How Ordinary Race Concepts Get to Be Usable in Biomedical Science: An Account of Founded Race Concepts

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This essay unpacks a seeming paradox: a concept used to formulate, promote, and legitimate oppressive ideologies—a concept used to formulate mistaken, because they were typological, biological theories about human diversity—is, it seems, the same concept that now promises to deliver wonderful, socially sensitized, innovative results in social and genetic epidemiology. But how could that be? How could scientists expect a concept as problematic as ordinary race to deliver useful scientific results? I propose that there is a process for retranslating *Ballungen* race concepts in appropriate ways to make them fit and work within social scientific and bioscientific contexts.

1. Introduction. The history of using "race" in medicine is loaded.[1] Race concepts have been used to express false claims and to treat people cruelly. And all this is not in the past: 'race' is a concept still multiply understood and multiply used—and still used to questionable ends.

This essay unpacks a seeming paradox: a concept used to formulate, promote, and legitimate oppressive ideologies; to formulate mistaken, because they were typological, biological theories about human diversity; and to mea-

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1. I use double quotes to distinguish "terms," single quotes for 'concepts', and no quotes for the things these are meant to pick out.

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sure civil rights' violations, is, it seems, the same concept that now promises to deliver wonderful, socially sensitized, innovative results in social and genetic epidemiology. But how could that be? How could scientists expect a concept as problematic as 'race' to deliver useful scientific results?

This account concerns itself neither with debates about the reality of race nor with debates about the reality of science (Gannett 2010). Rather, I ask how we get to discuss or decide the reality of race, scientifically.

I propose that there is a process through which some everyday ideas become usable in scientific practice. I call this a process of *founding* concepts in scientific contexts and claim that it marks a special kind of science: what I call *found science* by analogy to the art of ready-mades or found art. I further argue that ordinary race concepts are being founded in socioscientific and bioscientific contexts, resulting in *sociorace* and *biorace* concepts, respectively.

After setting up the problem with race (sec. 2), I define found science and founded race concepts (sec. 3) and use these tools to analyze the use of race variables in a genetics study (sec. 4). I propose that "self-identified race ethnicity," or "SIRE," is tagging a founded race concept.

Through this discussion, "scientific concepts" are understood as ideas used and developed while doing science. As this account examines how the practice of science grounds and transforms everyday concepts, there is room here to challenge whether fixed, all-encompassing concepts exist or have ontological priority (cf. Machery 2005, 2009), but that is another project.

2. Not Based in Science but Doing It? Race Variables Used in Demography, Epidemiology, and Genetics. Despite a claim to nonscientificity, race and ethnicity categories have been deployed in social science, biomedical science, and recently population genetics, especially through standardized census classes (Epstein 2007; Rose 2007). The US institutional-discursive context where the categories are manifestly defined is the Office of Management and Budget (OMB).

Statistical Policy Directive no. 15, "Race and Ethnic Standards for Federal Statistics and Administrative Reporting," was adopted across American states in 1977 to track and remedy civil-rights violations affecting racial and ethnic minorities (Anonymous 1997, app. 1, 16874). The 2010 US Census collected data under six main races (white, black or African American, Asian, Native Hawaiian or Pacific Islander, American Indian or Alaska Native, and some other race) and two ethnicities (Hispanic or Latino, and Non-Hispanic), allowing multi-identification. I will refer to the OMB classes as "race/ethnicity."

The OMB proclaims the ontic status of race/ethnicity categories: "The categories that were developed represent a *political-social construct* designed to be used in the collection of data on the race and ethnicity of major broad population groups in this country, and are *not anthropologically or scientifically based*." Still, the next sentence reports, "The standards are used not only in the decennial census (which provides the data for the "denominator" for many measures), but also in household surveys, on administrative forms (e.g. school registration and mortgage lending applications), and *in medical and other research*" (Anonymous 1997, 36874; emphasis added). Though not scientifically based, these categories are used, and to be used, in medical scientific research. Indeed, epidemiologists measure striking stratifications for multiple health outcomes along race/ethnicity categories (Root 2000, 2001).

What causes these "racial" health disparities (or "ethnic" health disparities, as Ramos and Rotimi [2009] prefer)? Research in the social sciences, sociology, demography, gerontology, psychology, public health, and social epidemiology emphasizes that socioeconomic, educational, and environmental factors that affect dietary intake; mental health; and the availability, accessibility, and quality of health care are often significantly different across race/ethnicity groups (LaVeist 1994; Schulman et al. 1999; Williams and Collins 2001; Franco et al. 2009). Yet "race" often remains a significant 'risk factor' for the outcome in question, even after matching patients of different race/ethnicity on selected education and socioeconomic status measures (e.g., Brancati et al. 1996; Criqui et al. 2005). 'Controlling' for social factors associated with race is contested: race is arguably a "fundamental cause" of disease (Link and Phelan 1995) and difficult to break into component social causes (Kaufman, Cooper, and McGee 1997; Kaufman and Cooper 2001a, 2001b, replying to Jones 2001). Still, the question arises: Could inherited genetic susceptibilities account for residual "race"-associated health risks?

Francis Collins, director of the National Institutes of Health, seems to think so. Addressing the director of the National Institute of Minority Health and Health Disparities, Collins said: "I congratulate Dr. Ruffin and his staff on the Center becoming an Institute. This change by Congress reflects the importance of studying the issue of health disparities with an even greater intensity. We need to learn much more about *what causes disparities*—including the role of society, the environment, and *genes*—and to find effective ways of overcoming or changing them" (Anonymous 2010; emphasis added). Collins considers genes as possible causes for racial health disparities, despite debate (see the *Nature Genetics* supplementary issue that includes Collins [2004] and Duster [2005]).

Population genetics research concludes that "self-identified ancestry" well approximates the genetic structure of the global human population (Rosenberg et al. 2002), while "self-identified race/ethnicity" approximates US genetic structure (Tang et al. 2005; see sec. 4). Reportedly, genomic markers for disease and drug response differ significantly across race/ethnicity classes: Risch and colleagues (2002) offer a theoretical argument, Wilson and colleagues (2001) and Tate and Goldstein (2004) focus on race/ethnicity drug-response variations, and Daar and Singer (2005) claim that population-specific pharmacogenetics is the “ethical” way forward for the drug industry. Popular in genetic epidemiology, genome-wide association studies (GWAS) compare genomes of cases of a disease to genomes of controls to associate genomic regions with disease risk. Arguing for “diversity” in GWAS, Rosenberg et al. (2010) refer to continental populations associated with race.

Race-related biomedical research thus poses a conundrum:

1. If race/ethnicity variables deliver interesting results in genetic epidemiology, is race a genetic category?

Generally:

2. If a nonscientific idea can be used in science, is it a scientific category?
3. Can science work with ideas not based in science?

To answer these questions, I turn to discuss scientific concepts.

3. How Science Can Use Nonscience: Founding *Ballungen* in Science. Philosopher and social scientist Otto Neurath used the idea of a congestion (*Ballung* in German) to convey the density and complexity of certain (social) scientific concepts: “We are not dealing with clearly outlined concepts as in mathematics[;] these concepts are barely defined in their internal parts; hazy edges are essential to them” (quoted in Uebel 2007, 116). Neurath thought science has to deal with *Ballungen*. According to Cartwright and colleagues, Neurath thought *Ballungen* (often also translated as ‘cluster-concepts’) “are not made out of parts. They are rather the primitive concepts from which we start and from which other concepts might be constructed or derived” (1996, 190). However, Neurath saw no bridge from complex and imprecise *Ballungen* to precise, quantifiable, scientific concepts (Cartwright et al. 1996, 188–202).

It is this kind of concept I think ‘race’ is, though, unlike Neurath, I think *Ballungen* need not be taken up wholesale by science. They cannot be.

Writing around the same time, Ludwik Fleck was thinking about the development of science fact from “prescientific, somewhat hazy, related proto-ideas or pre-ideas” (1979, 23). In *Genesis and Development of a Scientific Fact*, Fleck says: “Proto-ideas are at first always too broad and insufficiently specialized. According to Hornbostel, ideas—just as word meanings—have a development that proceeds ‘not through abstraction from the particular to the general, but *through differentiation or specialization* from the general to the particular’” (27; emphasis added). Fleck explored connections between scientific ‘facts’ and proto-ideas, claiming, however, that "such links cannot be substantiated" (23). I dare venture here a general description for the life cycles of some scientific concepts—ones derived from ordinary ideas. I call my account of this process, and the kind of science thus created, "found science."

3.1. The Thesis of Found Science. Found science claims that some ordinary ideas become usable in science if but only if they are transfigured appropriately.[2] This transfiguration is effected by a recursive process:

1. **Find** a concept C in a scientific context.
2. If C is nonscientific, **found** the concept as scientifically meaningful in that context and go to step 1; otherwise, **stop**.

Finding and founding are actions happening in scientific contexts: discursive, theoretical, social, and material spaces marked by science. Science textbooks, equations, laboratory spaces, or the minds of trained scientists are scientific contexts of different complexity or nature(s). Scientists 'detecting' something in a data sample, 'reading' a term on a document, 'recalling' something from memory are all 'finding' actions, happening in a context of science. Finding ordinary ideas in science need not be hard: by stipulation these ideas are available to scientists as members of a broader (lay) community. Still, scientists are trained to work in ways that partially screen ordinary interferences, creating meaning in internally referential systems regulated through epistemic cultures (Knorr Cetina 1999). It is on such self-sustaining epistemic cultures that founding relies.

Finding an ordinary idea in science is not sufficient for doing science with it: founding is needed. 'Explaining' or 'sharing' the idea with a colleague, 'expressing' it in a scientific vocabulary, 'relating' it to scientific aims or interests, 'defining' it using scientific terms, 'operationalizing' it so that it can be measured, and 'arguing' about it in a scientific paper are all 'founding' actions. Whereas finding operations select an idea as of possible scientific interest, founding operations specialize it in precisely those ways that make it at least relevant and interesting and at best useful or accurate—where relevance, interests, aims, and accuracy are specified by negotiating epistemic, material, social, moral, aesthetic, and other constraints marking scientific practice in that domain.

Founding is not shielded from broader social influences nor fully determined by them. Work in feminist epistemology and science studies shows that the production of science can be guided by and shape societal and other

2. I borrow the term "transfiguration" from Danto (1981), though found science is not by analogy an institutional theory of science. Found science is not an attempt to define what is scientific. Found science describes how we can get some scientific ideas out of ordinary ones, given that a difference between science and nonscience makes sense.

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economic or political values (Jasanoff 1990; Longino 1990). Values too influence which ideas we care to found in science, and how, expending how much effort or money, ensuring whose 'participation'. At the same time, founding adheres to distinctive cognitive values, perhaps captured broadly in what Kuhn (1996) called *paradigms*, or Fleck called *styles of thinking*, keeping with commitments that are epistemological in kind (underestimated by Latour 1999) while connected, if only nominally, to common reality.

3.2. The Transfiguration of Ordinary Ideas. I call the founding of ordinary *Ballungen* in science "found science" by analogy to the art of objets trouvés, or ready-mades. Found art, pioneered by Marcel Duchamp's upturned and inscribed urinal *Fountain* (1917), became notoriously profitable in the 1990s with the (then) Young British Artists, including Tracey Emin and Damien Hirst (Hopkins 2004). Found art claims that art need not involve creation de novo. Rather, art can reuse already available, nonartistic objects under a new guise or concept: "Whether Mr. Mutt with his own hands made the fountain or not has no importance. He CHOSE it. He took an ordinary article of life, placed it so that *its useful significance disappeared under the new title and point of view—created a new thought for that object*" (Norton, 1917, 5; emphasis added).

Installation in an artistic context is decidedly and decisively transfigurative: once extracted from the sewage system, *Fountain* can no longer divert urine, and the shark in *The Physical Impossibility of Death in the Mind of Someone Living* (Hirst, 1992) is no longer man-eating. Yet, these objects purport to "work" as art precisely by retaining links to their ordinary settings, for instance, through a preserved and emphasized (framed) form.

Found science too seems to be about the given or *found*, but it relies on *founding*: transfiguring what is found to fit available scientific concepts, norms, tools, interests, and metaphysics. During founding, concepts may stay tagged by ordinary names. But they need not. During founding, selected meanings or internal concepts of a *Ballung* are developed and retranslated based on accepted scientific ideas, while others get dropped or "invisibilized." As an ordinary object loses some possible or appropriate uses when installed in an artistic context, an ordinary idea gets specialized to address just particular, scientific questions, yet (hopefully) deliver incisive and precise, scientific answers. Founded concepts thus often warrant new, scientific names.

Before reexamining race concepts used in medicine, I regiment my vocabulary as follows:

- A common concept is **found** (vis-à-vis found science) when it is **introduced** into a scientific domain.

- A common concept is **founded** in that scientific domain when it is **transfigured** in appropriate ways to support the uses to which it is put there.

3.3. Founded Race Concepts: Biorace and Sociorace. Found science claims that to create science one need not look to experts' definitions but rather to some, maybe vague, maybe loaded (maybe even thus partly false), common concept as a starting point. I am working in philosophy, so this is, strictly speaking, no ordinary rendering of the ordinary concept of race. But so it must be.

Take the articulation of the logical core of the ordinary concept of race offered by Michael Hardimon (2003). Hardimon specifies three criteria, in what he calls the "intelligible nucleus" of all concepts of race: these are criteria that any concept should satisfy for it to properly be a concept of race. Hardimon claims that the three theses "must be taken in conjunction" (442) to come to understand the ordinary notion of race (I label these "Hardimon logical core criteria," or "HLC"):

HLC1. visible physical features of the relevant kind (442),
HLC2. common ancestry (445),
HLC3. distinctive geographic origin (447).

HLC1 describes 'race' as a classification that sorts humans into groups according, inter alia, to the way they look: skin color, facial features, hair texture, and so forth. HLC2 captures the idea that race is shared across generations, inherited from one's parents, one's parents' parents, and so forth. HLC3 captures the association between the origins of these groups and particular geographical—continental—regions, for example, Africa, Eurasia, East Asia, America, and the Pacific Islands.

Now, assuming that an ordinary race concept has a logical core and added criteria, define two types of *founded* race concept as follows:

Sociorace concepts are concepts that attempt to articulate criteria in the logical core of an ordinary race concept (and/or added criteria) in sociologically meaningful terms.

Biorace concepts are concepts that attempt to articulate criteria in the logical core of an ordinary race concept (and/or other criteria) in biologically meaningful terms.

Sociorace and biorace are second-order race concepts, with an open slot for where a first-order 'ordinary race' notion goes and a specification of the type of intentional context we are in. They are also ideological in what Geuss (1981) calls "the descriptive sense," picking out discursive elements like ideas or beliefs and nondiscursive elements like feelings (4–12).

For example, a sociorace concept may translate HLC1, 'visible physical features of the relevant kind', in terms of 'visible markers of social status', or translate HLC2 common and HLC3 distinctive 'ancestry' in terms of respectively shared and distinctive 'cultural narratives' or 'sociopolitical histories' for these groups. The notions of 'status', 'narrative', or 'history' can help reconceive ordinary 'race' to better fit social science ontologies and methods. Correlatively, a biorace concept might express HLC1 in terms of a 'phenotype', HLC2 in terms of 'genetic lineage', and HLC3 as geographical origins of 'isolated breeding populations', ever so slightly but, even so, significantly fitting this available concept into a bioscientific domain.

Note that not all core criteria need to be retranslated into scientifically meaningful terms by a founded concept. Hardimon (2003) claims that all race concepts that are "developments" of the ordinary concept will share HLC1–HLC3. But if we understand conceptual development as transfiguration, *pace* found science, this becomes contingent, as founded concepts may relate to other scientific concepts more closely than to first-order ordinary ones. For instance, the notion of human races articulated by Pigliucci and Kaplan (2003) relies on the biological concept 'ecotype', which does not require HLC2. Ecotypic races are roughly understood as genetic adaptations to environmental conditions and noticeable in populations of different genetic lineage: ecotypic race is thus a biorace notion that reexpresses HLC1 and HLC3, leaving out HLC2.

Discipline-specific founding of everyday ideas is often done tacitly with little notice. Yet, despite its simplicity, founding is crucial for honing *Ballungen* into concepts that can admit scientific specification, definition, and measurement. Let us now consider an example from genetics: a founded race concept tagged by "self-identified race/ethnicity" (or SIRE).

4. Founding Race Concepts in Genetics. In the paper "Genetic Structure, Self-Identified Race/Ethnicity, and Confounding in Case-Control Association Studies," Hua Tang and colleagues at Stanford claim that "self-identified race/ethnicity" approximates genetic structure in the US population: "Ancient geographic ancestry, which is highly correlated with self-identified race/ethnicity—as opposed to current residence—is the major determinant of genetic structure in the US population" (2005, 268).

How could these geneticists have even thought to study this association had they only had a sociorace concept? To see the resulting cognitive dissonance, replace "self-identified race/ethnicity" in the quote above by "marital status": a statement associating ancient geographical ancestry with the social kind 'marital status' is not meaningless; yet that result likely would be deemed uninteresting, an artifact of statistics, unsuitable for further, genetic exploration. This indicates that a biorace notion is operative here.

Indeed, bioinformatics tools were used to ensure this. The program STRUCTURE (Pritchard et al. 2000) was designed to cluster together information obtained from genetic material according to its genetic 'structure'. STRUCTURE follows a parametric, model-based, Bayesian clustering algorithm: simply put, a mathematical equation defines what form information from genetic data of assumed similar genetic structure should have, given biological theory and prior expectations, and the model specifies the specific values of the parameters as it sequentially sorts through the data.

Why go to the trouble of sorting populations this way? STRUCTURE is aimed to (1) confirm or ensure that classifications based on nongenetic information, like geographical origin, physical features, or language, represent "a natural assignment in genetic terms" (Pritchard et al. 2000, 945) and (2) infer that these "subjective classifications" are "appropriate for studying the questions of interest" to genetics (945). For our purposes, whether structure succeeds in articulating actual genetic structure is not as important as how it helps found ordinary 'race' in genetics.

Individuals in Tang et al. (2005) self-identified as belonging to four major OMB "race/ethnicities": white, African American, East Asian, and Hispanic. Comparing structure clusters for a particular resolution with these "subjective" categories showed that of 3,636 subjects of varying race/ethnicity, only five (0.14%) belonged to a cluster different from their self-identified race/ethnicity. Ordinary race is supposed to sort people according to HLC2 common ancestry: this provides a hook for the concept to be founded in the context of these studies. If HLC2 common 'ancestry' is understood in genetic terms, via similarity in inherited 'genetic material', then one could get a founded, biorace concept that retranslates 'common ancestry' as 'shared patterns in genetic material' or 'shared frequencies for selected polymorphisms' (heritable DNA mutations) using notions related to STRUCTURE's outputs. When, for some resolution, STRUCTURE clusters align with ordinary race/ethnicity groupings, the biorace articulation of 'race' that explains this is lent credence, thought fit, and fitted in the discourse. The pull of this chain of reference-cum-inference helps hook a biorace notion to a context of genetics.

Objections to the design of Tang and colleagues (2005) exist. Individuals came from uncharacteristically homogeneous populations (the Hispanic group resided in a single location in Texas; Tang et al. 2005, 273), while assumptions built into STRUCTURE's model were not fully assessed (cf. Kalinowski 2010). Yet, on one issue the authors seem alert: the dubiousness of "race." "Another major point of discussion has been the correspondence between genetic clusters and commonly used racial/ethnic labels. Some have argued for poor correspondence between these two entities, whereas others have suggested a strong correlation" (Tang et al. 2005, 273). Notice "genetic clusters" and "race/ethnicity labels" are dubbed "entities" in the most general way possible but still studied scientifically: "We have shown a nearly perfect correspondence between genetic cluster and SIRE for major ethnic groups living in the United States, with a discrepancy rate of only 0.14%" (273). Notice the change of verbiage here: genetic clusters are reported matched to the acronym SIRE instead of the perhaps less opaque but more invitingly contentious "self-identified race/ethnicity" and "racial/ethnic" labels. This is important.

The jargon suggests that a distinct, founded concept is starting to operate here, tagging a specialized genetically interesting idea. 'Self-identified race/ethnicity' links up to 'self-identified ancestry' used by Rosenberg et al. (2002, 2381) and to how census race/ethnicity is (self-)identified to track "subjective" populations. The term "SIRE" is indeed popular enough to be specifically scrutinized as a variable (and further founded; Miles et al. 2008).

Tang and colleagues caution: "This result indicates that studies using genetic clusters instead of racial/ethnic labels are likely to simply reproduce racial/ethnic differences, *which may or may not be genetic*. . . . Therefore, researchers performing studies without racial/ethnic labels should be wary of characterizing difference between genetically defined clusters as genetic in origin, since social, cultural, economic, behavioral and other environmental factors may result in extreme *confounding*" (2005, 274; emphasis added). "Race/ethnicity"-tagged categories are not genetic in origin, and yet, and precisely for that reason, the categories should be used, installed, in genetics as relevant to genetic questions.[3]

It is precisely this kind of work that found science does: by straddling the zone between the ordinary and the scientific, a biorace concept labeled "SIRE" works for the purposes of genetics, making it sensible that race could track genetic structure, while holding visible its relation to *Ballung* 'race' and to multiple alternate biorace and sociorace articulations of socioeconomic, biomedical, and political relevance (see pragmatic interests discussed in Gannett [2005]).

5. Race Science as Found Science. Thinking of race concepts used in biomedical science as founded *Ballungen* cracks the paradox: race concepts look to be common because they come tagged by common terms. But when understood relative to the research they support, "race" terms pick out founded concepts aimed to do specialized work—not necessarily speak to the same problem, nor to each other, let alone have the ultimate word. Coordinating science on race should thus involve a diversity of science and policy perspectives, lay stakeholders, and philosophers.

3. This challenges Root's (2003) advice that self-reported ancestry is a better proxy for genetic structure than race, on both an epistemic and a methodological level.

1. If race/ethnicity variables deliver interesting results in genetic epidemiology, is race a genetic category? Race is a *found genetic* category; in the context of genetics "SIRE" tags a founded, biorace concept, which retains a connection to ordinary race.

Generally:

2. If a nonscientific idea can be used in science, is it a scientific category? Yes, when it corresponds to a founded concept.
3. Can science work with ideas not based in science? Science can work with ordinary ideas only by transfiguring them into founded concepts.

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