

BIOLOGICAL CONCEPTIONS OF RACE

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1 INTRODUCTION

Do human races exist or are human racial categories biologically meaningless?¹ Questions such as this one are part of a series of more general philosophical questions such as those that concern realism and classification in the natural sciences. What is the basis of an objective classification scheme within systematic biology? In what ways, if any, do systematists's conceptions of biological kinds deviate from traditional philosophical conceptions of natural kinds? To what extent, if any, is everyday language about biological kind terms characterized by the practice of semantic deference to science? To what extent should it be?

Questions about the biological reality, or lack thereof, of race are also thought to carry important social implications. Part of the reason is that belief in the biological reality of race has been (and sometimes still is) used in an effort to justify sociopolitical inequalities. Though the connection between biological realism and racism is a contingent one, it is generally assumed that the nonexistence of biological races is an important first step in arguments against racism.

There are at least two ways to approach questions about the biological reality, or lack thereof, of race. One way is to examine conceptions of race within systematic biology and to ask whether any can be applied, successfully, to humans. Another way is to examine common sense conceptions of race and to ask whether biology provides support for any such conceptions.² For the most part, this chapter takes the first approach. Yet it is important to note that these two approaches are not entirely distinct. Throughout the history of the term, common sense and biological conceptions of 'race' have developed side by side — each reinforcing and influencing the other [Banton and Harwood, 1975; Smedley, 1993; Gould, 1981; Appiah, 1996]. In addition it is generally agreed that scientific conceptions of race must overlap reasonably with common sense conceptions; otherwise, we are no longer talking about 'race' [Zack, 2002; Glasgow, 2003].

Historically, few scholars doubted the biological reality of race. There have been at least two prominent race concepts in systematic biology — namely, the

¹In this paper, I will use the expressions 'biologically objective', 'biologically real', and 'biologically significant' interchangeably. Though there are important differences in the meanings of these expressions, such differences will not be important for our purpose.

²For critical discussions of this type of approach see Mallon [forthcoming] and Haslanger [2005]. Both reject this semantic strategy in favor of pragmatic and normative approaches to understanding 'race'.

typological and the geographical concepts. Both have a long history and both have been used for defining human and nonhuman race. Today, however, the majority view is that human biological races don't exist. Nevertheless, a growing number of biologists, anthropologists, and philosophers accept the shortcomings of earlier biological definitions, but nonetheless maintain that human biological races might still exist.

2 THE TYPOLOGICAL RACE CONCEPT

The typological race concept represents one of the first comprehensive efforts to provide a biologically objective definition of 'race'. This concept has its roots in the philosophical doctrine of essentialism as well as pre-Darwinian ideas about the objective basis of systematic classification schemes. Essentialism is the idea that natural kinds ought to be individuated in terms of *kind-specific essences*. A 'kind-specific essence' can be roughly defined as a nonaccidental and intrinsic property (or set of such properties) that an object must have in order to be the kind of thing that it is. Such properties are supposed to be necessary and sufficient for kind-membership; they are also supposed to account for other properties typical of members of a kind. Take gold, for example. The essence of gold can be given by its atomic number. Being made of atoms that have atomic number 79 is a nonaccidental and intrinsic property possessed by all and only gold things. In addition, this property explains many other properties characteristic of gold such as its color and malleability.

Prior to the modern synthesis, it was generally agreed that essentialism is the right view to take about systematic classification [Hull, 1965; Mayr, 1942; 1959; Ereshefsky, 2001]. Naturalists used essentialism to define taxa at all levels in the taxonomic hierarchy. Its application to 'race' was no exception. As with any kind-specific essence, racial essences are supposed to be nonaccidental and intrinsic properties, possessed by all and only the members of a race, that account for many other properties typical of that race. In the case of humans, the essence of each race was assumed to be in the blood, melanin, or cranial shape and size [Banton and Harwood, 1975; Gould, 1981; Smedley, 1993].³ A contemporary essentialist might argue for genetic essences. Many essentialists also assumed that the members of a race are similar not only with respect to overt physical features (skin color, hair type, eye shape, etc.), but with respect to psychological and behavioral traits as well [Banton and Harwood, 1975; Gould, 1981; Appiah, 1996]. It is important to note, however, that racial typology would not be shown false if psychological and behavioral traits were found to be poor predictors of race membership.

The common sense corollary to the typological race concept is what Anthony Appiah [1996] has called 'racialism'. Racialism is the idea that humans can be

³Although racial typologists assumed the existence of race-specific essences, they were hard-pressed to find any property or set of properties that could meet all of the criteria demanded of essential properties. Defenders of typological conceptions of species faced a similar problem [Ereshefsky, 2001].

divided into a small number of racial groups such that all of the members of each share certain heritable characteristics (skin color, etc.) with one another that they do not share with the members of any other race. The main difference between racialism and racial typology is that, unlike racial typology, racialism *would* be shown false if psychological and behavioral traits were found to be poor predictors of race membership.

Throughout the late nineteenth and early twentieth centuries, racial typology and racialism developed side by side, each influencing and reinforcing the other [Banton and Harwood, 1975; Gould, 1981; Smedley, 1993; Appiah, 1996]. For example, in a set of instructions written for explorers on how to study indigenous peoples, George Cuvier assumed that the physical differences among different groups would explain their social and behavioral differences. Later he elaborated this idea by arguing that humans are naturally divided into three racial types, which can be arranged in an ascending scale from blacks to Asians to whites [Cuvier, 1812]. Similar ideas were held by other nineteenth century race scholars. S. G. Morton [1839; 1844; 1849], for example, argued for statistically significant differences in the cranial capacities among members of different races. He also maintained that these data establish a biologically based racial hierarchy. J. C. Nott and G. R. Gliddon advanced a similar argument in a book titled *Types of Mankind* [1854] as did Count Joseph Arthur Gobineau [1853-54] in his *Essay on the Inequality of Human Races*.⁴

The typological race concept was the received biological race concept for more than a century. Today, most scholars agree that it is mistaken. Yet, there is some confusion over the exact nature of the problem. A number of biological arguments have been offered to explain where the typological concept goes wrong. Some of these are better than others. In the remainder of this section, I will critically examine such arguments with the aim of isolating the better ones.

Some race scholars have adapted an argument that was originally developed against the typological species concept (i.e., the idea that species taxa ought to be defined in terms of species-specific essences) and have applied it to the typological race concept.⁵ Defenders of this argument maintain that racial typology is incompatible with contemporary evolutionary theory because the former supposes that races are static and unchanging while the latter supposes that races evolve [Montagu, 1941; Banton and Harwood, 1975; Goldberg, 1993; Smedley, 1993; Zack, 2002].⁶ The assumption at work here is that biological races, if they exist, are taxonomic categories. Hence they, like species, are supposed to be capable of evolving.

⁴See Banton and Harwood [1975], Smedley [1993], Gould [1981], and Appiah [1996] for more on the history of racial typology. See Mayr [1959], Hull [1965], and Sober [1980] for more on the influence of typological thinking in other areas of systematic biology.

⁵See, for example, Hull [1965].

⁶When discussing arguments against the biological reality of race, some scholars use double quotations around the term 'race' to indicate their belief that races are biologically unreal. In this chapter I will not follow this convention in part because many scholars who reject the biological reality of race nonetheless maintain that races are socially real (See, for example, [Sundstrom, 2002] and [Root, 2000]).

Racial typology, on the other hand, assumes that races are natural kinds defined according to essentialist criteria. Since such kinds are supposed to be immutable, defenders of this argument conclude that races cannot be types.

Although it is true that most nineteenth century typologists believed in the fixity of types, this assumption was not held by all typologists [Sober, 1980]. Both Aristotle and Linnaeus considered the possibility that a new species could arise as a result of cross-species hybridization. Likewise Cuvier, Smith, and Gobineau each defended the idea that all humans are the descendants of Adam and Eve and that races did not come into existence until after Adam's and Eve's initial creation [Banton and Harwood, 1975].⁷ Perhaps more importantly, there is no inconsistency in the idea that essentialism is compatible with change [Sober, 1980]. According to essentialism, natural kinds are eternal categories that individual objects occupy. While each natural kind has its own immutable essence, an individual can change with respect to its accidental properties and still be a member of the same natural kind. An individual can also change with respect to its kind-specific essence — but when it does, it ceases to be a member of that natural kind. Applying these ideas to race, a population belonging to one race can give rise to a population belonging to a different race — but when this occurs, the two populations are members of different natural kinds.

A second argument advanced against the typological race concept is the idea that races cannot be types because the boundaries among races are vague [Banton and Harwood, 1975; Zack, 2002; Appiah, 1996]. Defenders of this argument maintain that many of the phenotypic traits used to individuate races (e.g., skin color, hair type, bone structure, etc.) are clinal; they vary gradually across a geographic range. Clinal variation is assumed to pose a problem for racial typology because natural kinds are supposed to have sharp boundaries; they are not supposed to shade into one another.⁸

As a number of philosophers have argued, however, the requirement that there be precise boundaries between natural kinds is no longer viewed as tenable [Boyd, 1991; Sober, 1993; Pigliucci and Kaplan, 2003]. It is like demanding that there be a precise line of demarcation between baldness and having a full head of hair, or between being rich and being poor. That there are line drawing problems in these cases does not mean that the properties in question (wealth and baldness) are unreal. Likewise natural kinds defined according to essentialist criteria might be real, even if the boundaries among them are somewhat vague.

Some scholars have tried to discredit racial typology by appeal to Mendel's law of independent assortment [Montagu, 1941; Banton and Harwood, 1975; Appiah, 1996; Zack, 1997; 2002]. Independent assortment is the idea that genes are assorted independently in meiosis, unless they are tightly linked on the same chromosome. Defenders of this argument assume that racial essences, if they exist, are genetic properties. They also assume that races must breed true to type. That is, the members of a race must share a number of traits with one another that they do

⁷Racial differentiation was assumed to be the result of a series of natural catastrophes.

⁸For a parallel argument against species essentialism see [Hull, 1965].

not share with the members of any other race — and this collection of traits is supposed to be passed on faithfully in reproduction. Because many of the traits typically used to individuate races (skin color, bone structure, etc.) are multigenic and are most likely spread all over the human genome, independent assortment is thought to call into question the assumption that races breed true to type.

The central problem with this argument rests in the assumption that the genes for racial traits must be genetically linked in order for races to breed true to type. Races will breed true to type even when racial traits are independently assorted, provided that there is little outbreeding among racial groups. Inbreeding reduces heterozygosity in the gene pool, thus making it more likely that traits will be passed on faithfully and as a package in reproduction. Cultural factors and geographic separation are two factors that might contribute to reproductive isolation.

Other critics of racial typology argue that races cannot be types because the morphological traits typically used to individuate races (e.g., skin color, hair type, eye shape, etc.) are often clinal and discordant [Banton and Harwood, 1975; Appiah, 1996; Zack, 1997].⁹ Not only do many so-called racial traits vary gradually across a geographic region; they also vary independently. For example, a classification scheme based solely on skin color might fail to agree reasonably with one based solely on hair type — and both might fail to agree reasonably with one based solely on bone structure, and so forth. Critics of racial typology sometimes add that a similar problem can be found at the genetic level. Support for the latter claim comes from Lewontin [1972] who argues that there is more genetic variation within than among major racial groups (blacks, whites, and Asians). The conclusion that is frequently drawn is that racial typology is false because these data cast doubt upon the typological assumption that the members of a race have a cluster of properties in common that they do not share with members of other races.

While this argument against racial typology is an improvement over the previous one, it is still not fatal. As Sober has argued [1980], variation within and continuity among taxa need not pose a problem for typological definitions in systematic biology. By appeal to what Sober calls the ‘natural state model’, pre-Darwinian essentialists had a way of explaining nature’s diversity that is consistent with essentialism. According to this model, the members of a kind have a common natural state, determined by the kind-specific essence, but interfering forces often prevent individuals from realizing that state. In other words, essential properties can be thought of as dispositional properties that, when there are no interfering forces at work, have the propensity to manifest the traits typical of the members of a kind. By appeal to this model, then, a racial typologist can recognize significant variation within, and continuity among, races provided that there are discrete natural tendencies underlying this variation.

Not only does this reply reveal a problem with the previous argument, it also points to a better argument against racial typology. It is not variation *per se* that

⁹This argument combines some elements of the previous two arguments against racial typology but also differs from them in that it makes no assumption about the cause of clinal and discordant variation.

poses a problem for typological definitions in systematic biology; the problem is that, with the development of population biology, evolutionary theory no longer uses the natural state model to explain variation within and continuity among taxa [Sober, 1980]. To see why this is so, let us think about the model from the perspective of contemporary genetics. It is the idea that all of the members of a taxon (racial, specific, generic, etc.) share a common genetic essence that, in conjunction with its natural environment, results in the natural phenotype for that taxon. All other phenotypes are regarded as the result of interfering forces and all other environments are regarded as perturbations of the system. The problem is that the ideas of type and of deviation from type do not feature in contemporary evolutionary theory. Contemporary evolutionary theory does not distinguish between the natural phenotype for a given genotype and those that are the result of interference — nor does it identify a natural environment for a given genotype. Moreover, no particular genotype is privileged and viewed as essential for a taxon. Instead all genotypes and environments are treated as being on a par, and the phenotype of a given genotype is always described relative to an environment.

A further problem with typological definitions in systematic biology has been articulated by Michael Ghiselin [1974] and David Hull [1976; 1978]. Their arguments were originally advanced against the typological species concept, but can be generalized to show why typological definitions are problematic at any level in the taxonomic hierarchy. According to Ghiselin and Hull, natural kinds defined according to essentialist criteria are supposed to be spatiotemporally unrestricted classes. They are defined by appeal to purely qualitative properties possessed by all and only the members of a kind. As such, kind membership does not depend on spatiotemporal or causal relations among the members of a kind. Systematic categories, on the other hand, are best understood as spatiotemporally localized historical entities. Most systematic biologists, for example, define taxa (at least in part) in terms of the genealogical relations among organisms. Since genealogical relations are not purely qualitative, Ghiselin and Hull maintain that essentialism is the wrong view to take about biological classification.

It is important to stress that although essentialism was historically influential, not all conceptions of race (common sense or scientific) are essentialist in nature. With the development of contemporary evolutionary theory and the rise of population genetics, the typological race concept was replaced by a population concept of race. It is to this concept that I now turn.

3 THE GEOGRAPHICAL RACE CONCEPT

After the downfall of the typological race concept, biologists began defining ‘race’ geographically. According to the *geographical race concept*, a race is a geographically localized subdivision of a species that differs phenotypically and genetically from other conspecific populations [Mayr, 1942]. Several features of this definition are worth noting. First, a single geographical race typically comprises several

breeding populations, all of which are very similar. Yet, because there can be slight differences among the populations that make up a race, race membership must be defined with reference to many characters. There must also be statistically significant differences in the mean values of the traits used to define race membership. Second, as a general rule, geographical races are *allopatric populations*; they are populations that are separated from one another by a geographic barrier such as a mountain range, desert, or large body of water. When such populations remain reasonably isolated over time, geographic differentiation is likely to occur. Sometimes, however, geographical races are *sympatric populations* — viz., populations that share the same geographic range but are, in large part, reproductively isolated from other conspecific populations for some other reason. An example of sympatry can be found in some human populations, such as the Amish, that are largely reproductively isolated due to certain cultural and/or religious practices.

The geographical race concept has been used for defining both human and nonhuman race. In its application to humans, it was often assumed that the members of a race are similar to one another, and differ from the members of other races, with respect to certain observable characteristics (skin color, hair type, bone structure, etc.). It was also presumed that these traits are heritable and, thus, that there are average differences among the races at the genetic level as well [Dobzhansky, 1953; 1955; Garn, 1961; Coon, 1963]. In the early days of molecular genetics, researchers focused largely on differences in the distribution of blood types (e.g., ABO, Rh, MNS, and Rhesus, etc.) as a measure of underlying genetic differences. Though no group was exclusively of one blood type, biologists found average differences in the distribution of blood groups among human populations from diverse geographic regions. Because such populations are also observably different, a number of biologists and anthropologists took such data as providing support for the existence of human geographical races.

Before discussing some of the problems with the geographical concept, it is worth mentioning that it avoids many of the problems faced by the typological concept. One reason is that, unlike the typological concept, the geographical concept is a population concept. Geographical races are defined in terms of resemblance within and variation among populations, rather than in terms of properties possessed by the individuals that make up a race. A second reason is that, according to the typological concept, kinds are defined by properties possessed by all and only the members of a kind. Though the geographical concept also defines races in terms of shared properties, such properties need not be universal nor unique. As noted above, there must simply be statistically significant differences among the traits used to individuate geographical races. Third, the typological concept requires that the defining properties are intrinsic and explanatory. The geographical concept, on the other hand, simply defines races in terms of clusters of properties without assuming that such properties are due to a common intrinsic causal property (or set of such properties). Indeed, there is often an implicit assumption that external causal factors explain the clustering.

The geographical race concept was eventually abandoned for reasons originally

articulated by E. O. Wilson and W. L. Brown [1953]. Their arguments focused primarily on the use of this concept for defining nonhuman races, but (as we will see in the next section) critics of the biological significance of human race later applied these arguments to the human context. According to Wilson and Brown, the primary problem with the geographical race concept is that it assumes that geographical variation is typically concordant when, in fact, such variation is often discordant. Racial traits vary concordantly when each of the traits used to define a race yield the same or similar classification schemes. Concordance among a large number of traits is important when individuating geographical races because it indicates reliable covariation in the properties used to define a race. This, in turn, is taken as indirect evidence that the classification scheme is biologically significant.

According to Wilson and Brown, discordant variation has resulted in two problematic trends in systematic biology. As a general rule, discordance increases with an increase in the number of traits used to individuate a race. Consequently, some systematists began naming geographical races on the basis of a small number of traits — and, thus, were arbitrarily ignoring nonconforming characters. This is problematic because, without reliable covariation among a large number of traits, there is no reason to suppose that the resultant designations are biologically significant. Other taxonomists tried to circumvent the problems caused by discordant variation by naming races that are restricted to very small geographic areas. One problem, here, is that such designations result in an overly detailed classification scheme that is of limited use to the systematic biologist. A second difficulty is that, because the most concordant infraspecific units are frequently local breeding populations, the term ‘race’ becomes synonymous with ‘breeding population’ and, thus, loses its significance as a concept.

In addition to the problems discussed by Wilson and Brown, there is an underlying theoretical problem with the geographical race concept. The geographical concept is a phenetic concept [Andreasen, 2000]. Pheneticists define taxa in terms of the overall similarity of their members. Breeding populations are grouped into races based on phenotypic and genetic similarities; races are grouped into species by the same method, and so on up the taxonomic hierarchy. A central problem with pheneticism is that for any population or set of populations, there are frequently several competing patterns of similarity that could be used to define a taxon [Hull, 1970; Ridley, 1986; 1993; Sober, 1993]. Pheneticism in general, and the geographical race concept in particular, offers no nonarbitrary way of picking one similarity grouping as the correct one.

It is now widely agreed that both the typological and geographical race concepts are unacceptable. One might be tempted to conclude from their respective failures that human races are biologically unreal. Yet, such a conclusion would be too hasty. The arguments discussed above should be thought of as *local* arguments against the biological reality of both human and nonhuman race; each aims to show that some particular biological race concept is unacceptable. The arguments that I will discuss in the next section are, in a certain sense, more narrow. Each argues

for the nonexistence of *human* biological races. In a different sense, however, they are more *global*. Rather than focusing on a particular race concept, each aims to explain why *any* proposed biological definition of human race is doomed to failure.

4 GLOBAL ARGUMENTS AGAINST HUMAN BIOLOGICAL RACES

In this section I will present three global arguments against the biological reality of human race.¹⁰ I will call the first ‘the no subspecies argument’, the second ‘the independent variation argument’, and the third ‘Lewontin’s genetic argument’. These arguments have been extremely influential and are widely assumed to prove, unambiguously, that human races are biologically unreal. Yet, as we will soon see, these arguments are not as conclusive as people often suppose.

Let us begin with what I have called ‘the no subspecies argument’. Defenders of this argument aim to show that human races are biologically unreal by establishing that there is no respectable race concept in systematic biology [Livingstone, 1964; Gould, 1977; Futuyma, 1986]. This argument starts with the assumption that the term ‘race’ is synonymous with the taxonomic term ‘subspecies’. Human races, for example, are subspecies of *Homo sapiens*. Next, it is argued that the subspecies concept has been discredited in systematic biology. After the downfall of the typological and geographical concepts, many systematists simply gave up the practice of dividing species into subspecies. One reason is that some began to worry that the subspecies concept is misleading. On their view, it suggests discrete units of variation when, in reality, infraspecific variation is often clinal and discordant. A second reason is that there are other ways of studying variation below the species level — and, thus, some have argued that the subspecies concept is superfluous. Proponents of this argument conclude that if there is no legitimate subspecies concept in systematic biology, then there is no legitimate basis for the everyday practice of dividing humans into biological races.

The central problem with this argument is that the subspecies concept has not been fully abandoned in systematic biology [Kitcher, 1999; Pigliucci and Kaplan, 2003; Andreasen, 2004; Gannett, 2004].¹¹ After the downfall of the typological and geographical concepts, some systematists began defining subspecies *phylogenetically* — as distinct evolutionary lineages within a species [Templeton, 1999; Shaffer and McKnight, 1996; Legge *et al.*, 1996; Miththapala, 1996].¹² As we

¹⁰The distinction between global and local arguments against the biological reality of race is not frequently made in the race literature. Indeed, sometimes an author draws a global conclusion from a local argument. For these reasons, I have reconstructed some of the arguments that I will present in this section.

¹¹An important difference between Gannett, on the one hand, and Kitcher, Andreasen, and Pigliucci and Kaplan, on the other, is that Gannett rejects the biological reality of human race whereas Kitcher, Andreasen, and Pigliucci and Kaplan suggest that human biological races might exist (or might have once existed).

¹²Although Templeton allows for the possibility that subspecies might be defined phylogenetically, he denies that *human* races can be defined in this way. Part of the reason is that he believes that there is, and always has been, too much outbreeding among human populations for

will seen in the next section, a number of different phylogenetic conceptions have been offered. What is important for our purpose, however, is that they all differ from the typological and geographical concepts by requiring that races be distinct evolutionary lineages. Others, especially plant systematists, turned their attention to an *ecological* subspecies concept [King and Stansfield, 1990; Stone *et al.*, 2001; Vincente *et al.*, 2001].¹³ On this view, races are infraspecific groups that have become genotypically, and often phenotypically, differentiated as a result of differential selection pressures from different local environments. This concept is similar to the geographical race concept in that it defines races, at least in part, as phenotypically and/or genotypically distinct populations. Yet, unlike the geographical concept, the ecological concept allows that races can be defined on the basis of very few characteristics [Pigliucci and Kaplan, 2003]. A further difference is that the ecological concept does not require geographic localization. It simply requires phenotypic and/or genetic differentiation that is due to a common selective regime. Not only is it possible for similar ecotypic characteristics to evolve independently in distinct geographic locations; it is also possible for two or more distinct ecological races to coexist in the same geographic location. I will have more to say about each concept below. What is important for now is that, in order for the ‘no subspecies argument’ to be successful, one would need to argue that the phylogenetic and ecological race concepts have been — or ought to be — discredited.

Defenders of the second and third global arguments, by and large, aim to show that there can be no adequate biological definition of human race by arguing that biology lends no support to common sense conceptions of race. An implicit assumption at work, here, is that any biological race concept, were it to deviate too far from common sense, is not really a concept of ‘race’. One difficulty that must be addressed, however, is that the term ‘race’ often gets used in a number of different, sometimes conflicting, ways in everyday discourse [Smedley, 1993; Omi and Winant, 1994; Wright, 1994]. Critics of the biological race concept are aware of this problem but argue that, in spite of the differences, there are certain core elements common to all or most common sense conceptions of human race [Root, 2001; 2003; Zack, 2002; Keita and Kittles, 1997].^{14,15} Two such elements

phylogenetic races to exist.

¹³According to Pigliucci and Kaplan [2003], some systematists combine these concepts and, thus, define subspecies ecologically and phylogenetically.

¹⁴Hardimon [2003] also makes this assumption, but does not use it to argue against the biological reality of human race. His aim is simply to characterize what he takes to be the everyday notion of race. Likewise Hirschfeld [1996] as well as Machery and Faucher [forthcoming] make this assumption in the context of their discussion of the possibility that such elements are due to some universal aspect of human cognition. Like Hardimon, however, they do not use this as part of an argument against the biological reality of human race.

¹⁵It is unclear whether, and to what extent, defenders of this type of argument take these elements to be universal across cultures and historical periods. On the one hand, race constructionists often maintain that there is a diversity of race concepts that covary with cultural and historical differences. On the other hand, defenders of this type of argument rarely relativize their claims to a specific time or place.

will be important for understanding the arguments in this section. First it is often said that common sense demands that races be defined, at least in part, in terms of clusters of directly observable properties — and, in particular, that there be reasonable continuity within, and significant difference among, the races with respect to such properties [Root, 2001; 2003; Zack, 2002; Keita and Kittles, 1997; Keita *et al.*, 2004]. Although there is some disagreement over which properties are supposed to be the defining ones, skin color is frequently taken to be central. Other traits such as hair type, eye shape, and bone structure are often included as well. Second, it is often said that common sense requires that such features be heritable and, thus, that the members of a race be reasonably genetically similar to one another and significantly genetically different from the members of other races [Lewontin, 1972; Root, 2001; 2003; Zack, 2002; Keita and Kittles, 1997; Keita *et al.*, 2004].

With these ideas in the background, I will now present ‘the independent variation argument’. This argument takes its lead from Wilson’s and Brown’s main objection to the geographical race concept. Recall that, according to Wilson and Brown, the geographical concept is problematic because it assumes that phenotypic variation is often discrete when, in fact, it is typically discordant. Analogously, critics of biological conceptions of human race sometimes argue that it is not possible to provide a biologically respectable definition of human race because biology lends no support to the common sense idea that races ought to be defined in terms of clusters of covarying observable characteristics. On the contrary, it is argued, most of the traits typically used to individuate races vary independently. The idea at work here is that a classification scheme based on skin color, for example, might cross-classify one based on hair type — and both might disagree with one based on eye shape (etc.). Because this problem is said to be compounded as more traits are added to the classification scheme, defenders of this type of argument conclude that human races are biologically unreal [Diamond, 1994; American Anthropological Association, 1998; Root, 2001; 2003; Zack, 2002].

Some philosophers have argued, however, that the above argument places too much emphasis on the idea that races ought to be defined in terms of clusters of overt physical features [Andreasen, 1998; 2000; Kitcher, 1999]. Biologists and philosophers have known for some time that overall similarity, although sometimes useful, can be misleading as a method for uncovering a stable classification scheme [Goodman, 1978; Ridley, 1986; 1993; Hull, 1970; 1998]. In addition, the assumption that races must form discrete phenotypic clusters is an implicit demand for essentialism [Pigliucci and Kaplan, 2003; Sesardic, 2003]. For these reasons, it is not clear that we ought to hold biology to this particular common sense belief. Furthermore, discordance among overt physical features may not, in fact, be a violation of common sense. Independent variation is a matter of degree — and presumably common sense allows for some discordance among overt physical features. Of course, a defender of the independent variation might respond that there is *too much* discordance, and thus too much deviation from common sense,

for human races to be biologically real. However, it is hard to know how much discordance is too much, and little effort has been taken to address this question.

The final global argument that I will discuss was originally advanced by Richard Lewontin [1972], but has been repeated many times since its original formulation [American Anthropological Association, 1998; Root, 2001; 2003; Zack, 2002; Keita *et al.*, 2004]. This argument parallels the independent variation argument, but does so at the genetic level. It is the idea that biology lends no support to the common sense assumption that for races to be biologically real there must be significant genetic similarity within, and significant genetic difference among, the major racial groups. Defenders of this argument maintain that genetic studies reveal that there is more genetic variation within than among major racial groups. Lewontin [1972, 396], for example, states: “The mean proportion of the total species diversity that is contained within populations is 85.4% . . . Less than 15% of all human genetic diversity is accounted for by differences between human groups! Moreover, the differences between populations within a race accounts for an additional 8.3%, so that only 6.3% is accounted for by racial classification.”¹⁶ Other geneticists have reported similar findings, and though the numbers are somewhat different, the overall pattern is said to be the same.

Anthony Edwards [2003] has provided an interesting and often overlooked challenge to Lewontin’s argument. Edwards’ objection can be broken into two parts. The first aims to establish that Lewontin’s analysis of his data, although fine for some purposes, is not the right sort of analysis for addressing questions about classification. Lewontin examined the relative frequency of 17 polymorphic proteins in 7 populations (Caucasian, African, Mongoloid, S. Asian Aborigines, Amerins, Oceanians, Australian Aborigines) and bases his argument on a locus-by-locus analysis of these data. He, thus, overlooks (or ignores) the fact that gene correlations provide information in addition to gene frequencies. This is problematic, according to Edwards, because it is often the correlation structure of the data that enables the discovery of a stable classification scheme. Edwards concludes that Lewontin’s argument is circular. By relying on gene frequencies alone, he ignores the structural aspects of his data and then concludes that these data possess no such structure. The second part of Edwards’ argument aims to establish that once the right type of analysis is applied, there is likely to be more genetic differentiation among human populations than is commonly supposed. This goes beyond the purely methodological point discussed above.

So far we have seen some problems specific to each global argument. In addition to these, there are at least two problems shared by the second and third global arguments. Both of these problems turn on the shared background assumption that it is possible to prove the nonexistence of human biological races by showing that biology lends little support to certain core features of everyday conceptions of race. The first problem is that the question of what everyday folk mean by

¹⁶For the purpose of this study, Lewontin identified the seven racial groups listed above. However, elsewhere [1984] he argues that the results are robust and hold up no matter how races are defined.

race is an empirical question. Empirical data can come from a number of different sources — including historical uses of the term, references to ‘race’ in governmental documents, psychological studies on how people think about race, sociological surveys, and so forth.¹⁷ Yet defenders of the second and third global arguments often simply stipulate the features that they take to be central to common sense, without providing empirical support for their claims.¹⁸ Without such support, however, it is hard to know why we should assume that the core features specified above are so central that failure to meet them constitutes a global argument against the biological reality of human race. Indeed, because the term ‘race’ has taken on a number of different meanings throughout history, we should not overlook the possibility that there is no single set of core features possessed by all or most common sense conceptions of race.¹⁹ It is not implausible to suggest, for example, that a number of different ideas have been dominant in different cultures and/or different historical periods without there being any single feature or set of features shared by all or most everyday conceptions of race.

A second difficulty is that it is not clear that we should practice complete semantic deference to “the” everyday notion of race. Let us suppose for the sake of argument that the two “core” elements specified above form an important part of the everyday race concept. Let us also suppose that these assumptions are biologically unjustified. What conclusion should one draw, if both of these claims are true? Defenders of Lewontin’s genetic argument and the independent variation argument suggest that we ought to conclude that races are biologically unreal. But why should we accept this conclusion? Suppose that one were to find a biologically significant conception of race that deviates somewhat from the features specified above. Why not say that there is a biologically respectable definition of ‘race’ that deviates somewhat from common sense [Andreasen, 1998; 2000; 2005; Pigliucci and Kaplan, 2003]? In response to this type of question, some have argued that such a conception would not count as a concept of ‘race’ because it deviates too far from everyday uses of the term [Zack, 2002; Glasgow, 2003]. I will briefly respond to this worry in the next section. For now, let me make a different point. If there are core elements common to most everyday notions of race, the two elements specified above need not be the only ones. Common ancestry and/or geographic location, for example, have also been cited as central features of the everyday race concept [Hardimon, 2003; Root, 2001; 2003]. It is possible, therefore, that there is a biologically respectable definition of ‘race’ that agrees with these features, even if such a definition disagrees with the features specified above.

¹⁷See, for example, Gould [1981]; Smedley [1993]; Wright [1994; 1995]; Appiah [1996]; Hirschfeld [1996]; Hirschman [2000]; Machery and Faucher [forthcoming].

¹⁸Examples include Root [2001; 2003], Zack [2002], and Hardimon [2003], though Hardimon does not take a stance on the biological reality of race.

¹⁹See Hirschfeld [1996] and Machery and Faucher [forthcoming] for the opposing idea that there is a universal cognitive mechanism that explains certain patterns in everyday reasoning about race.

5 ECOLOGICAL AND PHYLOGENETIC CONCEPTIONS OF RACE

The three global arguments discussed in the previous section have been highly influential and have played an important role in establishing what many take to be the received view about race — viz., that human races are biologically unreal. As we have just seen, however, not everyone takes them to be decisive. Indeed, doubt about their success has led some philosophers and biologists to revisit the question of the biological reality of human race and to ultimately argue for what they take to be improved biological conceptions of race.

As noted earlier, two types of accounts have been offered — one ecological and another phylogenetic. Let us recall that ecological conceptions of race typically define races as subspecific groups composed of individuals who are phenotypically and genetically similar to one another due to a common selective regime. Phylogenetic conceptions, on the other hand, define races in part as lineages of reasonably reproductively isolated breeding populations. I will discuss these views in more detail momentarily. For now, I would like to note that such accounts are often taken to be improvements over their predecessors, in part, because they are relatively minimalist in comparison with previous biological conceptions. For example, each calls into question the racist assumption that knowledge of a person's race allows one to make inferences about the psychological and behavioral traits that she is likely to possess.²⁰ Second, each abandons the idea that races must form discrete genotypic and/or phenotypic clusters for races to be biologically real. Consequently, each allows that human biological races might exist despite the empirical findings typically cited against the biological reality of human race.²¹ In what follows, I will discuss a number of difficulties that the ecological race concept must address. I will then defend phylogenetic conceptions of human race against three important objections.²²

The ecological race concept, as well as its application to humans, has recently been endorsed Massimo Pigliucci and Jonathan Kaplan [2003]. Like the geographical race concept, the ecological race concept defines a race, in part, as a group of individuals who have a number of phenotypic and genetic similarities in common. Yet, as noted earlier, there are also a number of important differences. The ecological race concept requires that the similarities and differences used to individuate races be *adaptive* similarities and differences, whereas the geographical race concept has no such requirement. Second, the geographical concept requires that race membership be defined with reference to many characteristics. Pigliucci and Kaplan, however, allow that ecological races can be named on the basis

²⁰Pigliucci and Kaplan [2003] are more willing than either Kitcher [1999] or Andreasen [1998; 2004] to acknowledge the possibility that knowledge of a person's race might allow one to make inferences about her psychological and behavioral traits.

²¹See Pigliucci and Kaplan [2003] and Andreasen [2004] for more developed discussions of this point.

²²For more detailed defenses of phylogenetic conceptions of race, see Andreasen [1998; 2000; 2004; 2005], Kitcher [1998], and Risch *et al.* [2002].

of very few characteristics.²³ Third, geographical races are typically allopatric populations, while ecotypic races will often be sympatric. Not only can distinct ecological races coexist in the same geographic region, similar ecotypes can and do evolve independently in diverse geographic locations.

To further enhance our understanding of the ecological race concept, let us briefly examine how it differs from phylogenetic conceptions of race. The main difference between phylogenetic conceptions of race and the ecological race concept is that the former require that races be lineages of human breeding populations, while the latter has no such a requirement. Indeed, Pigliucci and Kaplan maintain that different ecologically important traits may sometimes vary independently. Thus, on their view, it is possible for a single breeding population to belong to different ecological races. In addition, Pigliucci and Kaplan argue that ecotypic races can exist despite significant gene flow — so long as the forces of selection are sufficient to maintain the genetic differences that cause the different adaptive phenotypes. This difference, according to Pigliucci and Kaplan, is one the main advantages that the ecological race concept has over phylogenetic conceptions of race. Against the phylogenetic conceptions of race, it is sometimes argued that races cannot be lineages because there is, and always has been, too much gene flow among human populations for human phylogenetic races to exist. I will discuss this objection, as well as some responses to it, in more detail below. For now it is important to note that, according to Pigliucci and Kaplan, the ecological race concept avoids this difficulty because ecological races need not be phylogenetic units.

Though Pigliucci and Kaplan present little data in support of their view (a point that I will return to momentarily), they do provide a couple of suggestive examples that illustrate its application to humans. They maintain, for example, that skin color is an ecologically significant trait and, thus, implicitly suggest that there are ecological races associated with skin color differences (and possibly other adaptive phenotypes as well).²⁴ They also discuss the possibility that there might be ecotypic races associated with regional differences in physiology and, hence, athletic ability. For example, West African populations produce more world-class sprinters, on average, than other populations from around the world. Likewise, Kenyan populations produce more successful marathon runners, on average, than other populations from around the world. Pigliucci and Kaplan [2003, 1167] hold that if such regional differences in the production of top athletes reflect regional differences in physiology — and if such differences are adaptations to different local environments — then there would “indeed be races associated with athletic ability”.

The above examples are both intuitive and appealing. Nonetheless, there are a number of problems that need to be addressed before one could reasonably conclude that human races are ecotypes. The first problem is one that I alluded to

²³It is unclear from what they say whether this is a widely held view about ecotypes.

²⁴It is unclear, given what Pigliucci and Kaplan say, whether skin color alone is sufficient to designate ecotypic races.

earlier — namely, there is little empirical support for the application of this concept to humans. The idea that human races are ecotypes is a conceptual possibility and making note of this fact is, in and of itself, a valuable contribution to the race debate. Nonetheless Pigliucci and Kaplan make a stronger claim — i.e., that human ecotypic races exist — but provide no data and few examples to support their view.

Second, the suggestion that human races and human ecotypes are one and the same requires argument. On the surface, at least, these concepts are importantly different. Part of the reason is that the two terms — ‘race’ and ‘ecotype’ — are typically used somewhat differently in common sense. As Pigliucci and Kaplan themselves argue, human ecotypes need not (and often will not) correspond with folk racial categories. Folk racial categories are often said to be based, at least in part, on ancestral geographic origins. For example, a person who is classified as ‘black’ is frequently assumed to have African ancestral origins. Yet, according to Pigliucci and Kaplan, a classification system based (in part) on geographic origins need not, and often will not, correspond with one based on adaptive phenotypes alone. On their view, not only is it possible for the same or similar ecotypic traits to evolve independently in different geographic locations — thus allowing for sameness of race across diverse geographic regions — it is also possible for different ecological races to evolve in the same geographic location. A second reason why there might be an extensional mismatch between common sense conceptions of race and the ecological race concept stems from the widely held assumption that common sense conceptions of race require concordant variation in racial phenotypes. (It is this assumption that is at work in the argument that I have called ‘the independent variation argument’.) Pigliucci and Kaplan, however, argue that independent variation is not a problem for their view. In fact they argue that, due to independent variation in adaptive phenotypes, a single population can belong to more than one ecotypic race.

Perhaps in partial response to this type of worry, Pigliucci and Kaplan maintain that their account is not “completely orthogonal to folk conceptions of race” [2003, 1166]. However, they fail to explain why they think that this is so — and, because they provide no data and few examples of human ecotypic races, it is hard to know exactly what they have in mind. Furthermore, they are not consistent on this point. Sometimes they maintain that human ecotypic races are “not completely original” to folk conceptions of race — but at other times they maintain ecotypic races have “little or nothing in common with folk races” so much so that they suggest that we avoid the term ‘race’ altogether [2003, 1161-2].

Of course, one need not hold science hostage to common sense. Regardless of how the terms are used in everyday discourse, one might argue that the terms ‘race’ and ‘ecotype’ *should* be treated as synonymous, if they are used interchangeably in most scientific contexts. The problem, however, is that these terms are not always used interchangeably in science — especially when talking about human race. While it is true that these terms are sometimes used interchangeably in some branches of systematics — for example, some systematists identify ecological

subspecies in plants and insects — this is not how scientists in general typically think of human race. By and large biologists and anthropologists — whether they defend or deny the biological reality of human race — have either assumed one of three types of definitions. They have either assumed that human races ought to be defined by appeal to race-specific essences, that they ought to be defined as groups of geographically localized individuals with a number of phenotypic and genetic properties in common, or that they ought to be defined, at least in part, as lineages. As we have already seen, Pigliucci and Kaplan maintain that their account is importantly different from each of these conceptions of race. These factors, taken in conjunction with the worries expressed above about the relation between ‘race’ and ‘ecotype’ in everyday discourse, leaves them open to the demand for an explanation as to why one ought to suppose that human races are ecotypes.

A final difficulty with Pigliucci’s and Kaplan’s ecological race concept is that it lacks development. Although there are certainly adaptive differences among distinct human populations, it is not clear when and under what conditions such differences constitute different ecotypic races. Does each adaptive difference constitute its own racial division, or do only certain adaptive differences — or certain sets of adaptive differences — count? Since ancestry and geographic location are two ideas commonly associated with race, one might be tempted to rely on these factors in an effort to explain which adaptations are the racial ones. Yet, because Pigliucci and Kaplan argue that there is and always has been too much gene flow for human races to be distinct lineages, they cannot use phylogeny to answer this question. Likewise, due to some of the ways in which their account differs from the geographical race concept, they cannot rely on geographic location for an answer. To further complicate matters, let us recall that Pigliucci and Kaplan maintain that human ecotypic races can, and often will, deviate significantly from folk racial categories. This statement, in conjunction with their claim that that ecotypic races can be named on the basis of very few characteristics, leaves the reader wondering how many ecological races there are and which groups constitute ecological races. In fact, when one recalls that a single population can belong to more than one ecotypic race, it appears that the number of races could be very large indeed. At the extreme, it is possible that each individual or population could belong to its own ecotypic race — thus trivializing the concept of race.

I have just discussed several issues that must be addressed before one can reasonably conclude that human ecotypic races exist. Let us now turn to some phylogenetic conceptions of race. Recall that although there are a number of different phylogenetic conceptions of race, all of them assume that races ought to be defined, at least in part, as reasonably reproductively isolated breeding populations. Robin Andreasen [1998; 2000; 2004; 2005] and Philip Kitcher [1999] have independently defended somewhat different phylogenetic conceptions of race. After briefly discussing each, I will defend both against some of the central objections advanced against the idea that races are phylogenetic units.

Andreasen has advanced and defended a view that she calls ‘the cladistic race concept’. Cladistics is a branch of systematic biology that, with reference to a well-

confirmed branching structure, defines taxa solely in terms of common ancestry. Cladistic classification was originally developed by Willi Hennig [1966] for defining higher taxa. On his view, higher taxa are monophyletic groups (groups composed of an ancestor and all of its descendants) of well-defined species.²⁵ Andreasen argues that, on the assumption that it is possible to represent human evolution as a branching process, cladistic classification can be adapted for defining race. Cladistic races would, thus, be monophyletic groups of reasonably reproductively isolated breeding populations.²⁶

Next, Andreasen argues that some support for the existence of human cladistic races can be found in current work in human evolution. In particular, a number of different research groups have proposed branching diagrams that aim to represent human evolutionary history — i.e., patterns of migration and subsequent geographic isolation among human breeding populations.²⁷ Andreasen maintains that, assuming that such diagrams are (or can be) empirically well-supported, they suggest that the condition of reasonable reproductive isolation has been met in the distant past. This, in turn, suggests on her view that human cladistic races once existed. Yet, because Andreasen also speculates that it is unlikely that the condition of reasonable reproductive isolation is being met today, she concludes that human races are most likely on their way out.

Like Andreasen, Kitcher [1999] argues that races ought to be defined phylogenetically. On his view, races are founder populations and inbred lineages that have become differentiated (phenotypically or genetically) in the absence of reproductive contact. The idea at work, here, is that racial divisions begin with the division of a species into founder populations, possibly due to migration or some other form of geographic separation. Over time, and with limited interbreeding among geographically separated populations, phenotypic and genetic differentiation is likely to occur. Kitcher argues that such differentiation can be used for individuating races — provided that when previously separated populations are brought back together, there is enough reproductive isolation to sustain the distinctive phenotypic or genetic properties that mark the races. One way for this to occur in humans is if previously separated populations develop certain cultural barriers to outbreeding.

In defense of the application of his view to humans, Kitcher argues that data on the geographical history of human populations suggest that, in the distant past, there was most likely sufficient geographical separation and reasonable re-

²⁵It is important not to confuse cladistic classification with cladistic methods of phylogenetic inference [Sober, 1993]. Doing so will result in a number of faulty arguments against the cladistic race concept (see, for example, [Zack, 2002]).

²⁶There is, of course, some ambiguity in the idea of reasonable reproductive isolation. Part of the reason is that, as members of the same species, all humans can interbreed. Nonetheless there can still be significant reproductive isolation among human groups — either due to sociocultural barriers or due to geographic isolation. See Kitcher [1999] for further development of the concept of reproductive isolation and its relation to racial classification.

²⁷See, for example, Nei and Roychoudhury [1972; 1974; 1982; 1993]; Vigilant *et al.*, [1991]; Wilson and Cann [1992]; Cavalli-Sforza *et al.*, [1994]; Risch [2002], Bamshad and Olson [2003].

productive isolation among human breeding populations. In addition to these data, Kitcher also relies on data on the rates of interracial relationships and reproduction in the United States today. While admitting that such data are limited, Kitcher argues that those data that do exist suggest that there is still reasonable reproductive isolation among human breeding populations today. Thus, he tentatively concludes that some biologically significant races exist in the United States today.²⁸

Let us compare and contrast the cladistic race concept with Kitcher's conception of race. Both accounts define races historically — i.e., as lineages of reasonably reproductively isolated breeding populations. Yet, on the cladistic account, genealogy alone is sufficient for defining race, whereas Kitcher's model treats genealogy as a necessary, but not sufficient, condition. In addition to genealogical differentiation, his model also requires that (A) there be some phenotypic or genetic distinctness among distinct races, and that (B) the residual mixed race populations be relatively small. Second, because the cladistic account requires that races be monophyletic groups, a population must be reproductively isolated over a significant portion of evolutionary history before it can be designated a cladistic race. Kitcher's account, on the other hand, does not require monophyly. On his view, races may sometimes be historical (diachronic) lineages, but sometimes we may want to recognize nondimensional races — viz., “groups at a particular place at a particular time that are not exchanging genes at substantial rates” [1999, 243]. Third, Andreasen and Kitcher provide different kinds of support for their views. For the most part, Kitcher uses data on the rates of interbreeding among major racial groups in the U.S. today. Andreasen, on the other hand, uses current work in human evolution. This leads to a fourth, and perhaps the most important, difference between the two views. Kitcher is more optimistic than Andreasen about the existence of human races today.

As noted earlier, one of the primary objections to phylogenetic conceptions of human race is that there is, and always has been, too much gene flow among human breeding populations for distinct lineages to have evolved [Wolpoff *et al.*, 1988; Wolpoff, 1989; Thorne and Wolpoff, 1992; Templeton, 1999]. For example, one way of understanding the genetic data cited by Lewontin and others (in what I have called ‘Lewontin's genetic argument’) is to see it as support for the claim that human populations were never been reasonably reproductively isolated over a significant portion of evolutionary history. Pigliucci and Kaplan [2003, 1164-1165] summarize this position well:

The current distribution of genetic variation within *H. sapiens* implies that at no time in the past were any of the (currently extant portions of the) population evolving independently. While the *Homo* genus very likely generated incipient species during its history, none of these currently survive. The evolution of contemporary *Homo sapiens* was likely *not* marked by populations that at one time had independent evolu-

²⁸The racial groupings that Kitcher has in mind are blacks, whites, and Asians.

tionary trajectories but exist today as part of the larger population.

Though this objection applies to Kitcher's account as well as to the cladistic account, one might argue that it is particularly problematic for the cladistic race concept. One reason why cladistic classification is typically applied at or above the species level is because monophyly requires evolutionary branching without reticulation. Since significant gene flow prevents branching, it would thus impede the formation of cladistic races [Zack, 2002; Gannett, 2004].

This is probably the strongest objection to phylogenetic conceptions of human race — yet, it is not fatal. Part of the reason is that, as noted above, there is some disagreement over the significance of Lewontin's data. Edwards [2003], for example, questions Lewontin's analysis of his data on the grounds that it fails to take gene correlations into consideration. In addition, he adds that once gene correlations are taken into consideration, it is possible to derive a convincing branching diagram of human evolutionary history. Like Edwards, many other human geneticists accept Lewontin's analysis of his data, but nonetheless maintain that the allele frequencies differences that exist are highly structured and are useful for identifying distinct lineages [Prichard *et al.*, 2000; Risch, 2002; Rosenberg, 2002; Bamshad *et al.*, 2003]. Taking a different (but consistent) approach, Andreasen [1998] has suggested another reading of Lewontin's data. On her view, the data are consistent with the possibility that, while there may be significant outbreeding today, there was once enough reproductive isolation for distinct lineages to have evolved. Indeed, this is the main reason why she suggest the possibility that human races once existed, but are now anastomosing.

That being said, I would like to add that Andreasen and Kitcher each maintain that their thesis is best understood as a conditional claim: If there is, or has been, reasonable reproductive isolation among human breeding populations, then it is possible to provide a biologically significant definition of human race. Both are aware of competing models of human evolution — such as the trellis model or the multiregional evolution hypothesis — which assume that there is, and always has been, too much gene flow among human populations for phylogenetic differentiation to have occurred [Wolpoff *et al.*, 1988; Wolpoff, 1989; Thorne and Wolpoff, 1992; Templeton, 1999]. Furthermore, both acknowledge that if such a model were to be empirically vindicated, then human races don't exist and never have existed.

A second objection to phylogenetic conceptions of race has been advanced by Lisa Gannett [2004]. Gannett's objection has three-parts.²⁹ Her main concern is that the branching diagrams (constructed by defenders of candelabra models of human evolution) upon which phylogenetic conceptions rest are not empirically well supported. They are not empirically well supported, on her view, because they lack independent confirmation that the breeding populations used in tree

²⁹ Gannett's objection focuses largely on the cladistic race concept, but since much of what she says applies to other phylogenetic conceptions as well, I will present her objection as being more general.

reconstruction “have not simply been imposed on evolutionary history”. Citing Alan Templeton, a defender of the trellis model of human evolution, she suggests that defenders of candelabra models have overstepped their bounds and that they have merely *assumed* that human evolution takes the form of a branching diagram.³⁰ Templeton states [1999, 639]: “The computer programs used to generate “trees” from genetic distance data will do so regardless of what evolutionary factors generated the distances. It is therefore the obligation of the users of such programs to ensure that the genetic distance data have the properties of treeness before representing their data as a tree”. To this Gannett adds that by defining races and breeding populations in terms of relations among groups, rather than among individuals, there is further encouragement for assuming “the property of treeness”. Finally, she maintains that Andreasen has ignored the warnings of feminist epistemologists that scientific investigation is inherently value-laden and that theory construction and confirmation cannot be free from bias. She concludes, therefore, that there are good reasons to question the objectivity of the branching diagrams upon which the cladistic race concept rests. Thus, on her view [2004, 324], the cladistic race concept — and by extension other phylogenetic conceptions of race as well — constitutes “an illegitimate biological reification of race”.³¹

Let me begin by responding to Gannett’s worry that a branching pattern has been imposed on evolutionary history and that there is little support for the assumption of treeness. First, it is important to note that Templeton’s objection applies only to phylogenetic trees constructed using genetic distance based methods. Since other methods of inferring population structure exist, his argument is somewhat limited in scope. Using model-based methods, for example, Noah Rosenberg *et al.* [2002, 2382] and others [Prichard *et al.*, 2000; Mountain *et al.*, 1997] have argued that analysis of individual multilocus genotypes permits researchers to infer ancestry without relying on information about sampling locations of individuals. Rosenberg and his colleagues tested the correspondence of predefined populations (defined, for example, on the basis of culture or geography) with groups that have been inferred from individual multilocus genotypes. They used a computer algorithm that clusters individuals with distinctive allele frequencies. Clusters were made blind, meaning that genetic data were fed into the computer without including information about the populations from which these data came. Rosenberg, *et al.* found a general agreement between predefined populations and those that were inferred from individual multilocus genotypes.

³⁰According to this trellis model, there has always been significant gene flow among human evolutionary history. Thus, defenders of this model deny that human evolution takes the form of a branching diagram.

³¹In addition to this three-part objection, Gannett maintains that the cladistic concept ignores racial admixture. This is a misrepresentation of the Andreasen’s view — since she holds that distinct lineages once existed, but that human are now anastomosing. Another misrepresentation occurs when Gannett describes the cladistic concept as a static conception of race. Andreasen clearly states that races are dynamic categories. Finally, Gannett refers to the cladistic concept as a “false typology”. Although she states that she does not have essentialism in mind, the use of the term ‘typology’ is politically charged and misleading.

In response to Gannett's other two worries — viz., her conceptual worry that defining races in terms of groups encourages the assumption of treeness as well as her worry that ideological bias is at work — I would simply like to note that an empirical argument is needed in both cases. Take the ideological claim, for example. One would need to demonstrate *empirically* that bias plays a significant role in the confirmation of human phylogenies and that there is too much bias for such theories to be objective. It would also need to be shown that the bias is due to the goal of advancing some political agenda.³² Indeed, though most philosophers of science agree that science is a social process, there are important differences of opinion among philosophers of science (feminist and non-feminist) about the extent to which ideological bias is filtered out in the process of confirmation.³³

Related to her charge of bias, Gannett also claims [2004, 331] that Andreasen's account "is problematic in its maintenance of rigid dichotomies between science and society, facts and values, nature and culture, and the biological and the social". Such dichotomies are problematic on her view because they leave "no room to inquire about ways in which biological and social forces interact in the structuring of human groups". I disagree with Gannett on this point. Indeed, as Kitcher [1999] has argued, social and cultural factors can produce one mode of reasonable reproductive isolation. As for endorsing rigid dichotomies, the only dichotomies that Andreasen is committed to are ones between certain biological conceptions of race and some social constructionist conceptions and ones between certain sociological questions asked by some social constructions and certain biological questions asked by some human evolutionists. This does not entail, however, that there is no room to inquire about the role of the social.

The final objection to phylogenetic conceptions of race that I would like to discuss allows for the possibility that distinct lineages exist, or once existed, within *Homo sapiens*. Defenders of this objection maintain that such lineages are not races, however, because they deviate too far from common sense conceptions of race [Zack, 2002; Glasgow, 2003]. Joshua Glasgow [2003] has provided the most detailed formulation of this objection. Glasgow focuses primarily on the cladistic concept, because he thinks it suffers the most difficulties, but also argues that Kitcher's view suffers similar difficulties.

Glasgow argues that there is significant extensional disagreement between the cladistic concept and common sense conceptions of race. For example, he asserts that the number of races recognized by the cladistic concept, which he assumes is nine, exceeds the number recognized in common sense. While admitting some disagreement within common sense, he holds that rarely does the number exceed five. Glasgow also reminds the reader that the cladistic concept raises the possibility that 'Asian' may not be a cladistic race — and, thus, that the cladistic concept cross-classifies common sense racial groupings. Next, Glasgow argues that there is significant intensional disagreement between common sense and the cladistic

³²I am, here, employing an argument originally discussed by Sober [1993] in reference to the charge that sociobiology is ideological.

³³For more on this issue, see Longino [1990] as well as the *Monist*, volume 77, 1994.

race concept. The main problem, here, is that skin color (and often other overt features as well) is (are) often an inextricable part of common sense conceptions of race. Yet, according to Glasgow, the cladistic concept treats overt morphology as irrelevant to race because it defines races in terms of genealogy alone. After considering and rejecting the possibility of semantic deference to science over the meaning of 'race', Glasgow concludes that cladistic races are not really 'races'.

Andreasen [2005] responds to Glasgow in part by arguing that he tells a selective story about the meaning of 'race'. She adds that once we examine a fuller picture, we see more overlap — both intensional and extensional — between the cladistic concept and common sense than Glasgow allows. She adds that because Glasgow allows that minor revisions in meaning are allowable, this is sufficient to show that the cladistic race concept is legitimately a theory about 'race'. Nonetheless, because she acknowledges that some divergence between the cladistic concept and common sense is possible, she argue that some cross-classification is not a problem for the cladistic view. Part of the reason is that differing folk conceptions of race sometimes cross-classify on another as well.³⁴

Ultimately, the disagreement between Glasgow and Andreasen is over how to settle the meaning of purported natural kind terms when scientists and everyday folk disagree. With respect to 'race', Glasgow defends the authority of common sense and argues that scientists are not the arbiters of the meaning of 'race'. Andreasen [2000; 2004; 2005] argues, on the other hand, that one need not reject the cladistic concept because it deviates somewhat from common sense. She uses the causal theory of reference as well as examples from the history of science to support her point. Yet she also raises the possibility that there might be two somewhat divergent meanings of 'race' — one folk, the other scientific — that coexist in relative harmony.

6 CONCLUSION

When addressing questions about the biological reality, or lack thereof, of race, it is often assumed that scientists have shown, conclusively, that races are biologically unreal. I hope to have shown, however, that the answer to this question is not as straightforward as many make it seem. Not only are many of the arguments against the biological reality of human race problematic, there are a number of newer biological conceptions that are not addressed by the standard arguments against the biological reality of race. Of these, phylogenetic conceptions appear to be the most promising.

³⁴See Atran [1990] and Dupré [1993] for a similar point about other types of biological categories.

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