ellet Drake Award of the American Society for Laser Medicine and Surgery and was honored for his work in laser surgery by the Sturge Weber Foundation at its 20th Annual Gala. Dr. Dover is past president of the American Society for Lasers in Medicine and Surgery and past president of the American Society for Dermatologic Surgery. He is married to Dr. Tania Phillips and has two daughters, Sophie and Isabel.

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Dr. Vashi is a recognized leader in medical and cosmetic dermatology. She is widely published in peer-reviewed literature, author of several book chapters, and a frequent lecturer at both national and international dermatology meetings. She has published two textbooks, *Beauty and Body Dysmorphic Disorder: A Clinician's Guide* and *Dermatoanthropology of Ethnic Skin and Hair,* both available on www.amazon.com. She has been featured extensively

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