3 HOW TO BE A BIOLOGICAL RACIAL REALIST

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3.1. Introduction

"There's an echogenic intracardiac focus (EIF) on the ultrasound image." That is what I heard during the second trimester ultrasound exam for the mother of my first child. Those are not words that any parent wants to hear. An EIF is a small bright spot on an ultrasound image that represents a calcification in the heart of a fetus. The scary thing about spotting an EIF is that EIF is correlated with having a fetus with an abnormal number of chromosomes in all or some of its cells, a state called 'aneuploidy' in medical jargon. Furthermore, aneuploidy usually (but not always) causes a genetic disorder in the child. For instance, a fetus with an extra chromosome 21 in all of its cells (a state called 'trisomy 21') usually develops Down Syndrome.[1] Other genetic disorders that arise from aneuploidy are Patau Syndrome (caused by trisomy 13), Edwards Syndrome (caused by trisomy 18), and Turner Syndrome (caused by monosomy X).[2]

The next step after spotting an EIF is to assess whether the chance of having an aneuploidal fetus is high enough to warrant doing an amniocentesis, which is a procedure where amniotic fluid is extracted from the mother and the fetal cells are tested for aneuploidy. But an amniocentesis is not risk-free. Doing an amniocentesis during the second trimester will result in a miscarriage in 2.5% of instances for women 20–34 years old (Papantoniou et al.

1. However, there are benign aneuploidies. For instance, a fetus with trisomy 21 in some of its cells instead of all of them will develop "mosaic Down Syndrome," which is benign if few enough cells are affected.

2. A person has *monosomy X* just in case she has one X chromosome and no other sex chromosome in all of her non-reproductive cells.

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2001, 1055). So, an amniocentesis is inadvisable if the chance of having an aneuploidal fetus is lower than the chance of having a miscarriage from an amniocentesis. Here is where things got interesting. Our risk assessment was very short. The obstetrician said, "I wouldn't recommend an amniocentesis because she's Asian. EIF is a common occurrence for Asian mothers."

While I was delighted to hear the recommendation, I was also skeptical. How good was our obstetrician's reasoning? In particular, was she justified in using *race* as a relevant factor in her risk assessment? After all, what we are trying to do is assess the risk of aneuploidy in a fetus, and aneuploidy is a purely biological condition. What does that have to do with the mother's race? So I did some research. It turns out that T. D. Shipp et al. (2000) conducted a landmark study on whether there are racial differences in EIF frequencies among expectant mothers, and whether any such differences (if they exist) are caused by racial differences in having an aneuploidal fetus among expectant mothers.

Shipp et al. (2000, 461) divided mothers into Asian, Black, White, and Unknown. Next, the authors found that the EIF rates for Asian, Black, White, and Unknown mothers were 30.4%, 5.9%, 10.5%, and 11.1%, respectively, but that only one fetus had aneuploidy and it was from a White mother (Shipp et al. 2000, 461).[3] Given the sample sizes for each race, it follows that the average EIF rate for the sample was 12.1%, which is much lower than the 30.4% seen in Asian mothers.[4] Furthermore, using the definition of a conditional probability, a frequentist interpretation of the probability of an event, and the results from this study, it follows that the probability of having an aneuploidal fetus given that an EIF is observed on the mother's second trimester ultrasound image (call it '$\Pr\{\textit{Aneuploidy} \mid \textit{EIF}\}$') is 1 out of 59, or $\approx 1.7\%$, and that the probability of having an aneuploidal fetus given that an EIF is observed on an Asian mother's second trimester ultrasound image (call it '$\Pr\{\text{Aneuploidy} \mid \text{EIF} \cap \text{Asian}\}$') is less than or equal to 1 out of 14 ($\leq 7.1\%$).[5]

3. The fetus had monosomy X in some, but not all, of its non-reproductive cells and was diagnosed with mosaic Turner Syndrome.

4. Shipp et al. (2000, 461) sampled 46, 34, 400, and 9 mothers from the Asian, Black, White, and Unknown races, respectively.

5. I say "less than or equal to" instead of "less than" here because Shipp et al. were unable to follow up with one of the Asian mothers to determine whether her child had aneuploidy. See Shipp et al. (2000, 461).

Furthermore, these probabilities are not unique to Shipp et al. (2000). S. H. Tran et al. (2005) did a follow-up study on 7,480 mothers and found that $\Pr\{\text{Aneuploidy}|\text{EIF}\} = {}^{9}\!/_{309}$ $(\approx 2.9\%)$ and $\Pr\{\text{Aneuploidy}|\text{EIF} \cap \text{Asian}\} = {}^{3}\!/_{83}$ $(\approx 3.6\%)$. While Tran et al.'s $\Pr\{\text{Aneuploidy}|\text{EIF}\}$ value is slightly higher than Shipp et al.'s,[6] their $\Pr\{\text{Aneuploidy} \mid \text{EIF} \cap \text{Asian}\}$ values and the pattern that the race of the mother matters are consistent with Shipp et al.'s study.

Given that research, two things became clear to me. First, the probabilistic reasoning of our obstetrician was flawed. While our obstetrician was correct that EIF is a more common occurrence for Asian mothers compared to mothers overall, the latter is because aneuploidal fetuses are more common in Asian mothers! Moreover, it takes a large sample of expectant mothers to see that. Second, our obstetrician was correct that race matters in calculating the risk of having an aneuploidal fetus. So, I did a calculation of my own using the $\Pr\{\text{Aneuploidy}|\text{EIF} \cap \text{Asian}\}$ value from Tran et al. (2005) and determined that an amniocentesis was unwarranted, and not because of a miscarriage risk, but because of the test's false-positive rate for detecting aneuploidy!

Stories like the preceding raise the interesting philosophical question of whether race is biologically real. While I—as a concerned parent—interpreted the research as showing that race matters in medical genetics, many medical scholars would discourage such an interpretation. For instance, Michael Yudell et al. (2016, 564–565) have argued that "racial classifications do not make sense in terms of genetics," and, thus, to use race as an indicator of human genetic diversity in any way is "problematic at best and harmful at worst." In truth, there are three routes that one can take to explain the higher occurrence of aneuploidal fetuses in Asian mothers in the medical studies I discussed.

One route is to look for a purely biological explanation, such as differences in medically relevant allele frequencies between Asian mothers and mothers of other races.[7] Another route is to look for a purely social explanation. For

6. This might be explained by the fact that 57% of the mothers in Tran et al. sample were 35 or older, which is itself a risk factor for having an aneuploidal fetus. See Tran et al. (2005, 159).

7. For instance, one could look at the alleles that affect spindle checkpoint. *Spindle checkpoint* is a series of checks during gametogenesis that reduce the probability of chromosomal nondisjunction (the most frequent cause of aneuploidy) (May and Hardwick 2006).

instance, neither Shipp et al. (2000) nor Tran et al. (2005) report the average age of Asian mothers in their samples. Since we know that a woman's risk of having an aneuploidal fetus increases with age, the reason why Asian mothers in these studies displayed a higher risk for having an aneuploidal fetus might have been because they were, on average, getting pregnant at a much later age than mothers of all other races. Yet a third route is to look for a biosocial explanation. For instance, Shannon Sullivan (2013) has highlighted how epigenetic processes—such as inheritable DNA methylation acquired from diet, pollution, or stress—can explain some racial disparities in health.[8] So, that could be what is happening in this case.

Hence, we have an interesting and unsettled philosophical question about whether (and, if so, how) race matters in calculating someone's risk for being born with a genetic disorder. Furthermore, answering that question encourages a position on the biological reality of race.[9] If you think that race is not biologically real, then it probably would not make sense to you to include race in a calculation of someone's risk for developing a genetic disorder. For instance, people who think that race does not exist or that race is wholly socially real and not at all biologically real would be baffled by such a risk assessment. However, if you think that race is biologically real, then whether race is relevant in such calculations is a sensible question to ask. Of course, there are other good reasons for asking whether race is biologically real, but its relevance to medical genetics is sufficient to warrant philosophical attention.[10]

What does the question "Is race biologically real?" mean? Well, first, I want to engage with my coauthors, and second, I want to engage with people in the medical profession struggling with whether race should be used in genetic disorder risk assessments and in other ways relevant to medical genetics. Since both groups are interested, to some extent, in 'race' as it is used

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8. An *epigenetic* process is any inheritable process in an organism that alters its gene activity without altering its genetic sequence (Weinhold 2006, A163). There are three paradigm examples of epigenetic processes: histone acetylation (which causes DNA to unwrap itself from histones, making genes available for expression), DNA methylation (which involves methylation at the cytosine bases in front of a gene, thus preventing that gene's expression), and mRNA silencing from microRNA (which is when non-protein-coding RNA halts gene expression by deactivating protein-coding RNA).

9. I say "encourages" instead of "presupposes" because it is possible for something to not be biologically real but to be a reliable indicator for something that is biologically real.

10. In fact, my personal interest in whether race is biologically real came from reading *The Bell Curve* and wondering whether the authors were confused when they posited a "genetic component" to the average IQ score differences among Blacks, Whites, and East Asians (Herrnstein and Murray 1996, 299).

to classify people in current, ordinary American English, that is the way I will understand 'race' in the question.[11]

For instance, in Joshua Glasgow's *A Theory of Race*, he explicitly states that he is interested in what 'race' means according to "competent English speakers in the United States" (Glasgow 2009, 3). He also focuses on "contemporary mainstream discourse" in that linguistic group (Glasgow 2009, 8). Also, in Sally Haslanger's *Resisting Reality,* she states that she is interested in the "single or dominant public meaning (or folk concept) of 'race' " as it is used among "competent users of English" (Haslanger 2012, 304). While Haslanger does not limit her focus to American English speakers, she is certainly interested in how people are "currently racialized in the United States" (Haslanger 2012, 308).

Finally, in Chike Jeffers's "The Cultural Theory of Race," he assumes a combination of Paul Taylor's and Michael Hardimon's definitions for 'race' (Jeffers 2013, footnote 62). Furthermore, Taylor (2013, 20) is upfront about his primary interest in "contemporary US conceptions of race" and its "English" roots. Also, Hardimon (2017, 27) has recently clarified that his focus is "ordinary uses of the English word 'race' and its cognates."

As for engaging with people in the medical profession, there are certainly many medical scientists and healthcare providers who do not care about how 'race' is used in American English. However, many of them do. For instance, both Neil Risch et al. (2002, 5) and Esteban Burchard et al. (2003, 1171) have argued that the racial scheme used on the "2000 US Census" is relevant to studying and treating human genetic diseases.

But there is a second ambiguity lurking here, namely, what I mean by a "biologically real" entity. All I will say right now is that I intend to use the term 'biologically real entity' in a way that adequately captures all of the entities that are used in empirically successful biology (e.g., the monophyletic group, the TYRP1 gene, the hypothalamus, etc.) and that adequately rules out all of the entities that are not (e.g., the monobaramin, the feeble-mindedness gene, the destructiveness organ, etc.).[12] However, I will offer a

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11. For the rest of this chapter and Chapter 7, I will drop the phrase "to classify people" when talking about 'race' usage in current and ordinary American English. Instead, I'll just presuppose that the usage of 'race' in this context is about classifying people. I'll also stop modifying the noun 'American English' with "current" and "ordinary" as well for the rest of this chapter and Chapter 7, and, instead, I will just presuppose these modifiers when I talk about American English.

12. The monobaramin is the fundamental unit of classification in baraminology, which is a creation-science version of taxonomy. See Wood (2006, 151) for its definition. The

particular conception of a biologically real entity when I defend my answer to the question of interest. So, for clarity, the question I will answer is whether race is biologically real, and, more specifically, whether race—in any way that 'race' is used in American English—is real in the same way as entities like the monophyletic group, the TYRP1 gene, and the hypothalamus. My answer to this question is a highly qualified 'yes.'

3.2. OMB Race Talk as a US Race Talk

Suppose a *race talk* is a discourse that uses 'race' (or a synonym) to classify people into subgroups. Suppose the subgroups picked out in a race talk are *races* and the names of races are *race terms.* Also, for ease of discussion, I will call any race talk that occurs in American English a *US race talk.*[13] While this jargon is new, I consider it to be a thinner version of Taylor's (2013, 28) "race-talk." According to Taylor (2013, 16–18), a race-talk is any discourse that utilizes "race thinking," and race thinking is "a way of assigning generic meaning to human bodies and bloodlines," by which he means the activity of drawing "distant" inferences about a group of people from "bodily appearance and ancestry." While I like Taylor's definition of 'race-talk,' we will soon see why it is too thick to capture the diverse ways in which groups of people are called 'races' in American English.

One US race talk that is widely used by current Americans is *OMB race talk.* OMB race talk is any race talk that uses the meaning of 'race' that's currently adopted by the Office of Management and Budget (OMB), which is the largest office in the executive branch of the US government. Also, by 'currently adopted' I mean the race talk that the OMB endorses on the date that I'm writing this chapter, not the race talk that the OMB happens to endorse when this chapter is being read. In OMB race talk, the races are American Indians, Asians, Blacks, Pacific Islanders, and Whites. Hispanics are not a race in OMB race talk, but rather, are an ethnicity composed of people from

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feeble-mindedness gene is a fictional gene that was often referred to by eugenicists. For example, see Davenport (1917, 365). The destructiveness organ is a fictional organ in animal brains that was believed to exist by phrenologists. See Combe (1853, 256–276) for a discussion of this organ.

13. Note that I am using 'US race talk' differently here than how I used it in Spencer (2014). In Spencer (2014, 1026), I used 'US race talk' to name the race talk that has the widest-used meaning of 'race' in the US that is also used by a majority of US citizens.

Table 3.1 The OMB's "Definitions" for Each of Its Races According to Federal Register Document 97-28653

American Indian or Alaska Native—A person having origins in any of the original peoples of North and South America (including Central America) and who maintains tribal affiliation or community attachment.
Asian—A person having origins in any of the original peoples of the Far East, Southeast Asia, or the Indian subcontinent including, for example, Cambodia, China, India, Japan, Korea, Malaysia, Pakistan, the Philippine Islands, Thailand, and Vietnam.
Black or African American—A person having origins in any of the black racial groups of Africa.
Native Hawaiian or Other Pacific Islander—A person having origins in any of the original peoples of Hawaii, Guam, Samoa, or other Pacific Islands.
White—A person having origins in any of the original peoples of Europe, the Middle East, or North Africa.

multiple races.[14] Furthermore, according to the OMB, people can belong to more than one race at a time. In Table 3.1, I have listed what the OMB calls its "definitions" for each of its race terms according to the federal register document where the OMB introduces its racial scheme; a document called "97-28653."

OMB race talk usually occurs in formal communication among Americans and usually involves one or more persons self-reporting their race(s) to another party. For example, it is not uncommon for Americans to engage in OMB race talk when applying to college, applying for a job, applying for a mortgage loan, applying for a birth certificate, filling out a health provider survey, filling out a child-care registration request form, or so forth. See the following figures for some evidence.

Figure 3.1 is a screenshot of the race and ethnicity questions on the 2016 college application for Penn State. Figure 3.2 is a screenshot of the race and ethnicity question on the 2016 registration request form for a child-care center in Pennsylvania. Figure 3.3 is a screenshot of the race and ethnicity questions on a 2016 Starbucks' job application for a barista position.

14. While 'Latino' is a synonym for 'Hispanic' in OMB race talk, I will primarily use 'Hispanic' to talk about Hispanics in this chapter.

8 Racial/ethnic background

Is your ethnicity Hispanic/Latino (Cuban, Mexican, Puerto Rican, South or Central American, or other Spanish culture of origin)?

☐ Yes ☐ No

What is your race? (Select all that apply.)

☐ White
☐ Black or African American
☐ Asian
☐ American Indian or Alaska Native
☐ Native Hawaiian or other Pacific Islander

FIGURE 3.1. Question 8 on Pennsylvania State University's 2016 undergraduate application.

Part 6. Participant's ethnic and racial identities (optional)

Mark one ethnic Identity:	Mark one or more racial Identities:	
☐ Hispanic or Latino	☐ Asian	☐ American Indian or Alaska Native
☐ Not Hispanic or Latino	☐ White	☐ Native Hawaiian or Other Pacific Islander
	☐ Black or African American	

FIGURE 3.2. The race and ethnicity questions on Today's Child Learning Centers' 2016 child-care registration request form.

The OMB began regulating race talk among federal agencies in 1977 with the introduction of Directive No. 15, which is a statistical policy directive that requires any federal agency in the United States that uses race talk in official business to classify people into races in a way that is translatable into OMB's racial scheme. From the Department of Education to the Centers for Disease Control and Prevention, all federal agencies in the United States must follow Directive No. 15.[15]

15. Incidentally, Directive No. 15 is one reason why the OMB's racial scheme is used outside of the US government. For instance, because the US Department of Education (USDE) has to comply with Directive No. 15, it requires all educational institutions that receive USDE funding to use OMB's racial scheme when reporting racial and ethnic data to the USDE. This is why many American colleges and universities use OMB's racial scheme on their college applications. See document E7-20613 in the federal register.

Are you Hispanic or Latino? (A person of Cuban, Mexican, Puerto Rican, South or Central American, or other Spanish culture origin, regardless of race)

- ○ Yes
- ◉ No
- ○ I do not wish to provide this information

Race:

- ○ American Indian or Alaska Native – A person having origins in any of the original peoples of North and South America (including Central America), and who maintain tribal affiliation or community attachment.
- ○ Asian – A person having origins In any of the original peoples of the Far East, Southeast Asia, or the Indian Subcontinent, including, for example, Cambodia, China, India, Japan, Korea, Malaysia, Pakistan, the Philippine Islands, Thailand, and Vietnam.
- ◉ Black or African American – A person having origins in any of the black racial groups of Africa.
- ○ Native Hawaiian or Other Pacific Islander – A person having origins in *any* of the peoples of Hawaii, Guam, Samoa, or other Pacific Islands.
- ○ White – A person having origins In any of the original peoples of Europe, the Middle East, or North Africa.
- ○ Two or More Races – A person who identifies with two or more race/ethnic categories named above.
- ○ I do not wish to provide this information.

FIGURE 3.3. The race and ethnicity questions on Starbucks' 2016 job application for a barista position.

In 1997, the OMB revised its race talk to include only the five races that it uses today. In that revision, the OMB clarified that the purpose of Directive No. 15 is, first, "to provide consistent data on race and ethnicity throughout the Federal Government," and second, "to enforce civil rights laws" (OMB 1997, 58782). Also, the OMB (1997, 58782) said that it revised its race talk in 1997 in order to deal with concerns about its 1977 race talk as being outdated due to a significant rise in "immigration" and "interracial marriages" in the United States since 1977. To deal with these concerns, the OMB included the people indigenous to Central and South America in its American Indian race (e.g., Maya, Pima, Quechua, etc.), recognized Asians and Pacific Islanders as two distinct races, dropped its Asian or Pacific Islander race, and allowed people to be a member of more than one race.

Despite the empirical support that I have provided for the claim that OMB race talk is a US race talk, this claim is not uncontroversial. For instance, someone might object to OMB race talk as being an *ordinary* race talk. Since a US race talk must be an ordinary race talk (given how I have defined it), the objection would imply that OMB race talk is not a US race talk. Perhaps the motivation for such an objection is that in order to be an ordinary race talk, it is not sufficient to be a race talk that occurs

in ordinary discourse (which is how I have defined it in the preceding). Rather, the race talk must be "how ordinary people conceive of race," which may differ from how a group of "experts" conceive of race (Glasgow 2009, 48).

This is a good concern. It is important to distinguish between ordinary race talk and "specialist" race talk among experts because, first, the two can harbor different meanings of 'race,' and second, I am interested in exploring ordinary race talk in this chapter (Glasgow 2009, 48). Furthermore, OMB race talk is a specialist race talk. It is the default race talk that agencies in the US government use. With that said, I am not convinced that we should limit what an ordinary race talk is to only those race talks that embody "how ordinary people conceive of race," and that is because it assumes that ordinary race talk does not partake in a linguistic division of labor.

Notice that limiting what an ordinary race talk is to what ordinary people conceive about race implicitly assumes that ordinary people are the correct people to consult to find out the meaning of the terms they are using. Sometimes the latter is not a bad assumption. For instance, most English-speaking Americans should be able to define 'foot' (the unit of measurement), at least in terms of inches. However, the latter assumption is false for a large portion of terms used by ordinary people. In cases where

(3.1) ordinary speakers intend a term `t` to refer,
(3.2) ordinary speakers intend `t` to refer to the same object that a group of experts on `t` intends `t` to refer to, but
(3.3) ordinary speakers do not know or do not agree on what `t` means

it turns out that the meaning of `t` is whatever that group of experts means by `t`. The fact that some terms used by ordinary speakers have a meaning determined by a group of experts was first recognized by Hilary Putnam (1973, 704), and he called this sociolinguistic phenomenon a "division of linguistic labor." For example, consider the term 'DNA' in American English.

The term satisfies (3.1) because Americans do not use 'DNA' as if it is a term with no referent, like, say, 'unicorn.' Americans also talk about DNA with an intention to talk about the same stuff as biochemists, geneticists, and other scientists who are experts on DNA, thus satisfying (3.2). However, most Americans do not know what DNA is. For instance, if you think that DNA is just the genetic material of living things, you're wrong. For one, the genetic material of all living things on earth used to

be RNA.[16] But also, it is possible for something to be a strand of DNA without ever having played the role of being genetic material (e.g., DNA synthesized in a lab). Rather, biochemists, geneticists, and other DNA experts define 'DNA' as 'a polymer of deoxyribonucleotides' (Stryer 1995, 75–76).

While it is true that some terms used in ordinary discourse seem to be involved in a division of linguistic labor but are not actually involved in a division of linguistic labor,[17] there is no reliable way to know which ones are and which ones are not without empirical investigation. So, as long as it is *possible* that terms used in ordinary discourse (including 'race') are involved in a linguistic division of labor, we should not require ordinary race talk to be "how ordinary people conceive of race" (Glasgow 2009, 49). Rather, we should define ordinary race talk as race talk used in ordinary discourse, and pay attention to "how ordinary people conceive of race" in an ordinary race talk only after ruling out the possibility that 'race' is involved in a division of linguistic labor. However, one interesting fact about OMB race talk is that it *is* involved in a division of linguistic labor.

3.3. The Meanings of 'Race' and Race Terms in OMB Race Talk

Remember that Putnam's conditions for a term t having a meaning that is determined by a group of experts on t, call it 'e,' are as follows: (3.1) ordinary speakers intend t to refer, (3.2) ordinary speakers intend t to refer to the same object that e intends t to refer to, and (3.3) ordinary speakers do not know or do not agree on what t means. It turns out that 'race' and race terms in OMB race talk satisfy (3.1)–(3.3), and here is why.

First, some solid evidence that American English speakers intend 'race' and race terms to refer in OMB race talk is that the overwhelming majority of Americans self-report one or more race when queried for their race in that race talk. For example, on the 2010 US Census questionnaire, there were 299.7 million respondents, and a whopping 93.8% self-reported one or more OMB race, while just 6.2% reported "Some Other Race" (Humes et al. 2011,

16. This is known as *the RNA world hypothesis*, and it was independently invented by Francis Crick, Leslie Orgel, and Carl Woese in the late 1960s. See Robertson and Joyce (2012) for a discussion of the hypothesis.

17. For some examples, see Dupré (1981, 74–75).

4). That statistic would be hard to explain if American English speakers did not intend 'race' and race terms to refer in OMB race talk.

Next, there are strange patterns in how American English speakers self-report their OMB race that would be hard to explain if (3.2) were not true for 'race' and race terms in OMB race talk. First, on the 2000 US Census questionnaire—which is the most recent one that collected data on Arab ancestry—80–97% of Arab Americans self-reported 'White' (de la Cruz and Brittingham 2003, 8). This result might seem strange, but it is not strange if Arab Americans intend to use 'White' (in OMB race talk) in the same way that the OMB uses it. After all, in OMB race talk, White is not a narrow group limited to Europeans, European Americans, and the like. Rather, White is a broad group that includes Arabs, Persians, Jews, and other ethnic groups originating from the Middle East and North Africa.

Second, on the 2010 US Census questionnaire, the majority of Hispanic Americans self-reported in a way that corresponded to their primary ancestry in three continental groups.[18] The most populous Hispanic American national origin groups are Mexicans (58.7%), Puerto Ricans (15.1%), Cubans (3.3%), Salvadorians (3.0%), and Dominicans (2.7%).[19] Furthermore, we know from genetic studies that Cuban Americans, Puerto Rican Americans, Dominican Americans, and Mexican Americans have, on average, 73%, 62%, 50%, and 47% "Caucasian" ancestry, respectively (Manichaikul et al. 2012, 4).[20] Moreover, what is interesting here is that the average Caucasian ancestry of a Hispanic American national origin group nicely correlates with the proportion of that group that self-reports 'White' alone in OMB race talk.

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18. Actually, the correct term to use here is 'genomic ancestry.' I will explain why later. Also, the continental groups I'm referencing are "Caucasian, African, and Native American" (Manichaikul et al. 2012, 1). Finally, I'm looking at how Hispanic Americans' racial self-reporting correlates with their primary ancestry in these three continental groups because just looking at racial self-reporting for Hispanic Americans as a group is likely to be misleading (due to confounding), and it's plausible to think that Hispanic Americans' racial self-reporting is correlated to this particular kind of ancestry.

19. These are all of the Hispanic national origin groups that composed $\geq 2.5\%$ of total Hispanic Americans according to 2010 US Census data, including Puerto Rican residents. See Ennis et al. (2011, 14) and USCB (2010).

20. The estimate for Salvadorian Americans is missing because they have not yet been singled out in genetic studies of Hispanic Americans. Also, while I am just reporting estimates from Manichaikul et al. (2012), their estimates fall within the 95% confidence interval of estimates from other studies, such as the "European ancestry" estimates for Mexican and Puerto Rican Americans in Risch et al. (2009, 3).

For instance, on the 2010 US Census questionnaire, the proportion of Cuban Americans, Puerto Rican Americans, Mexican Americans, and Dominican Americans who self-reported 'White' alone was 85.4%, 63.2%, 52.8%, and 29.6%, respectively (Ennis et al. 2011, 14). Conducting a linear regression analysis shows that the average Caucasian ancestry of a Hispanic American national origin group positively and highly correlates ($r = +0.864$) with the proportion of that group that self-reported 'White' alone on the 2010 US Census questionnaire.[21] This pattern would be hard to explain if (3.2) were not true for 'race' and race terms in OMB race talk.

Now, one could worry that the statistic that I reported about the racial self-reporting of Arab Americans in OMB race talk is outdated.[22] After all, a lot has changed for Arab Americans since September 11, 2001 (or '9/11'). Most importantly, Arab Americans have experienced many more hate crimes since then due to being stereotyped as Muslim terrorists[23]—so much so that in February 2015, the Federal Bureau of Investigation (FBI) added a new uniform crime reporting bias code—code 31—to track hate crimes against Arab Americans (FBI 2015, table 1).

While a lot has changed for Arab Americans since 9/11, whether and how much those changes have affected their racial self-reporting in OMB race talk is testable. For instance, if we look at the "Some Other Race" respondents to the 2010 US Census questionnaire in the 50 states and the District of Columbia, and compare that number to the USCB's 2010 estimate for the number of Arab Americans, we can estimate that the maximum percentage of Arab Americans who wrote in some other race (e.g., Arab, Middle Eastern, etc.) on the 2010 US Census questionnaire was 36.7%.[24] For context, the

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21. The linear regression equation I used to make this calculation is: $Y = 1.6812X - 39.761$.

22. For instance, I would expect Joshua Glasgow, Linda Alcoff, and Paul Taylor to have this concern. See Glasgow (2003, 472; 2009, 96), Alcoff (2006, 258), and Taylor (2013, 146–147).

23. What is so absurd about this stereotype is that the overwhelming majority of Arab Americans are not even Muslim! For instance, in Alia Malek's myth-busting book *A Country Called Amreeka,* she reports that just 24% of Arab Americans are Muslim (Malek 2009, ix–x). Rather, the overwhelming majority of Arab Americans are Christian (Malek 2009, x).

24. I arrived at this estimate in the following way. I started by using the USCB's 2010 American Community Survey one-year estimate for the number of Arab Americans in 2010 (1,698,570). Next, I assumed that the percentage of Arab Americans who self-reported as Hispanic on the 2010 US Census questionnaire was the same as the percentage who did so on the 2000 US Census questionnaire, which was 3.2% (de la Cruz and Brittingham 2003, 8). Thus, there should have been 54,354 Hispanic Arab Americans in 2010. Next, I assumed that the percentage of Arab Americans who self-reported as Hispanic on the 2010 US Census questionnaire had

"Some Other Race" write-in rate for Mexican Americans on the 2010 US Census questionnaire was 39.5% (Ennis et al. 2011, 14).

However, remember, the latter is a maximum estimate. In fact, it assumes that all of the non-Hispanic "Some Other Race" write-ins on the 2010 US Census questionnaire came from Arab Americans, which is almost certainly false. So, as it turns out, the aftermath of 9/11 has not affected the racial self-reporting of *most* Arab Americans ($\geq 63.3\%$) in OMB race talk. Furthermore, this result should not be too surprising. According to the Pew Research Center, 94% of Jewish Americans self-report as "non-Hispanic white," and this is despite the fact that the rate of anti-Semitic hate crimes is very high in the United States (Lugo et al. 2013, 46; FBI 2014).

So far, I have provided empirical support for (3.1) and (3.2) holding for 'race' and race terms in OMB race talk. All that remains to be done to show that OMB race talk is involved in a division of linguistic labor is to show that American English speakers do not know or do not agree on what 'race' and race terms mean in OMB race talk. But this will be easy.

While there are lots of empirical studies that are relevant for supporting the claim that Americans do not share a common meaning for 'race' and race terms when engaging in OMB race talk, my favorite study is the focus group portion of the Alternative Questionnaire Experiment (AQE), which was conducted by Elizabeth Compton et al. (2013) for the USCB. The AQE focus group study is unusually informative for three reasons. First, it uses focus groups instead of surveys, and lots of useful, qualitative information can arise in focus groups that are hard to obtain from surveys. Second, it was explicitly designed to study how Americans use 'race' and race terms in OMB race talk (Compton et al. 2013, 68–69). Last, and most importantly, it is one of the few studies on how Americans use 'race' and race terms that uses a nationally representative sample of US adults.[25] So, what did they find?

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the same "Some Other Race" reporting rate as Hispanic Americans overall, which was 36.7% (Humes et al. 2011, 6). Thus, there should have been 19,948 Arab Americans who reported both 'Hispanic' and 'some other race' on the 2010 US Census questionnaire. Next, I assumed that all of the non-Hispanic "Some Other Race" respondents on the 2010 US Census questionnaire (a total of 604,265 people) were Arab Americans (Humes et al. 2011, 6). Next, I added 19,948 and 604,265 to obtain a maximum value for the number of Arab Americans who self-reported "Some Other Race" on the 2010 US Census questionnaire, which, of course, turns out to be 36.7% of the number of Arab Americans in 2010.

25. For instance, while Hirschfeld (1996), Glasgow et al. (2009), Morning (2011), and Guo et al. (2014) have conducted relevant empirical studies for this topic, their samples of US adults are not nationally representative. However, see OMB (2000) for another nationally representative empirical study on how Americans use 'race' and race terms in OMB race talk.

One major finding was that there was "no consensus" on the definition of 'race' in OMB race talk (Compton et al. 2013, 70). Rather, "race was defined as skin color, ancestry, culture, etc." among focus group participants (Compton et al. 2013, 70). Another major finding was that many participants expressed confusion about why the White race included Arabs and why Hispanics were not a race (Compton et al. 2013, 70). But what was most fascinating was that the participants "recommended that these terms should be defined so respondents could better understand how to report" (Compton et al. 2013, 71). The first two major findings suggest that (3.3) is true for 'race' and race terms in OMB race talk, and the last major finding removes all doubt about whether 'race' and race terms are operating by a division of linguistic labor in OMB race talk. Here, the respondents are basically saying, "We are trying to racially self-report in the way the OMB wants us to, but we need more guidance!"

Now that we have solid evidence that 'race' and race terms are involved in a linguistic division of labor when used in OMB race talk, we can move on to figuring out what 'race' and race terms mean in OMB race talk by scrutinizing what the OMB intends these terms to mean. But let me back up a bit and talk about meaning. 'Meaning' is understood in different ways by academics. However, since I am interested in linguistic meaning, linguistic meaning is a prime area of research for philosophers of language, and since 76.6% of "specialists" in philosophy of language adopt a truth-conditional approach to the linguistic meaning of a name, I will adopt the truth-conditional approach to meaning to figure out what 'race' and race terms mean in OMB race talk (Bourget and Chalmers 2014, 483).[26] The truth-conditional approach to the meaning of a name is to see a name's meaning as the "contribution" it makes to the truth-conditions of propositions in which the name occurs (Perry 2001, 18).[27]

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26. The operational definition used for a *specialist* in philosophy of language in this study was that of a "regular" faculty member in a "leading" department of philosophy in the English-speaking or analytic philosophy world who lists 'philosophy of language' as an area of specialization (Bourget and Chalmers 2014, 468). Also, "leading" was determined by having a score of 1.9 or above in the Philosophical Gourmet Report (PGR) or by being judged to be "comparable" to such schools by the editor of PGR, which, at that time, was Brian Leiter (Bourget and Chalmers 2014, 468).

27. To be clear, Perry (2001, 17) considers *meanings* to be the rules that assign content to types of expressions or subsentential expressions (e.g., names). However, Perry (2001, 18) does say that "ordinary" meaning is the same thing as content. So, what I'm calling *linguistic meaning* is what Perry calls *ordinary meaning* or *content*, not *meaning.* However, what philosophers of race are interested in when they talk about the meaning of 'race' is the content of 'race,' not the rules for assigning content to names.

For instance, suppose I want to know what 'Fab Five' means in the specialist English discourse of NCAA basketball talk, and suppose I want to know its truth-conditional meaning. Then, what I should do is figure out what I can substitute for 'Fab Five' in all of the propositions that include 'Fab Five' in the relevant context while maintaining the same truth-values. Historically, there are two ways of going about doing this. One way is to use a set of "identifying conditions" (conditions that competent users of a term use to pick out the referent of the term) (Perry 2001, 4). For example, we could define 'Fab Five' as "the 1991 recruited class for the Michigan Wolverines men's basketball team." But another way is to use the object that the term designates. For example, we could define 'Fab Five' as the set consisting of Juwan Howard, Ray Jackson, Jimmy King, Jalen Rose, and Chris Webber. The first approach is known as *descriptivism* among philosophers of language, while the second approach is known as *referentialism*.

There is an ongoing debate in the philosophy of race about whether descriptivism or referentialism is the best way to model an ordinary meaning of 'race.'[28] However, I do not want to take sides in this debate. Rather, I will assume that both approaches are respectable options, but that the best approach to use for 'race' and race terms in OMB race talk is the one that works best for these names. For instance, it is widely acknowledged among philosophers of language that non-referring names (e.g. 'feeble-mindedness gene,' 'Santa Claus,' etc.) are poorly modeled by referentialism (Perry 2001, 6–7).[29] So, it will be prudent to model the meanings for 'race' and race terms in OMB race talk as their referents only if these names refer.

Also, it is widely acknowledged among philosophers of language that descriptivism is a poor model for a name's meaning if assuming that the name's identifying conditions are its meaning results in getting the wrong truth-values for a large number of counterfactual or modal propositions in which the name occurs (Perry 2001, 5).[30] For instance, Saul Kripke (1980, 117) argued that 'yellow metal' is not the meaning of 'gold' because taking it to

28. For example, see Glasgow (2009, 20–26), Haslanger (2012, 429–445), and Glasgow (forthcoming).

29. 'Feeble-mindedness gene' was a name used in eugenics for what is now known to be a nonexistent gene.

30. A *counterfactual* proposition is a conditional where the antecedent intentionally states something that is false, such as "If the Golden State Warriors had won the 2016 NBA finals, then they would have had a better season." A *modal* proposition is a proposition that says something is or is not necessary or possible, such as, "LeBron James could have been the NBA's MVP in the 2015–16 season."

be so leads to several counterfactual conditionals with the wrong truth-value. One example that Kripke (1980, 118) gave was, "If the substance in South Africa that we call 'gold' were not actually yellow due to an optical illusion brought about from the South African atmosphere, then there would be no gold in South Africa." The correct truth-value for this counterfactual conditional is *false* according to Kripke (1980, 118), but if the meaning of 'gold' is 'yellow metal,' then this counterfactual conditional is *true*. So, it will be prudent to model the meaning of 'race' and race terms in OMB race talk as their identifying conditions only if doing so captures the correct truth-values for a large number of counterfactual and modal propositions in which these names occur.

Furthermore, I will judge whether 'race' and race terms refer in OMB race talk and how well the identifying conditions and referents (if there are any) for 'race' and race terms serve as truth-conditional meanings by appealing to what the OMB presently intends to pick out with 'race' and its race terms, both in the actual world and in non-actual, accessible possible worlds.[31]

First, let's look at what the OMB calls its "definitions" for its race terms. These are the identifying conditions that many American English speakers use to figure out how to self-report in OMB race talk. However, given what the OMB intends to pick out with its race terms, these identifying conditions are anything but *meanings*. Before the OMB introduced its revised racial scheme in 1997, it adopted 13 "principles" to guide that revision (OMB 1997, 58782).[32] According to principle 4, OMB race terms should pick out "population groups" in humans that are "comprehensive in coverage" and "nonduplicative" (OMB 1997, 58783). In other words, in the OMB's racial scheme, there are not supposed to be any unnecessary races, and every single member of the human species should belong to one or more races.[33]

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31. Thus, I am adopting Kripke's (1980, 163) view that the referent of a name is fixed by the "present intentions" of the speaker (or speakers) that control its meaning. Also, I will be using quantified modal first-order free logic with a T interpretation of necessity and necessary identity to assign truth-values to propositions in all possible worlds accessible to the actual world. See Girle (2009, 14, 107) for its syntax rules and Girle (2009, 14–15, 39, 108, 133) for the meanings of important types of expressions in the language (e.g., its propositions, its logical constants, its necessary truths, etc.).

32. These principles were developed by a committee of more than 30 federal agencies put together by the OMB in 1993 whose job it was to explore various options for changing OMB's racial scheme (OMB 1997, 58782).

33. It is easy to see why the OMB wants this. Obtaining a racial classification like this would solve the problem of how to classify any US immigrant and any child born from an interracial mating in the US.

However, given what we know about human evolutionary history, the "definition" that the OMB provides for 'Black' makes all of the other OMB races unnecessary!

Remember that the OMB claims that the "definition" for 'Black' is "A person having origins in any of the black racial groups of Africa" (OMB 1997, 58789).[34] Also, the OMB has explicitly or tacitly recognized all of the following ethnic groups as examples of Blacks: African Americans, Afro-Brazilians, Cape Verdeans, Ethiopians, Haitians, Jamaicans, Louisiana Creoles, and Nigerians (OMB 1995, 44682; OMB 1997, 58789; OMB 2000, 28).[35] However, the problem here is that it is not just African Americans, Ethiopians, Jamaicans, and the like that are Black according to this definition. Rather, *all* humans are Black according to this definition given what we know about human evolutionary history.

First, according to the widest accepted theory on the evolution of human populations, all current human populations descend from a single population (of about 1,000 people) that resided in East Africa about 100,000 years ago (Cavalli-Sforza and Feldman 2003, 270). Second, according to the most widely accepted theory on the evolution of human skin pigmentation, all humans had dark skin until about 40,000–60,000 years ago, when we first left Africa and found ourselves in environments with low ultraviolet B light (Jablonski and Chaplin 2010, 8962). Together, these two facts imply that all living humans—every single one of us—descend from black-skinned people in Africa, and, thus, all of us are *Black* according to the OMB's "definition" for 'Black.' While that result makes the OMB's racial scheme "comprehensive in coverage," it also makes all OMB races except Blacks unnecessary, which is something that the OMB does not want.

Now, we could try to fix this problem by offering a more nuanced identifying condition for 'Black.' For instance, we could add 'recent' in front of 'origins' in the OMB's "definition" in order to try to fix the problem. However, adding such tweaks creates counterfactual problems. For example, suppose

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34. The OMB is notoriously vague about what it means by 'racial groups.' However, it does not mean 'races,' since the OMB only acknowledges five races in its racial scheme and its "definition" for 'Black' is an attempt to define one of those races. However, given how the OMB uses 'racial groups,' I will interpret it as interchangeable with 'ethnic groups.'

35. For instance, the OMB rejected requests from Cape Verdean Americans and Louisiana Creole Americans to be recognized as distinct races because they can self-report as mixed Blacks (OMB 1995, 44682; OMB 1997, 58786).

that by 'recent' we mean 'before twenty-one generations ago.'[36] Furthermore, suppose that, contrary to how events actually unfolded, the English settlers who created the thirteen colonies that would eventually become the United States brought just one installment of black-skinned people from Africa (hereafter, *black Africans*) to the colonies for slave labor and forced that population to exclusively inbreed for twenty generations up until a generation t. Suppose we call these highly inbred people *American Africans* to contrast with African Americans, who are a mixed people. Also, suppose that, just as in the actual world, all human populations in this non-actual, accessible possible world descended from a single black African population. Then, since no American African at t has "recent origins" in any black African people, no American African at t is *Black* according to our revised definition for 'Black'! But there is more. Since no American African at t has any recent origin in any OMB race at all, this tweak prevents OMB's racial scheme from being "comprehensive in coverage" as well, which is a clear violation of principle 4.

Suppose we call the possible world in the preceding *the American African world*. The American African world is not "wholly metaphysical" (Hardimon 2013, 27; 2017, 45).[37] There are lots of human populations that are similar to American Africans in the actual world. For example, there are many unmixed Aboriginal Australians who do not possess "recent origins" from any of the original people to any of the geographic regions that the OMB mentions in its race term "definitions." Instead, unmixed Aboriginal Australians exclusively descend from the original people to Sahul, who arrived in Sahul 46–60 kya (where 1 kya is equal to 1,000 years) (McEvoy et al. 2010, 297).[38] Some examples of such populations are the Karryarra people of Western Australia, the Kuranda people of Queensland, and the Gunganji people of Queensland (Bergström et al. 2016, 810). Thus, there are many Aboriginal Australians who can go back at least 1,840 generations without finding a single ancestor

36. This is not an arbitrary number. Assuming that an average human generation is 25 years (which is standard in population genetics), twenty-one generations back from 2017 is 1492, the year that Europeans first colonized the Americas.

37. This is a phrase that Michael Hardimon uses to respond to a thought experiment of Glasgow's that attempts to show that sharing a common ancestry is not necessary to being a race in the ordinary English sense. See footnote 13 in Hardimon (2013) and Hardimon (2017, 45).

38. Sahul was a continuous landmass including present-day Australia, New Guinea, and Tasmania from at least 100 kya to about 10 kya.

from one of the original human populations to any geographic region that the OMB mentions in its race term "definitions."[39]

The problems that I have raised for considering the OMB's identifying condition for 'Black' as a meaning can be generated in an analogous way for each OMB race term. By that I mean, each of the "definitions" that the OMB provides for its race terms are inadequate to pick out the intended referents of those terms. Furthermore, while we could continue to try to tweak these identifying conditions to avoid each concern, a simpler explanation for what is going on here is that the OMB intends to pick out *ancestry groups* with its race terms, and since everyday American English is ill-equipped to articulate the essences of ancestry groups, we are better off taking the meanings of OMB race terms to be the objects they designate and leaving the task of articulating the nature of each race in OMB race talk to the experts on ancestry: geneticists.[40]

As for 'race' in OMB race talk, the OMB does not even attempt to give a definition for that term.[41] Furthermore, when names are used without any identifying conditions, but rather, as just tags for objects, that itself is *some* evidence that the name's meaning is just its referent.[42] For instance, in the city of Philadelphia, the name 'Penn' is just a tag for the University of Pennsylvania.[43]

Now, one could object here and try to offer a descriptive definition for 'race' in OMB race talk. For instance, perhaps the OMB is assuming what Hardimon (2003, 437; 2017, 27) calls "the ordinary concept of race," which is supposed to be a very thin concept of race that captures "ordinary uses of the English word 'race' and its cognates" (at least in the dominant use of 'race' in ordinary English). However, according to the ordinary concept of race,

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39. Here, I'm making a conservative assumption of an average Aboriginal Australian generation of 25 years.

40. The term 'ancestry group' is not mine. It was coined by Marcus Feldman (2010, 151).

41. For evidence that the OMB does not attempt to provide a definition for 'race' in any of its publications on its racial scheme, see OMB (1995), OMB (1997), Wallman (1998), and OMB (2000).

42. I'm borrowing the locution "tags for objects" from Perry (2001, 4). However, the convention of talking about names with referential meanings as merely "tags" originates with Ruth Barcan Marcus (1961, 310).

43. I learned this fact the hard way when I first moved to Philadelphia and misinterpreted the name 'Penn' as a nickname for Pennsylvania State University in a casual conversation. I was quickly corrected!

"visually indistinguishable" races are impossible, but that situation is not impossible in the OMB's racial scheme (Hardimon 2003, 442).[44]

For instance, in the OMB's racial scheme, Melanesians are a Pacific Islander subgroup (OMB 1997, 58789). However, in biological anthropology, it is well known that Melanesians, on average, share the same visible racial traits as black Africans (e.g., dark skin, black hair, very curly hair, full lips, etc.).[45] Suppose that American Indians, Asians, Blacks, Whites, and Melanesians exist in a non-actual possible world accessible to ours, but that no non-Melanesian Pacific Islanders exist in that world. Suppose we call this world *the black Pacific Islander world*.

It's worth pointing out that the black Pacific Islander world is not a world that clashes with biological facts. The world could easily be generated from non-Melanesian Pacific Islanders engaging in enough interbreeding with unmixed White people to make all non-Melanesian Pacific Islander subgroups go extinct. Now, an important observation about the black Pacific Islander world is that it contains two OMB races that are visibly indistinguishable: Blacks and Pacific Islanders. Thus, Hardimon's ordinary concept of race is not as ordinary as he thought!

While we could tweak Hardimon's ordinary concept of race to attempt to achieve an adequate descriptive definition for 'race' in OMB race talk, that strategy is no more likely to work than our previous attempt to tweak the identifying condition for 'Black.' Rather, the simplest explanation for the way the OMB uses 'race' is that the term's meaning is just its referent. But now the question arises, what is that referent? In my previous work on OMB race talk, I discovered a surprising fact about how the OMB uses 'race' (Spencer 2014, 1028). The OMB never calls race a kind or a category, but rather, always calls race a set of categories or population groups. For instance, the OMB calls race a "set of categories" six times in 97-28653. This observation leads me to believe that the meaning of 'race' in OMB race talk is just the set of five races used in that race talk.

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44. It's worth noting that many philosophers of race besides Hardimon think that the way 'race' is used in American English requires that races are not visibly indistinguishable. Some of these other proponents are Naomi Zack (2002, 37), Lawrence Blum (2002, 132), Glasgow (2009, 33), and Taylor (2013, 16). So, what I will say next applies equally well to these philosophers' theories of race as well.

45. See Spencer (2015, 50) for a discussion of this interesting fact. Also, by a "racial" trait I mean what Glasgow (2009, 86) means, which is one's skin color, facial features, hair type, and, sometimes, hair color.

While the result that the meaning of 'race' in OMB race talk is a *set* might be surprising at first, there are lots of names in American English that are used as tags for sets. For example, consider 'Fab Five.' That name is used as a tag in sports lingo for Juwan Howard, Ray Jackson, Jimmy King, Jalen Rose, and Chris Webber. Likewise, 'Twin Towers' is a name used as a tag in sports lingo for Tim Duncan and David Robinson. But more importantly, assuming that the meaning of 'race' in OMB race talk is just the set of five races in that race talk provides us with a large number of correct truth-values for related modal propositions. For example, given the referential approach, the following modal propositions possess the correct truth-value of *true*: "It is possible for there to be two visibly indistinguishable races" and "Pacific Islanders could be visibly indistinguishable from Blacks."[46]

Even though the referential approach has been fruitful so far, its utility will disappear if the things that I have been calling "referents" for 'race' and race terms in OMB race talk do not actually exist. While it is possible to defend the view that non-referring names have referential meanings, that defense is going to be a tough sell to many philosophers of language.[47] Thus, to convincingly defend my use of the referential approach, I need to show that the relevant terms refer, and, moreover, refer to what I have claimed they refer to. So, I need to show that OMB race terms refer to *real* ancestry groups in the human species, and I need to show that 'race' in OMB race talk refers to a *real* division of humans into ancestry groups.

3.4. The Nature and Reality of Race and the Races in OMB Race Talk

Before I begin, I should say more about how I will establish the reality of race and the races in OMB race talk. I will show that all of these entities are real in virtue of being biologically real entities. Unlike many philosophers of race, I will not require a biologically real entity to "exist objectively" or "independently of human interest" (Andreasen 1998, 209; Sundstrom 2002, 93).[48] Also, I will not require a biologically real entity to be a "primary or fundamental

46. I am assuming that the correct truth-value for these propositions is determined by how the OMB intends to use 'race' and its race terms, not my intuitions about what these truth-values should be.

47. Nevertheless, for one attempt to do so, see Braun (1993).

48. For other proponents of this way of defining 'biological racial realism,' see Mills (1998, 45–46), Zack (2002, 4–5), and Maglo et al. (2016, 2).

category in human population genetics," or otherwise be very important to biology (Maglo 2011, 363; Hochman 2013, 347). Rather, what I will mean by a *biologically real entity* is an epistemically useful and justified entity in a well-ordered research program in biology, which I will call a *genuine biological entity*. Furthermore, I am adopting this conception of a biologically real entity not because I want to defend a version of biological racial realism. Rather, I am adopting it because I think it adequately captures the collection of entities that are actually used in empirically successful biology (e.g., monophyletic group, TYRP1 gene, hypothalamus, etc.).

For instance, if we restrict the realm of biologically real entities to only those entities that exist independently of human interest, then we would have to tell population geneticists that they are wrong that "ethnic groups" in the human species (which exist only because of human interest) are real biological populations, such as the Han people of China, the Yoruba people of Nigeria, and the Maya people of Central America (Cavalli-Sforza 2005, 338–339). Also, if we restrict the realm of biologically real entities to only those that are very important to biology, then we would have to tell molecular geneticists that trivial alleles, such as the 93C allele from the TYRP1 gene, are not real because they are not important enough to biology.[49]

While the theory of a genuine biological entity is complex, the part of the theory that I will use is the part that designates an entity *e* as biologically real if

(3.4) *e* is useful for generating a theory *t* in a biological research program *p*,
(3.5) using *e* to generate *t* is warranted according to the epistemic values of *p* to explain or predict an observational law of *p*, and
(3.6) *p* has coherent and well-motivated aims, competitive predictive power, and frequent cross-checks (Spencer 2012, 193).[50]

I will assume that population genetics satisfies (3.6). Population genetics has been such an empirically successful research program in biology, it is not worth our time to detail exactly how it satisfies (3.6). Thus, in order to show that race and the races in OMB race talk are biologically real, all

49. The only function of the 93C allele is coding for blond hair in some Melanesian people. See Kenny et al. (2012).

50. For all of the details of this theory, see Spencer (2012) or Spencer (2016).

I need to do is show that they satisfy (3.4) and (3.5) for population genetics. To do this, I will use recent results from human population structure analysis.

A common research project in population genetics is to figure out all of the ways that a species subdivides into biological populations. This is called an analysis of "population structure" for that species, and each subdivision is called a "population subdivision" of that species (Hartl and Clark 2007, 275). There are many ways that population geneticists go about conducting population structure analysis, but a common method today is to use patterns in allele frequencies across a species' organisms to detect that species' *demes* (which are its randomly mating groups of organisms), and then to use patterns in allele frequencies across a species' demes to detect all other levels of population structure in that species. In essence, the method is to use different types of "genetic structure" to infer all of the population subdivisions in a species (Cavalli-Sforza 2005, 338).

In a landmark study by Noah Rosenberg et al. (2002), which was cross-checked by Rosenberg et al. (2005), five levels of genetic structure were detected among putative human demes. Furthermore, one of those levels is relevant for us because it is where we find both a human population subdivision and the referents for 'race' and race terms in OMB race talk. In Figure 3.4 are the genetic structure results from Rosenberg et al. (2005).

In Figure 3.4, Rosenberg et al. are reporting five levels of genetic structure among putative human demes. They discovered these levels from analyzing 993 loci in the human autosome that lack protein-coding alleles from 1,048 people in 52 ethnic groups that represent our entire geographic range, using a fuzzy genetic clustering algorithm in a computer program known as *structure.*[51] Each level is named according to the number of "genetic clusters" in the subdivision (Rosenberg et al. 2005, 660). So, for example, K = 3 is the level with three genetic clusters. Also, *genetic clusters* (represented as colors in Figure 3.4) are nothing more than fuzzy groups of organisms (organisms are represented as colored horizontal lines in the figure) such that an organism's degree of membership in any genetic cluster is equal to the proportion of its

51. Any human's genome is divided into three parts. A human's *allosome* is her set of sex chromosomes. A human's *autosome* is her set of non-sex chromosomes. Finally, every human has a set of mitochrondrial DNA that composes part of her genome. Note that the autosome is what Rosenberg et al. (2002, 2005) are studying. Keep this in mind when interpreting their results.

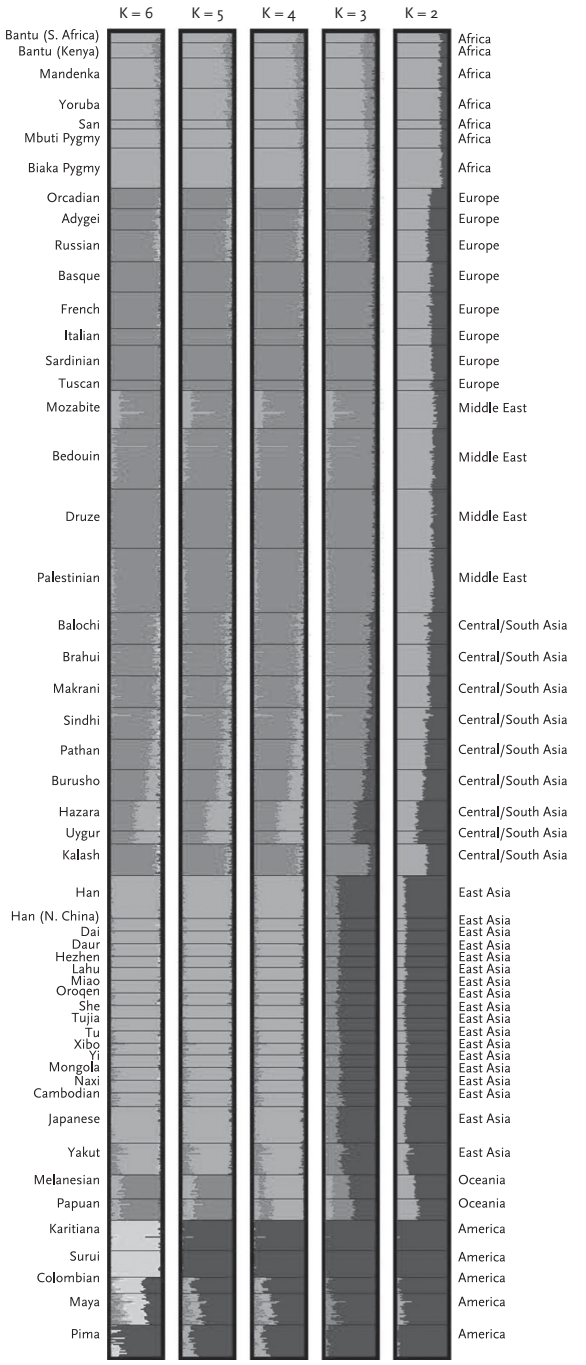

FIGURE 3.4. The genetic structure of putative human demes according to Rosenberg et al. (2005, 663).

genome that originated from that cluster.[52] Multicolored horizontal lines represent "mixed" organisms, and monochromatic horizontal lines represent unmixed organisms (Rosenberg et al. 2005, 660). Now, let us turn our attention to K = 5 genetic clusters: Africans, Eurasians, East Asians, Oceanians, and Native Americans.

While some of the K levels in the figure do not reflect a human population subdivision (e.g., K = 2), population geneticists have provided compelling evidence that K = 5 does. First, even though Rosenberg et al.'s K = 5 result does not always appear in similar studies, it is robust.[53] In particular, Rosenberg et al.'s K = 5 result has appeared in ~70% of all human genetic clustering studies that use a worldwide sample of human ethnic groups (Spencer 2015, 48).[54] Furthermore, these studies have used different samples of people, ethnic groups, and loci, and genetic clustering computer programs with different clustering algorithms (e.g., *structure, frappe, admixture*, etc.).

Second, even though Rosenberg et al.'s sample of ethnic groups is far from perfect due to its abundance of isolated populations and unmixed people (see Figure 3.4), there is ample evidence that Rosenberg et al.'s K = 5 result is not merely an artifact of that sample.[55] For one, Rosenberg et al. (2005, 663) have shown that even after controlling for the geographic distance among sampling locations, their K = 5 result still holds. But more importantly, Trevor Pemberton et al. (2013) have also obtained Rosenberg et al.'s K = 5 result using the largest and most diverse sample of human ethnic groups to date. They used 5,795 people from 267 ethnic groups from all over the world,

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52. For clarity, q_k^i is a model parameter of the admixture mode of *structure* that represents the proportion of an individual's genome that originated from a cluster, where that individual is i and that cluster is k (Pritchard et al. 2000, 948). However, q_k^i can be interpreted in additional ways depending on the data set. For instance, sometimes q_k^i values are interpreted as membership grades when the clusters are plausibly viewed as biological populations or ancestry groups. For instance, in Rosenberg et al.'s (2002, 2382) study, q_k^i values are called "membership fractions."

53. For critics who worry about the variation in *which* genetic clusters appear at K = 5 given different background assumptions used in the analysis, see Hochman (2013, 348) and Barbujani et al. (2013, 157). However, I have addressed this concern elsewhere and in depth. In particular, see Spencer (2014, 1034–1035) and Spencer (2015, 48).

54. By a *worldwide* sample, I mean a sample that includes every "major area" in the United Nations' 2011 classification of countries. These areas are Africa, Asia, Europe, Latin America and the Caribbean, Northern America, and Oceania.

55. For critics who worry that Rosenberg et al.'s K = 5 result is an artifact of their sample of ethnic groups, see Kittles and Weiss (2003), Serre and Pääbo (2004), Bolnick (2008), Maglo (2011), and Hochman (2013, 2014).

including dozens of non-isolated populations and hundreds of mixed people, such as African Americans, Coloured South Africans, Latin Americans, and Polynesians (Pemberton et al. 2013, 891, 897).[56]

Finally, we have adequate reason to believe that the genetic structure at K = 5 in humans is caused by underlying human population structure because each K = 5 human genetic cluster is anchored in a region circumscribed by major geographic barriers to human interbreeding, such as "oceans, the Himalayas, and the Sahara" (Rosenberg et al. 2005, 663).

Now, even if Africans, East Asians, Eurasians, Native Americans, and Oceanians form a human population subdivision, the latter does not imply that this subdivision is biologically real. As Koffi Maglo (2010, 362) has astutely pointed out, the utility of an entity in biology does not entail its biological reality. Thus, we need to argue for the biological reality of the human population subdivision at K = 5 directly.

In the medical genetics and population genetics literature, Africans, East Asians, Eurasians, Native Americans, Oceanians, and other continent-level human populations are known as "continental populations" (Cooper et al. 2003, 1167; Zhao et al. 2006, 399). However, for ease of reference, I will call Africans, East Asians, Eurasians, Native Americans, and Oceanians, and only these five populations, *the human continental populations*. The evidence that the set of human continental populations is biologically real is the following. First, the set of human continental populations satisfies (3.4) because it is useful in population genetics for generating a theory about human population structure—namely, the theory that the set of human continental populations is the population subdivision at level K = 5 in humans.

Second, the set of human continental populations satisfies (3.5) because the theory in which the entity is posited is warranted according to the population-genetic epistemic values of empirical accuracy, completeness, and quantitative precision to predict a population-genetic observational law.[57] That observational law is that humans have K = 5 genetic structure that is largely geographically clustered in the following regions: the Americas, Sub-Saharan Africa, Oceania, Eurasia east of the Himalayas, and Eurasia west of the Himalayas and North Africa. Given our assumption that population genetics satisfies (3.6), it follows that the set of human continental populations

56. Also, Rosenberg et al.'s K = 5 result was replicated again by Mallick et al. (2016, 9) using the second largest and second most diverse sample of ethnic groups to date.

57. These epistemic values are discussed in Pierre Duhem's *The Aim and Structure of Physical Theory*. See Duhem (1906/1981, 19–30).

is biologically real. An analogous line of reasoning can be used to show that each human continental population is biologically real as well.

Now that we have established the biological reality of the set of human continental populations and all of its members, I think you can predict where I am headed. From looking at the set of human continental populations and the set of races in OMB race talk, it is not absurd to think that the two sets are identical, which is what I will call *the identity thesis.* In fact, several medical geneticists realized early on that the set of human continental populations and the five major races used on the "2000 US Census" were at least "aligned nearly perfectly" (Risch et al. 2002, 5–6).[58] Of course, there's a big difference between being nearly identical and identical. Nevertheless, one way to defend the identity thesis is to show that adopting it provides us with solutions to the puzzles that led us to reject the OMB's "definitions" as definitions as well as the best predictive power—which are usually marks of a true empirical theory.[59]

For one, the identity thesis solves the puzzle of how to define a person's ancestry in a way that makes the OMB's racial scheme "nonduplicative" as the OMB intends. Remember that the OMB's "definition" for 'Black' is insufficient to yield a nonduplicative racial classification of people because human evolutionary history unfolded in such a way that every living human is a Black person according to the OMB's "definition" for 'Black,' thus making all non-Black races in the OMB's racial scheme unnecessary. Also, remember that temporal qualifiers for ancestry (e.g., 'recent') don't fix this problem due to counterfactual scenarios like the American African world and actual outliers like unmixed Aboriginal Australians. But also, comparative qualifiers for ancestry (e.g., 'primary') are dead ends as well for a different reason.[60]

What solves the preceding puzzle is that racial ancestry in the OMB's racial scheme is all and only ancestry that contributes to an individual's genome,

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58. For other medical geneticists who made this observation, see Burchard et al. (2003, 1171). For some population geneticists who made it, see Sarah Tishkoff and Kenneth Kidd (2004, S21).

59. Here and elsewhere in this book, I will be assuming a rather weak view of truth for empirical theories that comes from Arthur Fine's natural ontological attitude. The view is "referential" and simply states that "a sentence (or statement) is true just in case the entities referred to stand in the referred-to relations" (Fine 1984, 98).

60. Specifically, given what we know about the tree of life, the *primary ancestry* (understood as the majority of one's ancestors) of any human lies outside of the human species, thus making every human race-less. Furthermore, tweaking the qualifier to 'primary human ancestry' will yield unintended results, such as no Polynesian being a Pacific Islander due to the majority of any Polynesian's human ancestors not being Pacific Island natives.

called "genomic ancestry" in the population-genetic literature (Weiss and Long 2009, 707). For instance, according to the identity thesis, the meaning of 'Black' is the African population. Thus, a *Black* person is a person with genomic ancestry from the African population. That's it. In other words, if any allele in a person's genome originated from the African population, that person is Black. Furthermore, the *degree* to which a person is Black is equal to the proportion of her alleles that originated from the African population. Hence, according to the identity thesis, there are plenty of people who aren't Black.

For instance, a Taiwanese American who has 100% genomic ancestry from the East Asian population is exclusively *Asian*, and a European American who has 100% genomic ancestry from the Eurasian population is exclusively *White,* which makes the Asian and White races useful in OMB's racial scheme, just as they were intended to be. Also, an Aleutian Islander with 100% Native American genomic ancestry is exclusively *American Indian*, and a Native Hawaiian with 100% Oceanian genomic ancestry is exclusively *Pacific Islander*, which makes the American Indian and Pacific Islander races useful in OMB's racial scheme, just as they were intended to be.

Second, the identity thesis solves the puzzle of how to make the OMB's racial scheme "comprehensive in coverage." For instance, anyone from the American African population in the American African world is exclusively *Black*, since all of her alleles originated from the African population. Also, unmixed Aboriginal Australians—a group with no recent ancestors from the original people to any geographic region mentioned in the OMB's "definitions"—are exclusively Pacific Islander (McEvoy et al. 2010, 300).[61] So, solving the puzzle of which race unmixed Aboriginal Australians belong to is a concrete accomplishment of the identity thesis.

In addition, notice that there are several geographic regions that are not mentioned in the OMB's "definitions" despite there being indigenous people to these regions. For instance, in addition to Australia, the OMB neglects to mention the Andaman Islands, Central Asia, and Madagascar, to name a few. So, it's unclear how to racially classify the indigenous people to these forgotten lands. However, the OMB needs to racially classify each of these

61. I say "unmixed" because many Aboriginal Australians have recent European ancestors due to the colonization of Australia by European settlers. In fact, a recent genetic study by Duncan Taylor et al. (2012, 534) showed that 59% of Aboriginal Australian males possess a Y chromosome inherited from a European male. Thus, a substantial proportion of Aboriginal Australians are, at least, White.

indigenous people in order to have a "comprehensive" racial classification. The identity thesis solves this puzzle effortlessly.

According to current genetic clustering results, the Malagasy are a mixed people who, on average, belong to the African and East Asian populations (Kusuma et al. 2016, 5). As for Andaman Islanders, they are an assortment of different ethnic groups with different genomic ancestry mixture averages. For example, the Jarawa are mostly unmixed and Oceanic (Aghakhanian et al. 2015, 1210). However, some studies of the Onge show that they are mostly mixed and belong primarily to the East Asian and Oceanic populations (Mallick et al. 2016, 9). Finally, indigenous Central Asians are a mixed people that primarily belong to the Eurasian and East Asian populations. However, their primary racial membership varies by ethnic group. For instance, the Tajiks are primarily Eurasian, while the Uzbeks are primarily East Asian (Martínez-Cruz et al. 2011, 221).

Next, if the identity thesis is true, then we not only can solve lots of puzzles about OMB race talk, but we can make many predictions with "very high" accuracy (Burchard et al. 2003, 1172). For instance, if the vast majority of US adults have a primary human continental population membership, are competent in OMB race talk, self-report a single race, and racially self-report the human continental population in which they have primary membership, then using knowledge about primary human continental population membership alone, geneticists should be able to predict the self-reported OMB race of most US adults with very high accuracy. Interestingly, this is exactly what geneticists are able to do.

For example, using a nationally representative sample of US college students ($N = 2{,}065$), Guang Guo et al. (2014) tested the extent to which they could predict the self-reported OMB race of subjects who reported a single race using only each subject's primary genomic ancestry in a human continental population. After finding no self-reported Pacific Islanders and just four self-reported American Indians in the sample, the authors decided to focus on self-reported Asians, Blacks, and Whites (Guo et al. 2014, 153). Next, looking at just the subjects who reported a single race (which was 1,773 subjects) and using only *structure* and a sample of each subject's genome, the authors were able to predict each subject's race with 98.8% accuracy (Guo et al. 2014, 153).[62] While this is an amazing feat, Guo et al.'s result is not unique. Hua Tang et al. (2005, 271) were able to predict the self-reported OMB race of 2,657 US adults with 99.8% accuracy using primary human

62. This statistic includes the self-reported Hispanic subjects.

continental population membership alone.[63] While there are other instances of predictive power that I could talk about to lend further support to the identity thesis, perhaps I should wrap up.

3.5. Conclusion

In this chapter, I have defended a nuanced biological racial realism as an account of how 'race' is used in one US race talk. I will call the theory *OMB race theory*, and the theory makes the following three claims:

(3.7) The set of races in OMB race talk is one meaning of 'race' in US race talk.
(3.8) The set of races in OMB race talk is the set of human continental populations.
(3.9) The set of human continental populations is biologically real.

I argued for (3.7) in sections 3.2 and 3.3. Here, I argued that OMB race talk is not only an ordinary race talk in the current United States, but a race talk where the meaning of 'race' in the race talk is just the set of races used in the race talk. I argued for (3.8) (a.k.a. 'the identity thesis') in sections 3.3 and 3.4. Here, I argued that the thing being referred to in OMB race talk (a.k.a. the meaning of 'race' in OMB race talk) is a set of biological populations in humans (Africans, East Asians, Eurasians, Native Americans, and Oceanians), which I've dubbed *the human continental populations*. Finally, I argued for (3.9) in section 3.4. Here, I argued that the set of human continental populations is biologically real because it currently occupies the K = 5 level of human population structure according to contemporary population genetics.

Before I end, it will be interesting to see how much OMB race theory sheds light onto the problem that motivated this chapter. While I will not pretend that OMB race theory has the power to settle the debate about whether (and, if so, how) race matters in medical genetics, the theory does provide some helpful insight that may inch us closer to a resolution. For one, OMB race theory implies that medical scientists who investigate whether there are genetic explanations for racial disparities in heath are *not* making a

63. This statistic only includes the self-reported non-Hispanic Blacks and non-Hispanic Whites, and leaves out the Chinese, Japanese, and Hispanics in Tang et al.'s sample. I'm leaving out the Chinese and Japanese because they didn't self-report 'Asian' in the study, but rather, as 'Chinese' or 'Japanese.' See Tang et al. (2005, 269). I'm leaving out the Hispanics because it's well known that Tang et al.'s sample of Hispanics was unrepresentative. See Glasgow (2009, 95).

metaphysical mistake provided that the races they are using are OMB races. The latter is because OMB race theory gives us the result that OMB races are biological populations that are essentially genomic ancestry groups, and it is metaphysically possible for such populations to non-accidentally differ in medically relevant allele frequencies. So, for instance, Eric Jorgenson et al.'s (2004, 276) study that searched for medically relevant differences in genetic maps among "African Americans," "East Asians," and "whites" was not a metaphysically confused research project.[64]

However, my result conflicts with Yudell et al.'s (2016, 564–565) claim that "racial classifications do not make sense in terms of genetics."[65] While I am sympathetic to Yudell et al.'s claim, it turns out that *some* racial classifications do make sense in terms of genetics, namely, the OMB's racial classification. However, Yudell et al. are absolutely right that *some* racial classifications do not make sense in terms of genetics, such as any racial classification based on what Anthony Appiah (1996, 54) has called "racialism."[66]

A third result that's relevant for whether (or how) race matters in medical genetics is that OMB race theory does not *imply* that OMB races differ in medically relevant allele frequencies, and it does not imply that OMB races *don't* differ in medically relevant allele frequencies. Likewise, OMB race theory does not imply that OMB races differ in any socially important traits (e.g., intelligence, beauty, moral character, etc.), and it does not imply that OMB races don't differ in any socially important traits. Determining whether OMB races differ in any phenotypic ways requires a separate empirical investigation. Furthermore, I am not saying this out of political correctness. It turns out that the DNA evidence that supports the existence of human continental populations comes from non-protein-coding and non-functional DNA in the human genome. Nevertheless, we now know that it's metaphysically possible for some races to matter in medical genetics because *some* races are biologically real.

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64. Note that the authors are using 'African American' in this study as a term that is synonymous to the OMB's 'Black.' Also, a *genetic map* is a map of the relative position of each gene in a genome. The first genetic map was constructed by Alfred Sturtevant in 1913.

65. For other scholars who hold the same view, see Root (2003), Graves and Rose (2006), Kaplan (2010), and Roberts (2011, 129).

66. According to Appiah (1996, 54), "racialism" is the view that humans naturally divide into a small number of groups called 'races' in such a way that the members of each race share certain fundamental, inheritable, physical, moral, intellectual, and cultural characteristics with one another that they do not share with members of any other race.

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