

Skin color and race

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Abstract

Skin color is the primary physical criterion by which people have been classified into groups in the Western scientific tradition. From the earliest classifications of Linnaeus, skin color labels were not neutral descriptors, but connoted meanings that influenced the perceptions of described groups. In this article, the history of the use of skin color is reviewed to show how the imprint of history in connection with a single trait influenced subsequent thinking about human diversity. Skin color was the keystone trait to which other physical, behavioral, and culture characteristics were linked. To most naturalists and philosophers of the European Enlightenment, skin color was influenced by the external environment and expressed an inner state of being. It was both the effect and the cause. Early investigations of skin color and human diversity focused on understanding the central polarity between “white” Europeans and nonwhite others, with most attention devoted to explaining the origin and meaning of the blackness of Africans. Consistently negative associations with black and darkness influenced philosophers David Hume and Immanuel Kant to consider Africans as less than fully human and lacking in personal agency. Hume and Kant's views on skin color, the integrity of separate races, and the lower status of Africans provided support to diverse political, economic, and religious constituencies in Europe and the Americas interested in maintaining the transatlantic slave trade and upholding chattel slavery. The mental constructs and stereotypes of color-based races remained, more strongly in some places than others, after the abolition of the slave trade and of slavery. The concept of color-based hierarchies of people arranged from the superior light-colored people to inferior dark-colored ones hardened during the late seventeenth century and have been reinforced by diverse forces ever since. These ideas manifest themselves as racism, colorism, and in the development of implicit bias. Current knowledge of the evolution of skin color and of the historical development of color-based race concepts should inform all levels of formal and informal education. Awareness of the influence of color memes and race ideation in general on human behavior and the conduct of science is important.

KEYWORDS

climate, colorism, human classification, implicit bias, othering, skin pigmentation, taxonomy

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1 | INTRODUCTION

The association of skin color and race is something that most people take for granted, to the extent that the partitioning of humanity into groups according to skin color is commonly understood as natural. The history of the establishment of races and the role that skin color played in this process warrants distilling and retelling because a new generation of scholars can benefit from an updated understanding of how the race concept came to be applied to people and how color-based, named races arose. While the role-played by skin color in the formation of race concepts has been long recognized, and is often mentioned in introductory courses, the extent to which current thought and research remain influenced by color-based race concepts is rarely appreciated. A detailed chronological unfolding of the evidence for the creation of color-based races is presented here because knowing who said what and when has direct bearing on the persistence of color-based race concepts as organizing principles of European and colonial societies and science in the past and continuing to the present day.

That skin color and race has been a recurring theme of monographs and edited volumes for more than a half century (e.g., Curran, 2011; Franklin, 1969; Guterl, 2001; Mead et al., 1968; Montagu, 1964; Wheeler, 2000) attests to the durability and tenacity of race-thinking and of named races in human affairs. The reinforcement and continued use of race and labeled races in many countries by political, social, and biomedical constituencies lends continued credibility to these phenomena, and further justifies their exploration and explanation. The function of this article is to do just that.

2 | SKIN COLOR AS SIGNIFIER

Differences between people that are classified as racial differences are usually considered to be derived inherently from the body (McCoskey, 2012). The selection of particular physical attributes as signifiers of human difference is, however, a social and historical process (Omi & Winant, 1994). Through history up to the present, othering has not always involved physical traits. Some of the earliest historical examples of othering we know of come from antiquity, when sometimes trenchant “racial” differences were created on the basis of dress, language, or typical occupation (McCoskey, 2012). In the realm of physical traits, skin color has been one of the most widely used because it is visible. Colors themselves are value-neutral, but they gain meaning from our experiences and associations with them. As Bastide memorably put it, “Colors are not important in themselves..., but as bearers of a message” (Bastide, 1968, p. 34). In the history of the use of skin color in human classification, we see it change from an indicator of geographic origin and environment to a criterion of cultural and behavioral difference, and a standard for legitimizing role expectations (Dikotter, 1992). Through acculturation, skin colors become public markers of supposedly real social, cultural, and genetic differences and carry deep-seated cognitive associations that have manifold ramifications for expected behaviors and reactions

(Eberhardt, 2005; Eberhardt et al., 2004; Eberhardt & Fiske, 1998; Guterl, 2001). The importance of this fact is not only for our students. Scientists are not immune from such influences. When the cognition of racial differences is suggested, the recognition of races follows (Bourdieu, 2000). Practical taxonomies are established that are products of objective evaluation and subjective judgment, iteratively reinforced by experience (Bourdieu, 2000) and these categories become durable parts of the scientist's frame of reference (Bliss, 2012).

In this article, I discuss the description of human skin color diversity and its application to human classification in a Western context. Attitudes toward skin color and other physical features arose independently in China and India, resulting in distinct constructs of human groups (de Bary et al., 1958; Dikotter, 1992; Jablonski, 2012b). The intersections between Western and non-Western systems of perception and classification, especially in recent decades, are fascinating and relevant to many aspects of modern life, but I will not discuss them here.

2.1 | Early classifications of people were by color

The earliest scientific classifications of human beings used skin color as the cardinal characteristic distinguishing people. The first of these classifications was created by Carl Linnaeus (1707–1778) and published in the first edition of the *Systema Naturae* in 1735 (Linnaeus, 1735). In that work, Linnaeus placed people into four groups, *Homo Europaeus albescens*, *Homo Americanus rubescens*, *Homo Asiaticus fuscus*, and *Homo Africanus niger*. In this earliest formal taxonomy, humans are divided into four groups according to skin color and geography. This was before he introduced what would become the now-standard, binomial nomenclature, and classification of people into named subspecies of *Homo sapiens* (Marks, 2007). By the tenth edition of the *Systema Naturae* in 1758, Linnaeus retained the primary color differentiation of the four designated subspecies and, in each description, provided more detail about physical traits, along with descriptions of mental characteristics, modes of dress, and habits (Linnaeus, 1758) (Figure 1). He also added at that time a fifth variety, *Homo sapiens monstrosus*, catch-all collection of mostly fanciful anatomical oddities with which Linnaeus had a lurid fascination (Broberg, 1983). What is noteworthy in Linnaeus' arrangement of temperaments and associated skin colors is that it reflected his interpretation of the humoral theory of Hippocrates, Aristotle, and Galen in which particular elements (air, water, fire, and earth) were associated with specific climates, geographies, and humors (blood, phlegm, yellow bile, and black bile) (Svensson, 2015). According to this theory, climate and geography produce predominant humors in the body that influence the development of good or bad character and the color of the skin (Hippocrates & Adams, 1849; Isaac, 2004). Linnaeus' juxtaposition of individual human subspecies with specific skin colors and temperaments – *Americanus* with red and choleric, *Europaeus* with white and sanguine, *Asiaticus* with yellow and melancholy, and *Afer* with black and phlegmatic—had a lasting impact on how subsequent

MAMMALIA. PRIMATES. Homo 29

- America- α .** rufus, cholericus, rectus.
mus. *Pilis* nigris, rectis, crassis; *Naribus* patulis; *Facie* ephelctica; *Mento* subimberbi. *Pertinax*, contentus, liber. *Pingit* se lineis dadaleis rubris. *Regitur* Convetudine.
- Europæus β .** albus, sanguineus, torofus. *Pilis* flavescentibus prolixis. *Oculis* cæruleis. *Levis*, argutus, inventor. *Tegitur* Vestimentis arctis. *Regitur* Ritibus.
- Asiaticus γ .** luridus, melancholicus, rigidus. *Pilis* nigricantibus. *Oculis* fulcis. *Severus*, fastuosus, avarus. *Tegitur* Indumentis laxis. *Regitur* Opinionibus.
- Afer δ .** niger, phlegmaticus, laxus. *Pilis* atris, contortuplicatis. *Cute* holosericea, *Naso* simo. *Labiis* tumidis. *Femini* sinus pudoris; *Mammae* lactantes prolixæ. *Vasæ*, segnis, negligens. *Ungit* se pingui. *Regitur* Arbitrio.
- Monstro- ϵ .** solo (a) & arte (b, c,) variat:
sus. a. *Alpini* parvi, agiles, timidi. *Patagonici* magni, segnes.
 b. *Monorchides* ut minus fertiles: *Hottentotti*. *Juncæ* puellæ abdomine attenuato: *Europææ*.
 c. *Macrocephali* capite conico: *Chinentes*.
Plagiocephali capite antice compresso: *Canadenses*.
Habitat intra Tropicos *Palmis* *Lotophagus*.
Hospitatur extra Tropicos sub *novercante Cerere*, *carnivorus*.

DE-

que cogitas esse; cito natura revocavit & condet; Morti omnes æque vocat; iratis Deus propitiisque moriendum. Senec. II: 59.
 Memento mori!

Naturaliter: Te audacis naturæ miraculum, Animalium principem, cujus causa cuncta genuit natura, esse Simium animal flens, ridens, melodium, loquens, docile, judicans, admirans, sapientissimum; sed fragile, nudum, susceptive natura incerne, ad omnem fortunæ contumeliam projectum, alienæ o-

FIGURE 1 The classification of humans by Carl Linnaeus, as it appears in the 1766 edition of *Systema Naturae* (Linnaeus, 1766)

naturalists and philosophers described human physical diversity and how they considered skin color as correlated with specific attributes of character. Linnaeus' racial categories also have continued to influence the ideological assumptions that people today have with race, in ways that Linnaeus himself could not have predicted (Eberhardt & Fiske, 1998). Societal and psychological processes legitimize and perpetuate racial classifications, and promote the reification of race as a concept (Eberhardt & Fiske, 1998).

Questions linger over interpretation of the details in the classification of humans presented in Linnaeus' tenth edition. One concerns the order and designation of subspecies by α , β , γ , and δ and whether this represents a ranked hierarchy. Linnaeus was not explicit on this point, but it would be surprising if Linnaeus had not accepted the prevailing Enlightenment view of a linear *scala naturae* in which, "all aspects of the world [were] linearly arranged in a series of steps running from God at the top down through the various entities of the world to the inorganic" (Brace, 2005, p. 28). Clearly, Linnaeus ascribed some significance to the order in which groups were listed because, in the tenth edition, his classification reflects an inversion of the first

and second positions as compared with the first edition. The elevation of Native Americans to first position, ahead of Europeans, by Linnaeus appears to have been influenced by the positive views held by one of Linnaeus' disciples, Peter Kalm, who had been greatly impressed by Native Americans during a visit to North America in 1750 (Svensson, 2015). A second question concerns the change in his description of the skin color of Asians from the darker brown "fuscus" to the yellow or sallow "luridus." It has been suggested that this change denoted Linnaeus' alignment of the yellow bile humor to what was commonly perceived as the skin color of East Asians and that the lightening of the group elevated their status (Kowner & Skott, 2015). Another issue highlighted by Linnaeus' classification is the simplification of human types through designation of only four color-coded subspecies that were not representative of the diversity existing within the large four geographical regions he designated. Like many naturalists of his day, Linnaeus did not venture out of western Europe and had little firsthand experience with people from other places. He mostly received information about the appearance and habits of people outside Europe from his students, from Swedish and Dutch mercantilists, and from the written diaries and accounts of explorers and travelers. The reasons for his choosing to describe some groups rather than others (for instance, East vs. South or Southeast Asians) were somewhat arbitrary and had more to do with patterns of trade prevailing in Sweden and the Netherlands during Linnaeus' lifetime than with knowledge about the distinctive appearance of people (Kowner & Skott, 2015). The arbitrariness of groups chosen for named designation is one of the hallmarks of Enlightenment classifications of humans (see, e.g., table 1-1 in Molnar, 2005; table 1 in Barbujani, 2005). The identity of groups and the nature of the designations (races, varieties, etc.) were often contingent on the philosophical predilections and geographic and economic circumstances of the describers rather than with the variation present among human groups in the world. The different classifications of humankind created by eighteenth century naturalists have been compiled and critiqued in other works (Blancaert, 1993; Eze, 2001; Greene, 1954; Marks, 2007; Sussman, 2014). My interest here is in highlighting those treatments that focused on the nature and significance of differences in skin color. Of these, one of the most influential was that of George-Louis Leclerc, Comte de Buffon (1707-1788).

Buffon's interests in the effects of climate and geography on human physiognomy and anatomy compelled him to engage in detailed and long-term studies of human diversity. Collecting accounts of human appearance and customs from the accounts of travelers, explorers, traders, and fellow naturalists, Buffon concluded that,

From every circumstance we may, therefore, obtain a proof, that mankind are not composed of species essentially different from each other, that, on the contrary, there was originally but one individual species of men, which after being multiplied and diffused over the whole surface of the earth, underwent divers changes, from the influence of the climate, from the difference of food, and of the mode of living, from

epidemic distempers, as also from the intermixture, varied ad infinitum, of individuals more or less resembling each other... (Buffon, 1853, p. 135).

In contrast to Linnaeus, Buffon was interested in process (Sussman, 2014) or what we would now refer to as adaptation. Buffon's three major groups or races were distinguished by color, with each group containing multiple varieties who shared similar skin colors. The colors of the skin, in turn, reflected the circumstances under which people lived. Between 40 and 50 degrees latitude, he wrote, "we behold the human form in its greatest perfection; and there we ought to form our ideas of the real and natural colour of man" (Buffon, 1853, p. 134). Buffon's "White or Caucasian" race was described as having skin "white, or usually approaching to white" (Buffon, 1853, p. 138) contained three branches (Aramean; Indian, German, and Pelasgic; and Scythian and Tartarian) and two varieties (Malay and Oceanic). His "Yellow or Mongolian" race was distinguished as having, "complexion commonly olive" (Buffon, 1853, p. 139) and composed of five branches: Mantchu; Sinic; Hyperborean, or Esquimaux; American; and Mongol-Pelagian, or Caroline. His "Black or Melanian" race was composed of people who are "black or blackish" (Buffon, 1853, p. 140) and contained seven branches: Ethiopian; Caffre; Hottentot; Papuan; Tasmanian; Alfoursous-Endamène; and Alfoursous-Australian.

Buffon's ideal skin color was neither very light nor very dark, but reflected, primarily, the effects of an equable climate. Excessive heat or excessive cold, and life predominantly spent outdoors or mostly indoors, produced deviations from Buffon's ideal. Violent heat caused people to have skin that was black, while more temperate climates produced lighter shades (Buffon, 1853, pp. 133–134). Regardless of race, life in towns conduced to lighter skin because there people enjoyed life that was more "comfortable and agreeable," where they are provided, "with every expedient for defending themselves from the injuries of the weather..." (Buffon, 1853, p. 134). These conclusions are superficially similar to those of Hippocrates and Aristotle with respect to the influence of the extremes of heat and cold (Isaac, 2004), but the details of Buffon's color-based groups reflect a more compendious knowledge of skin color diversity worldwide, and the recognition that common physical forces—primarily heat, cold, and dryness—caused skin to be darker or lighter within given races. These observations presage important insights about the convergent evolution of skin color by natural selection revealed in recent decades.

Of the several Enlightenment thinkers who included skin color in their considerations of human physical diversity, Immanuel Kant (1724–1804) warrants consideration here because of his interpretations of the meaning of skin color, and for his pointed use of the word race and explicitly hierarchical arrangement of human races (Eze, 1995; Jablonski, 2012b). Kant considered that all people derived from a stem from which different races originated and then perpetuated themselves in different regions, according to the conditions of climate and soil. Throughout his life, Kant was keenly interested in the circumstances that caused people to be different because these reflected on their inherent talent and their capacity to develop

civilization (Eze, 1995; Jablonski, 2012b). His views on the origin and nature of races changed over the years, but his belief in the direct connection between skin color and character remained firm. Skin color was evidence of "unchanging and unchangeable moral quality" (Eze, 1995, p. 219) and thus ultimately of free will (Sussman, 2014). In works spanning 1775–1778, Kant described four races: The race of the Whites, The Negro Race, The Hunnic (Mongolian or Kalmuck) Race (including Americans), and The Hindu or Hindustani Race (Bernasconi, 2001, 2002; Eze, 1995, 2001). To a greater extent than Buffon, Kant developed a rigorous and strict scientific concept of race as being, "a class distinction between animals of one and the same line of descent (*Stamm*), which is unfailingly transmitted by inheritance" (Kant, quoted in Bernasconi, 2001, p. 14). Kant conceived of the original human genus carrying the seeds of all four races. Under the influence of environmental conditions, one of those seeds was actualized, and there could be neither a reversion to the original stem nor a change to another race (Bernasconi & Lott, 2000). Races were, thus, fixed and immutable. The conditions that conduced to the development of the highest talents and most elevated expressions of moral behavior and civilization prevailed in Europe, between the 31st and 52nd parallels of latitude, where—away from extremes of hot and cold—people were happiest and equally well prepared for transplanting elsewhere (Eze, 2001). Here, people of the stem genus, of "white brunette" appearance, contained all of humanity's potential talent and beauty. Members of the stem genus who developed under the equable conditions in central and northern Europe became The race of the Whites and represented the apex of the human condition. Other races were products of various kinds of degeneration resulting from the challenges of local environmental conditions, with dry heat having the effect of depleting character and potential to the greatest extent (Eze, 1995, 2001). Kant averred that local circumstances produced characteristic skin colors. In his *Physische Geographie*, Kant stated that all babies were born white and that they turned color within a few weeks, taking on their characteristic black, red, or yellow color as the result of the action of the environment (Eze, 1995). Skin color was the marker of race and evidence of difference in natural character (Eze, 1995).

2.2 | Explaining blackness

Skin color was the necessary differentiator of types or races of humans in European and Eurocentric race concepts of the eighteenth century. It was the keystone trait that defined races. All other attributes included in racial complexes, whether physical, mental, cultural, or psychological, depended on skin color.

Although the diverse classifications of the Enlightenment differed in the number and names of groups of humans that were designated, they shared the essential binary division of humanity into light-colored Europeans and everyone else, that is "white" and "nonwhite." European naturalists and philosophers were avid readers of the accounts of explorers and traders, and of sometimes apocryphal traveler's tales including the compilation known as *The Travels of Sir John*

Mandeville circulated between 1357 and 1371 (Price, 1997). The diaries of Portuguese and Italian explorers were particularly influential (Cole, 1972). The net effect of this large body of travel literature was to standardize the attitudes of Europeans toward the non-West by the sixteenth century (Cole, 1972). The seemingly objective information about people living in distant lands contained in these compilations was heavily weighted by preconceptions and explicit value judgments of appearance. When Europeans encountered people, primarily on the west coast of Africa, with extremely dark skin, they were startled by blackness, and sought to understand it through a haze of emotional disturbance (Cole, 1972; Jablonski, 2012b). By late medieval times, blackness conjured a picture of evil or something inherently defective, undesirable, or mysterious, and contrasted with whiteness or lightness, which was associated with goodness, desirability, and honesty (Cole, 1972; Eze, 1995; Jablonski, 2012b). Dark skin reflexively elicited suspicion, distrust, pejorative associations of negative behaviors including cannibalism and devilishness, and immediate associations of inferiority (Cole, 1972; Eze, 1995; Jablonski, 2012b). The color-based classifications of Linnaeus, Buffon, and Kant demonstrated an inarticulate subscription to a system of thought which assumed that what was different, especially that which is “black,” was or embodied evil, inferiority, and moral negation of “white,” light, and goodness (Cole, 1972; Eze, 1995).

For European thinkers of the 17th and 18th centuries, the condition of non-whiteness had to be explained, from both physical and moral perspectives. Influenced by developments in the new science of anatomy, studies of the precise source of blackness in African skin began in the early seventeenth century (Curran, 2011). The histological studies of the Italian anatomist, Marcello Malpighi (1628–1694), were strongly influential in this regard because they pointed to what was at first thought to be an “African layer” of the skin, not found in the skin of other people (Curran, 2011). Anatomical interest was further piqued by the announcement in 1739 by the Académie royale des sciences de Bordeaux of a prize to be awarded for the best essay addressing the question of, “the physical cause of nègres' color, of the quality of their hair, and of the degeneration of the one and of the other” (Curran, 2011, p. 2). The Bordeaux prize inaugurated interest in the anatomical origins and status of blackness that was not easily satisfied. Using newly invented tools of microscopy, enterprising anatomists from Europe and the American colonies continued this study in earnest. The results of the investigations of William Hunter, Samuel Stanhope Smith, Johann Friedrich Meckel, and others informed Buffon and Kant of the manifestations of the degeneracy that resulted in black bile affecting the skin and other organs (Curran, 2011).

Kant held a firm conviction that skin color encoded and proved rational superiority or inferiority. To him, Whites were the only self-actualized people imbued with talent and capable of learning and self-development. Other groups, most particularly, Blacks were only suited to “training,” by which he meant corporal punishment (Eze, 1995). Kant supported and extended the views of Scottish philosopher David Hume (1711–1776) when he wrote,

Mr Hume challenges anyone to cite a simple example in which a Negro has shown talents, and asserts that among the hundreds of thousands of blacks who are transported elsewhere from their countries, although many of them have been set free, still not a single one was ever found who presented anything great in art or science or any other praiseworthy quality; even among the whites some continually rise aloft from the lowest rabble, and through superior gifts earn respect in the world. So fundamental is the difference between the two races of man, and it appears to be as great in regard to mental capacities as in color... (Kant quoted in Eze, 1995, p. 222)

Kant took great care to amass evidence to support his views on the inferiority of Blacks, and based his accounts of the permanence of racial characteristics on dubious and unreliable sources, in the absence of personal experience or observations (Bernasconi, 2002). The effects of Kant's writings on human races were widespread and profound. His writings made explicit the nature and hierarchical classification of races, and solidified the supreme position of Whites and inferior position of Blacks (Bernasconi, 2002; Eze, 1995). Kant was well aware of the nature and extent of chattel slavery of Africans, but never repudiated it even though his ethical principles would appear to have precluded any even tacit support for the institution (Bernasconi, 2002). Bernasconi (2002) has speculated that Kant did not regard Africans as fully human because they did not possess all the talents and dispositions of complete human beings.

Hume's and Kant's writings on the superiority of European Whites, the inferiority of African Blacks, and the immutability of racial hierarchies had potent effects on the views of government leaders and business interests in Europe and America from the mid- and late 18th century onward. By reinforcing concepts of a natural order of humans at a time when chattel slavery of Africans was in full swing in the Americas, the works of Hume and Kant provided justification for the continuation of the transatlantic slave trade when the trade was being attacked as immoral and inhumane (Bethencourt, 2013; Guenther, 2011; Jablonski, 2012b; Sussman, 2014). The views of Kant on the immutability of races and of a strict racial hierarchy did not go unchallenged. During and after Kant's lifetime, other influential scholars wrote clearly and at length about human diversity and classification. Johann Gottfried von Herder (1744–1803) and Johann Friedrich Blumenbach (1752–1840) provided clear evidence from observations of studies of human variation, including skin color, cranial form and other physical characteristics that natural gradations existed between races and that racial classification was arbitrary (Bethencourt, 2013). Von Herder's evocative description of what we now describe as clinal variation in skin color is particularly memorable, “The colors lose themselves in each other [*Die Farben verlieten sich in einander*]” (Von Herder & Luden, 1828, p. 248). A close reading of their works, however, indicates that even they focused attention on explaining otherness relative to European norms (Eze, 2001). Blackness had to be explained, but whiteness did not.

By the close of the eighteenth century, attitudes toward the nature and order of color-based races had hardened (Curran, 2011). They were further supported by widely circulated treatises such as that of Edward Long (1734–1813) in his *History of Jamaica* (Long, 1774), who claimed that the “Negro” should be distinguished from “the rest of men, not in kind, but in species” (Long, 1774, p. 375).

The idea of an original and natural distinction between European whites and African Blacks reinforced Hume's writings, and found an engaged audience in the Americas. The influence of Hume's writings on America's anglophone “founding fathers” was considerable (Lutz, 1984), including those who owned African slaves (Jablonski, 2019). The development of what would later be labeled “bi-racialism” and a lived reality divided into whiteness and blackness followed in train (Guterl, 2001).

One of the most important messages emerging from this account is that, but the end of the eighteenth century, the world of Western civilization and commerce was racialized. This social reality had been created by the interplay of many forces and people who, wittingly or unwittingly, promoted the concept of a hierarchical arrangement of color-based races. The manifold effects of this knowledge shift become clear when we examine all the ways in which race has been defined and deployed in the last 250 years of world history (Chaplin, 2018). One of the manifestations of a racialized world was what came to be called scientific racism. What is important to reflect upon is that this started as science.

2.3 | Whiteness justified

From the late 18th century onward, the distinction of the races and the primacy of whiteness were expressed in many forms, from scientific investigations to religious treatises. Many of these began in the service of upholding slavery, but were quickly broadened and generalized in support of a wider variety of economic and social causes, most especially in the Americas and South Africa (Bethencourt, 2013; Chaplin, 2018; Smedley & Smedley, 2012; Sussman, 2014). The many manifestations of the beliefs in race (racialism) and the supremacy of a particular race (racism) have been researched and discussed at length elsewhere (e.g., Bethencourt, 2013; Maré, 2018; Smedley & Smedley, 2012; Stanton, 1960; Sussman, 2014). What is of salient importance in the context of this article is the lasting influence of ideas about the semantic meanings of skin color (Gergen, 1968), and the development of durable “color memes” in association with racial stereotypes (Jablonski, 2012c).

Until the abolition of the slave trade and of slavery in the Americas in the nineteenth century, the separation of people into “natural” races was important. This increasingly became a challenging practical and intellectual exercise because race mixing was so widespread. The unnaturalness and dangers of race mixing were decried by Kant (Eze, 1995), but the “contamination” brought about by race mixing had been discussed by generations of Spanish, Portuguese, Dutch, and French colonists in the New World, India, Southeast Asia, and

Melanesia from the sixteenth century onward (Samson, 2005). One of the most interesting developments in the history of the phenomenon of race occurred in the United States prior to the abolition of slavery in the late eighteenth and early nineteenth centuries. It was at this time that specific definitions of race were developed to fulfill the particular needs of slavery (Eberhardt & Fiske, 1998; Jablonski, 2012b). The introduction of “one drop laws” was remarkably effective in the context of chattel slavery because it created a system whereby any known trace of “black blood” in a person's ancestry made someone black and, thereby, enslaved (Brown, 2014; Eberhardt & Fiske, 1998; Jablonski, 2012b; Sussman, 2014). Under what became widely known as the “one drop rule,” skin color, which had been the visible identifier of race identity, was no longer the necessary and sufficient criterion for race classification. Simply the knowledge of past blackness was sufficient.

The presence in the American population of many “black” people who were not black posed problems for a society that had become obsessed with color. The social psychological effects of the one drop rule in the United States were considerable, even after the American Civil War (1861–1865) and through the Reconstruction (1863–1877) and Jim Crow (1877–1950s) eras. The detection of African ancestry—usually by careful inspection and comparison of skin color—became a preoccupation of families and institutions (Jablonski, 2012a), and a source of psychological pain to individuals who could not “pass” as white and those who could (Broyard, 2007; Byrd & Gates Jr., 2011). Among the many sinister collateral effects of the widespread belief in the superiority of whiteness has been the development and continued prominence of colorism in many countries and among many different peoples. The belief that, within any nonwhite, non-European group a person with light colored skin is preferred to one with darker skin is common (Dixon & Telles, 2017; Hall, 1998; Hunter, 2007, 2013; Jablonski, 2012b; Norwood & Foreman, 2014; Russell et al., 1992).

In the mid- to later 19th century, skin color continued to be associated with classifications and definitions of human races, but it no longer took center stage. Cranial shape and size commanded more attention because these characteristics could be more directly connected with innate intellectual aptitudes (Morton, 1839; Nott & Gliddon, 1854). This trend continued in the decades immediately after the publication of Darwin's *Origin of Species* and the gradual rise of social Darwinism and eugenics in Europe and the U.S. (Bethencourt, 2013; Montagu, 1964; Smedley & Smedley, 2012; Stanton, 1960; Sussman, 2014). Skin color continued to be a marker of racial difference, but its importance in race science receded to being more of an indicator of a superior “pure race” or an inferior “mixed race” rather than a measure, in itself, of ability and potential. The ramifying, malign effects of allegories of racial purity (Segal, 1991) influenced world events and science catastrophically in the twentieth century and have been the focus of many noteworthy treatments (Bethencourt, 2013; Brace, 2005; Ehrlich & Feldman, 1969; Fuentes, 2012; Graves Jr., 2003; Littlefield et al., 1982; Nicosia & Huener, 2008; Sanjek, 1994; Shipman, 1994; Smedley & Smedley, 2005, 2012; Sussman, 2014; Wade, 2002; Wolpoff & Caspari, 1997).

After the Second World War, skin color featured in treatments of human races and the evolution of human physical diversity, primarily in being illustrative of presumed adaptations to different climates (Cole, 1965; Coon, 1965, 1982). Details of evolutionary mechanisms were few and far between, however, and calls for a new science of human diversity studies to counter continuing racism in the U.S. (Mead, 1968) did not yield significant results until decades later.

Racial classifications or “population group descriptions” along with race labels continue to be used by many governments in official contexts, including in the U.S., South Africa, Brazil, and elsewhere (Petruccioli, 2015; Revisions to the Standards for the Classification of Federal Data on Race and Ethnicity, 1997; Statistics South Africa, 2016). These designations are only slightly modified versions of the color-based race classifications and race labels widely used in the nineteenth century. Justification for the use of these classifications is usually framed in the context of compliance with civil rights reporting guidelines. Recognition of the shortcomings of racial classifications have resulted in the elimination or reduction in their use by some governments (Lieberman, 2001) and the devising of other methods to determine disease risk or degree of economic hardship. The use of official racial classifications for positive social and economic reasons has been widely discussed and debated (e.g., Harris & Lieberman, 2015; Maré, 2011; Prewitt, 2013), and will not be elaborated here. What is relevant in the context of this article, however, is the continued use of standardized racial classification in biomedical research in the U.S. and elsewhere, and the widespread use of older race names, especially “Caucasian,” in clinical care contexts and biomedical research. The American National Institutes of Health utilize a standard racial and ethnic classification (National Institutes of Health, 2015) that include the categories, “White,” and “Black,” among others. The continued use of racial classification and race names in biomedical research has been a focus of discussion in the literature (Bradby, 2012; Duster, 2005; Witzig, 1996). One of the most obvious problems caused by the use of these categories and terms is that it makes it extremely difficult for people to understand overlapping ranges of variation and functionally significant clines. Racial groupings mask, not reveal, patterns of human variation and obscure the biological and evolutionary reality of our species. Among the many other problems attendant with the use of racial classifications and race labels in scientific—especially biomedical—research, and medical practice are those surrounding the semantics and adverse psychological associations of race labels. Race terms evoke pejorative uses and negative associations even when these effects are unintended, making it difficult for clinicians, scientists, and members of the public to create data and understand results in a value-neutral context (Chaplin & Jablonski, 2020). Even more disturbing is the fact that these categories and names conjure and re-create outdated and fallacious racial stereotypes and hierarchies, often at subconscious levels, and affect the ways in which people—including scientific researchers—regard each other and their research subjects. These issues have been explored deeply by the social philosophers John Searle (1995) and Ian Hacking (1995, 2005, 2006), who have emphasized the power of language in framing reality and in influencing behavior, especially with

regard to race. The subtle influence of race categories and race names in organizing the knowledge infrastructure in the minds of scientists, including human geneticists, is now recognized (Bliss, 2012). This warrants attention and revisiting as a problem, not just as an intellectual phenomenon.

For those who think that race-thinking is not pervasive in modern science or that race labels have fallen into disuse, consider the fact that a PubMed search run in October 2020 yielded over 114,252 occurrences of “Caucasian” from 1971 to 2020 (Figure 2), with the years of peak occurrences (over 6000 per year) falling between 2011 and 2017. Many fields of biomedical research and of clinical medicine are the last redoubts of institutional use of “Caucasian,” along with “Caucasoid” (66,778 occurrences since 1971), “Negroid” (81,399 occurrences since 1971) and “Mongoloid” (72,542 occurrences since 1971). “Caucasian” is the most widely used common name for a color-based race and probably has been more widely retained in common parlance because labels affixed to the dominant group in society are considered normal, standard, and not disparaging.

Genetics and genomics have not yet provided answers to these trenchant questions, but they have pointed the way to a working resolution for the conduct of scientific, including biomedical, research. The clear description of the phenotypes of interest and, to the extent possible, an explication of how those phenotypes align with genetic markers and self-identification (Klimentidis et al., 2009; Parra et al., 2004) makes possible the beginning of the process of disentanglement of traits, genes, and race labels. This process is more time-consuming than current methods of self-identification and “eyeballing” in the doctor’s office (Braun et al., 2007), but the scientific results are more precise and predictive and the social outcomes are more desirable.

3 | SKIN COLOR WITHOUT RACE

Interest in the causes of differences in skin color between people have existed for centuries and preceded the development of formal classifications of people according to color. The association between strong sunlight and dark skin existed in antiquity (Snowden Jr., 1970) and became more formalized over the centuries during which the climatic theory of skin color developed, in tandem with the humoral theory of medicine (Jablonski, 2012b). Interests in understanding the scientific basis of skin color were driven by a desire to know the agents and structures responsible for color in the skin, especially those that caused black skin, and an interest in understanding the processes that caused skin to be darker or lighter. Of the many of seventeenth- and eighteenth-century scientists who undertook such studies, Samuel Stanhope Smith (1751–1819) warrants attention because of his interest in understanding the physical and physiological processes that created skin color. Like many of his predecessors and contemporaries, Smith believed that black bile was responsible for the blackness of skin, but where he differed from others was in his recognition that the differences in the intensity of the sun affected the expression of the black bile in the skin (Smith & Jordan, 1965).

Use of "Caucasian" in PubMed Articles

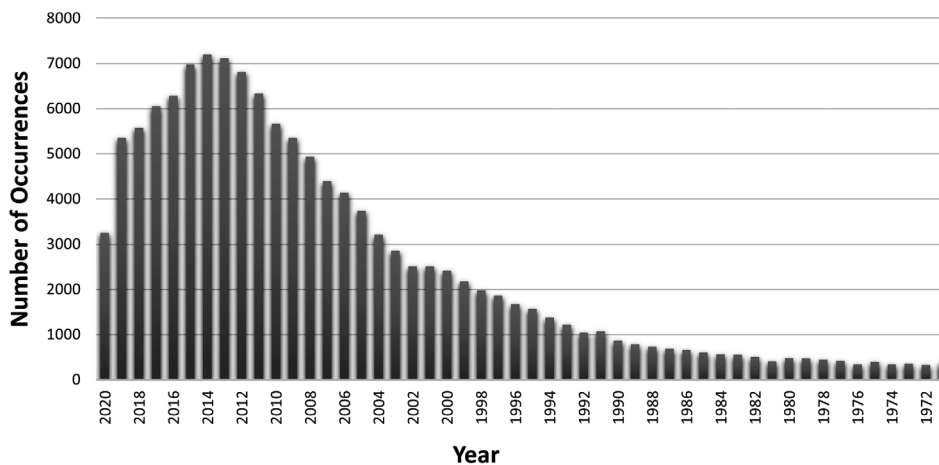


FIGURE 2 The number of occurrences of the word, “Caucasian,” in PubMed from 1971 to 2020 (as of 23 October 2020). The PubMed search engine accesses the MEDLINE database of references and abstracts in the life sciences and biomedicine. Since 1997, PubMed has been online and free to the public; records from 1971 to 1997, previously available on MEDLINE through institutional libraries, have been incorporated into the publicly available online database

Further, and more presciently, he noted that gradations of skin color were associated with gradations in the intensity of the sun and, latitude (Smith & Jordan, 1965). He observed that progressions of color were more noticeable in countries like China that spanned many degrees of latitude and where people had lived for thousands of years (Smith & Jordan, 1965).

“Race-free” studies of the evolution of human skin color diversity are relatively new. The history of these studies has been reviewed recently in treatments of different lengths and will not be repeated here (Jablonski, 2004, 2010, 2012a, 2012b; Jablonski & Chaplin, 2000). Among the most important developments in recent decades has been the integration of anatomical (including paleontological), physiological, climatological, and genetic evidence in the elucidation of the likely sequence of events in the evolution of skin color in the course of recent human dispersals. The intensity and seasonality of ultraviolet radiation is now understood to be the primary determinant of skin color variation throughout the peoples of the world (Chaplin, 2004; Chaplin & Jablonski, 2002; Jablonski, 2004; Jablonski & Chaplin, 2000, 2010). Discovery of the large number and diverse modes of action of “skin color genes” has been gratifying and surprising, with studies of the convergent evolution of similar skin colors under similar solar conditions being among the most important (Norton, 2008; Norton et al., 2007, 2016; Quillen et al., 2019). These studies and others have also demonstrated that skin color is, generally, not associated with other traits that have been used to characterize and classify human races. These findings lead to the conclusion that human skin color is not associated with other real or imagined racial traits.

4 | THE FUTURE

We are now in a position to understand the evolutionary and genetic mechanisms responsible for much of skin color variation in people. We also now clearly understand exactly when and how skin color was used in modern human history in the classification of people, in the

development of race concepts, and in the growth of color-based racism. These bodies of knowledge have been shared narrowly within academic circles for decades, but have, for the most part, not found themselves integrated usefully into general education. This can and should be done, and pilot programs aimed at doing this have received positive attention (Berg & Stanford, 2018; Wright et al., 2017; Wright et al., 2019).

The durable associations of skin color with behavior and human potential continue to adversely affect human societies in most countries. The eradication of color memes and racial templates is possible (Jablonski, 2012c; Maré, 2018), but can only be accomplished through a sustained, multi-generation commitment by government leaders worldwide to education of children about the nature of skin color and race in conjunction with the hard work of breaking down the structural legacies of racism in human communities. Such work demands enormous commitments of money and time, and relies on the creation of new vocabularies of human difference because the lexicon of human diversity is replete with descriptors that evoke pejorative associations while being bereft of useful and semantically neutral words (Chaplin & Jablonski, 2020). The role of natural and social scientists is to help explain how we got into this place, and to explore and explain the potential avenues to be followed to get out of it.

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CONFLICT OF INTEREST

The author declares no conflicting interests.

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