



Populations, individuals, and biological race

M. A. Diamond-Hunter¹

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Abstract

In this paper, I plan to show that the use of a specific population concept—Millstein’s *Causal Interactionist Population Concept* (CIPC)—has interesting and counter-intuitive ramifications for discussions of the reality of biological race in human beings. These peculiar ramifications apply to human beings writ large and to *individuals*. While this in and of itself may not be problematic, I plan to show that the ramifications that follow from applying Millstein’s CIPC to human beings complicates specific biological racial realist accounts—naïve or otherwise. I conclude with the notion that *even if* biological races do exist—by fulfilling all of the criteria needed for Millstein’s population concept (which, given particular worries raised by Gannett (Synthese 177:363–385, 2010), and Winther and Kaplan (Theoria 60:54–80, 2013) may not)—the lower-bound limit for the scope of biological racial realism is at the level of *populations*, and as such they cannot say anything about whether or not individual organisms *themselves* have races.

Keywords Race · Populations · Individuals · Metapopulation · Millstein

Introduction

Recent publications dealing with the biological reality of race have been put forward by both philosophers and biologists alike.¹ Recently, biological racial realist positions have been bolstered by Spencer (2012; 2014; 2016; 2018) and have been challenged by Kaplan and Winter (2014), Gannett (2013), Hochman (2013, 2016, 2017)—and, interestingly—Spencer (2019). Additionally, drawing on work done by Darwin (1859), there have been a number of recent developments in the philosophy

¹ See Andreasen (1998, 2004, 2005, 2007); Baran et al. (2012), Bowcock et al. (1991), Chiao and Blizinsky (2013), Dean (1994), Levran et al. (2012), Risch et al. (2002), Rosenberg et al. (2001), Tang et al. (2005), Tishkoff et al. (2009), Wilson and Brown (1953), Wilson et al. (2001).

✉ M. A. Diamond-Hunter
mah250@cam.ac.uk

¹ Department of History and Philosophy of Science, The University of Cambridge, Free School Lane, Cambridge CB2 3RH, UK

of biology that have been attempting to make sense of biological populations, including Millstein (2009, 2010a, b, 2015) Stegenga (2014); Sterner (2017), and Baraghith (2020). What is important to note is that philosophical arguments in support of biological racial realism take (either implicitly or explicitly) the notion that racial groups can be more-or-less best understood as biological populations². This discussion about *populations* is important, not just from a theoretical or conceptual standpoint in biology. It is also important because the concept is used for human beings in ways that are wide-reaching and deeply important, especially in fields that are related to biology—including epidemiology, public health, and medical genetics.³ The interplay between the biological reality of race and biological populations is what this paper will probe, as there are novel results that follow when applying a particularly robust population concept.

In teasing out the connections between the two, the paper will proceed as follows: The first section will provide a discussion of the different ways in which definitions have been provided for “biological races” in the literature. Previous attempts to define “biological meaningful population” have come across a number of problems—they have been confused, have begged the question, or both. This is due to the fact that the term “population,” as found in the biological literature, has been ill-defined. Nevertheless, the concept *population* has gained traction as a way to ground the biological reality of race, and as such, making the claim that “biological races” are just “biologically meaningful populations” is the best hope to have a coherent way of underpinning the former. The next section will outline Millstein’s (2009, 2010a, b, 2015) *Causal Interactionist Population Concept* (CIPC) as a way to provide background on the concept that will be applied for the project. The following section will then apply Millstein’s CIPC to human beings and will provide support for the following claim: the best interpretation of the concept is that human beings form a single population with no subpopulations identifiable by CIPC criteria. After defending this claim, the penultimate section will provide ramifications for the debate on the biological reality of race. The final section will provide some concluding remarks.

Defining biological meaningful populations

What follows in this section is a brief look at some ways that the notion of a *biological meaningful population* has been posited in the literature. The point of this section is to highlight the thought that if races can be more-or-less understood as biological populations, it may be important to examine how some of these concepts have been articulated, since the notion of a population is foundational for this branch

² See Millstien (2015) for evidence that the concept of *population* plays a central role for biologists and philosophers who endorse some type of biological racial realism.

³ See Spencer (2018) and Diamond-Hunter (2022).

of biological racial realism.⁴ This line of reasoning has been clearly expressed in Millstein (2015), stating that while particular characterisations of biological racial realism differ, many of them deploy a connection to the concept of a population.⁵ The last point of this section is to provide some background for how this has been addressed before turning to Millstein's Causal Interactionist Population Concept. The examples used in this section are non-exhaustive, but provide motivation for thinking that a more precise population concept would help with making headway on the current debate.

Some previous attempts to provide a workable definition have suffered from being conceptually unclear, ill-defined, or question begging. Examples of this include a number of textbooks (Relethford 2012; Crow and Kimura 2009; Royle and Dorazio 2008; Allendorf et al. 2007; Hamilton 2009; Templeton 2006). One of the more interesting examples taken from a textbook is found in *Principles of Population Genetics* by Hartl and Clark (1997)—a popular population biology textbook. In this textbook, the authors provide the following definition of the term *population* (emphasis mine):

The science of population genetics deals with Mendel's laws and other generic principles as they affect entire populations of organisms. The organisms **may be** human beings, animals, plants, or microbes. The populations **may be** natural, agricultural, or experimental. The habitat **may be** soil, water, or air...⁶

As a definition, the modal operators make it difficult to pin down what *does not count* as a population. Definitions should tell you the phenomena that falls under its scope, but it should also demarcate which phenomena falls *outside* its scope. This is done in order to avoid category mistakes when deploying the term for empirical work.

In the history of ecology and evolutionary ecology, there have been a number of discussions of the term *population*. Emerson (1943) stated that “species, subspecies and races are population concepts and the ecologist is interested in the intraspecific environment of the individuals within such populations and the environmental effects upon population physiology and integration.”⁷ Allee et al. (1967) included in their definition of a population organisms that were not con-specific⁸; and Winther et al. (2015) extend their population concept from two to three populations—*theoretical*, *laboratory*, and *natural* populations.⁹ Again, whilst this is a non-exhaustive list, it is an attempt to frame Millstein's *Causal Interactionist Population Concept* as a direct descendant of this discussion—which will be discussed in detail in the following section.

⁴ For alternate positions regarding biological racial realism, see Blumenbach (1865 [1775]), Dobzhansky (1937), Hooton (1926), Kaplan and Pigliucci (2003), Mayr (1942), and Templeton (1998).

⁵ Millstein (2015), pg. 5.

⁶ Hartl and Clark (1997), pg. 1.

⁷ Emerson (1943), pg. 101.

⁸ Allee et al. (1967), pg. 265.

⁹ Winther et al. (2015), pg. 13.

Millstein's causal interactionist population concept

The aim of the previous section was to illustrate that there have been a number of previous attempts to define *population*, all with various levels of applicability for the current discussion of the potential for human beings to have biological meaningful populations—and, as such, biological races. This current section will evaluate one contemporary population concept that can be utilised as a coherent and important definition of a “biologically meaningful population”: Millstein’s *Causal Interactionist Population Concept* (CIPC). The motivation for using Millstein’s CIPC is that it avoids being ill-defined like a number of the previous examples taken from biology textbooks. It is also an improvement upon the definitions given by Allee et al. and Emerson in that it does not presuppose that *race* is a viable unit of grouping in biology. In Millstein (2010), a population is integrated *via* the survival and reproductive interactions of organisms.¹⁰ The features of CIPC include the following: first, that Populations consist of at least two conspecific organisms that, over the course of a generation, are *actually* engaged in survival or reproductive interactions, or both; and secondly, that the boundaries of the population are the largest grouping for which the rates of interaction are much higher within the grouping than outside.

For Millstein, *reproductive interactions* include successful and unsuccessful matings as well as offspring rearing.¹¹ *Survival interactions* for Millstein are taken from Darwin’s discussion of them in chapter III of *On the Origin of Species (First Edition)*: where organisms compete for a spacial location or food; where organisms are in direct competition with each other; and where the organisms can struggle together.¹² The main point is that survival actions “are relevant to the cohesiveness of organism groupings and affect their ecological and evolutionary trajectories.”¹³ Given the core features of the Causal Interactionist Population Concept (CIPC), there are a number of details that follow from them. The features of CIPC include the following:

- A. Organisms that are located in the same spatial area (including recent migrants) are part of the population *if and only if* they are interacting with other conspecifics.
- B. If a later grouping is causally connected by survival or reproductive interactions to an earlier grouping, then it is the same population in this way. Populations, according to Millstein, can be continuous through time.

Specifically, with respect to the origins and completions of a population, Millstein’s CIPC posits the following:

¹⁰ Millstein (2010), pg. 67.

¹¹ Millstein, in personal communication, states that the term *successful* is meant to be interpreted as producing offspring. Perhaps there is something interesting in interpreting *successful* in a thin manner—that two organisms have merely engaged in an act of sexual reproduction. While this would be an interesting thought to pursue, the current paper does not hinge on how the term *successful* is interpreted.

¹² Millstein (2010), pg. 68.

¹³ *Op Cit.*

[N]ew populations generally begin with interacting founders who are no longer interacting with others in the population, as might occur with geographical separation, and that populations end with the death of the last organism in the population, if not sooner.¹⁴

Millstien (2015) discusses a number of scenarios that focus on the ways that populations may change across time (including fusing, splitting, and budding) and the ways in which migrations of an organism can affect the status of both the organism and the population.¹⁵

What differentiates Millstein's CIPC from other population concepts is what it leaves out. Millstein's CIPC does not consider gene flow relative to selection, nor migration, as boundary conditions for populations. For a population concept to be non-circular, it needs to keep the notion of selection separate since selection takes place and produces changes within populations. CIPC does not consider migration because it would be superfluous; if an organism migrates to a place where it has no reproductive or survival interactions with the grouping, then it is not part of the population. The converse also is superfluous—if an organism migrates to a place where it does have reproductive or survival interactions with the grouping, then it *is* part of the population. In the next section I will discuss whether any application of CIPC can support biological racial realism for human beings.

Biological races as causal interactionist populations

In Sect. 2, I have highlighted that there has been (so far) no good way to connect the concepts of *population* and *race*, given that the concept of *population* is at times in the history of biology vague, ill-supported, or ill-defined. Given that Millstein's CIPC is a coherent account for biological populations, I will now turn my attention to exploring a number of case studies that Millstein (2010) highlights to see if they are applicable to human beings. Each one of the case studies that Millstein highlights gives a different population structure, and the point of this section is to ascertain the correct population structure for human beings given Millstein's CIPC. Given that human beings reproduce sexually, one of the case studies that is brought up in the literature is immediately ruled out (Case #2: Populations with only survival interactions). This type of exploration will be informative because of Millstein's concluding remarks:

Both humans and right whales live widely across the planet (albeit in very different habitats!), but their patterns of interaction differ in evolutionarily important ways (This chapter has not included a discussion of population structure among humans, a complicated and interesting topic: however, the characterization of relatively distinct breeding groups that have survival interactions

¹⁴ Millstein (2015) pg. 2.

¹⁵ Ibid, pg. 3-4.

among all members would not characterize the present human configuration).¹⁶

What seems to be evident with human beings is that survival interactions and reproductive interactions are both present. This should remain in the background as each case is examined. As follows, I will utilise the same case numbering that Millstein (2010) uses for each potential application to human beings.

Case #1: human beings as one continuous population

Are human beings one continuous population like *Linanthus parryae* (desert snow)? This case discusses a type of flowering plant that covers a very large geographical area, with a large number of plants carpeting that geographic area. Millstein considers the plant “desert snow” to be one continuous population based on the following conclusion: “despite the likely pockets of density, it does not seem as though there would be have been groupings for which interactions were significantly higher. Rather, they would have been only somewhat higher, with the densities fairly variable from generation to generation.”¹⁷ When coupling this with the two central features of CIPC, human beings are a good candidate for being one continuous population—especially when considering that the interactions are not *just* survival or reproductive causal interactions by themselves, and that the amount of survival interactions between human beings is rather large. This is especially so when considering that survival interactions between human beings are found on a *global scale* and that reproductive interactions have been, historically speaking, much more widespread—especially considering the repugnant history of using sexual violence as a weapon in wars, colonialism and chattel slavery, to name a few.¹⁸

Case #3: human beings as a simple meta-population

Are human beings a simple metapopulation like *Cepaea nemoralis*, a type of land snail found in Southwestern France (and in other parts of the world)? For human beings to be a simple metapopulation, they would have to satisfy the following features: (A) rates of interaction (both survival and reproductive) within groupings would have to be much greater than that among groupings and (B) infrequent migrations from one population to another. If there were **no** interactions between populations, the simple metapopulation would be better classified as a number of populations. Given the fact that human beings have a long history of migration and movement across the planet, they would arguably fail to fulfill the first and second features.¹⁹

¹⁶ Millstein (2010), pg. 73.

¹⁷ *Op Cit*, pg. 73.

¹⁸ I take this point to be self-evidently true, and needing no academic citations.

¹⁹ See Bellwood (2013, 2017), and Fisher (2013) for examples of the fact that there has been a long history of human migration across the globe.

With respect to the first feature, survival interactions within groupings are smaller when compared to survival interactions across groupings—and as I will argue later in the paper, this claim can be justified when considering the wide-scope and heavy impact that deeply enmeshed social structures and frameworks have on everyday human survival interactions. There is a case for arguing that reproductive interactions are higher within groupings of humans as compared to across groupings. However, the *conjunction* of the two features for the first criteria for being a simple meta-population needs to hold: rates of (1) survival *and* (2) reproductive interactions within groupings would have to be much greater than among groupings. Since rates of *survival* interactions for human beings are not much greater within groupings than among groupings, the first criterion of a simple meta-population is not satisfied. Additionally, until there is an agreement of what constitutes “infrequent”, the second feature will be problematic to assess. Given the geopolitical history of conflict across this planet, I posit that human beings would not meet most specifications of the term “infrequent”.

Case #4: human beings as a patchy population

Are human beings a patchy population like *Chrysomela aeneicollis* (willow leaf beetle)? As Millstein notes, willow leaf beetles are found on willow shrubs where the shrubs are physically separated and the separation provides a difficult-to-surmount barrier. According to Millstein, “it appears as though the rates of interaction *within the bushes* are greater (but not very much greater) than the rates of interaction *among the bushes*, and that the interactions *within the bogs* are greater (but not very much greater) than the interactions *among the bogs*.”²⁰ For humans, this option captures the idea that rates of reproductive interaction within some groupings are greater (but not very much greater) than rates of reproductive interaction across groupings. Survival interactions are *also* an integral part of CIPC, and given that the reach of survival interactions for humans has greater scope (and affects many more organisms) as compared to the willow leaf beetle, this option fails to apply to humans. Consider one qualitative example—The Green Revolution—and its global impact on humans. When considering reproductive interactions *in conjunction with* survival interactions, one gets a much different answer. Survival interactions for human beings are greatest when drawing the boundary at the *global* level as opposed to any other restrictive drawing.

While it may seem that people who are within closer physical proximity to others interact in survival-related ways more so than people who are distal on average, this is a challenging claim to support. Given the developments of global integration structures and institutions—like global food supply chains, currency exchanges, stock markets, wide-ranging governmental and supra-governmental institutions—it appears to be a tough (but not implausible) claim to defend empirically. It also appears to be true, however, that while wide-ranging survival interactions are

²⁰ Millstein (2010), pg. 77.

currently incredibly pervasive, in the past the wide-ranging survival interactions may have had less of an impact than local survival interactions.

For a more detailed discussion, there would need to be a plausibly-agreed upon way for measuring survival interactions in contemporary society as well as in the past *and* a way to ensure that this method of measurement is coherently applied across time. Global systems that have had far-reaching effects upon the survival interactions of individuals, while a fairly recent historical phenomenon, imply that it may have been the case that human beings were a patchy population. This is because it seems likely that at least *one* human population, and *one* point in the history of human beings has met the criteria for a patchy population laid out by Millstein (2010).

Case #5: human beings as a metapopulation of reproductive populations

Are human beings a metapopulation of reproductive populations like the Southern Ocean right whale? Millstein uses this term to “refer to cases in which organisms mate locally, but struggle (in a Darwinian sense) globally.”²¹ The Southern Ocean right whale ends up being a metapopulation due to the fact that there are “*both* survival and reproductive interactions *within* breeding groupings but *only* survival interactions *between* breeding groupings.”²² Long story short: the breeding groupings are more cohesive, according to Millstein, than the survival (feeding) groupings, hence the notion that it is a metapopulation of breeding populations. For human beings to be considered a metapopulation of reproductive populations, one would have to illustrate that reproductive interactions within groupings are *much greater* when compared to reproductive interactions across groupings. This is a plausible option—it seems to square with the notion that groupings of humans have separated in just those particular ways. The geopolitical history of human beings seems to suggest otherwise, however. More about this will be discussed below.

Case #6: human beings as a metapopulation of survival populations

Are human beings a metapopulation of survival populations like *Gasterosieus neulentus* (the three-spine stickleback fish)? For this to be the case, there need to be “*both* survival and reproductive interactions within habitat groupings, but primarily reproductive interactions between habit groupings.”²³ In other words, the organisms all have reproductive interactions across groupings, but the survival interactions are *within* groupings. This is also one of the more plausible options for human beings. This would be apt for human beings if there was a history of *very* wide ranging reproductive interactions. In this specific case, this would look like the opposite situation of the Southern Ocean right whale: that there would only be reproductive

²¹ Millstein (2010), pg. 78.

²² *Ibid*, pg. 79.

²³ *Ibid*, pg. 80.

interactions between groupings even though there are both survival and reproductive interactions within populations. For human beings, it would be akin to having populations interact with much greater reproduction frequency between them than within their own populations. Given the history of human beings, this option seems to be less plausible than others. With all of the cases discussed in this section, the next question to ask is the following: which case is arguably the best fit for human beings? In the next section, I will provide an answer to the question, along with a discussion of the ramifications that CIPC has for other discussions of race.

Ramifications of Millstein's CIPC

There are a number of conclusions to be drawn from this exploration of Millstein's CIPC and its applicability to human beings. In this section, I will discuss the case that is the best fit for human beings, as well as how CIPC has ramifications for other aspects of debates about the biological reality of race.

Ramification #1: human beings are one continuous population

Given the evidence discussed earlier in the paper that details how futile other accounts have tried to tie *biological meaningful populations* to *race*, Millstein's (2010) account is the only one that provides a coherent, non-vague, and sufficiently specific way to understand them. When applying Millstein's CIPC, we can eliminate a number of potential cases for how human beings can be grouped at the population level. The reason why human beings are not a patchy population (Case #4), nor a metapopulation of reproductive populations (case # 5), nor a metapopulation of survival populations (case #6) is due to the features that Millstein has laid out at the beginning for CIPC:

1. Populations consist of at least two conspecific organisms that over the course of a generation, are *actually* engaged in survival or reproductive interactions, or both.
2. The boundaries of the population are the largest grouping for which the rates of interaction are much higher within the grouping than outside the grouping.

Both of these features of CIPC strongly suggest that humans are *one population*—the boundaries for the largest grouping for which rates of interaction are much higher within the grouping than outside the grouping is to include the entirety of human beings. This grouping also encompasses the maximum rates of survival and reproductive interactions.

The first conclusion drawn from the examination of Millstein's CIPC is that *human beings form one continuous population*. This conclusion entails that if races are biological populations, that there is *only* one biological race. Having only one biological race runs counter to the accounts given by Andreasen (1998, 2004, 2007), Kitcher (1999), and Spencer (2012, 2013), to name a few. This conclusion may be seen as counter-intuitive, given a number of recent articles over the past decade

(Rosenberg 2002, Tang et al. 2005, etc.) are at least interpreted as giving *general* support to the notion that there are such things as biological races. One response regarding this thought: Millstein's CIPC deals with a *restricted* domain within biology, so perhaps (even though I am doubtful) there are different biological race concepts for different divisions within biology. Would case #5 or #6 be better fits for human beings than one continuous population? The reason why I argue that they are not is not because I deny that there are densely grouped reproductive interactions; rather, I argue that the rate of reproductive interactions (successful or otherwise) *in combination with* the rate of survival interactions are far greater within the entire population than if the boundary lines were drawn below the global level.

While it appears to be *prima facie* correct that reproduction rates at a local level are currently higher than reproduction rates at the global level, human beings have both, and as such both need to be considered before drawing the boundary lines for demarcating populations. Continuing on this line of reasoning, even if there are differences in reproduction rates when comparing the global level to non-global levels, the difference between the rates is relatively small and has been diminishing as advancements in technology have developed. From a technological standpoint, consider the use of sperm banks or surrogacy over the last 50 years. In both of these cases, an individual can have a reproductive interaction even though they may be thousands of miles away from the gamete that they have donated.²⁴ One can have a reproductive interaction when the individual is not technically present, and this does extend to periods of time where the gamete(s) of the individual are viable even though the individual themselves may no longer be alive. This type of extended reproductive interaction (either geographically, chronologically, or both) is unique to this point in human history, and as such helps to illustrate why *current* rates of reproductive interactions at the local level are counter-balanced by rates of reproductive interactions at the global level.

The argument needs to be made that humans have been engaging in survival interactions throughout history. Given human history, there are a number of examples (benign and otherwise) to illustrate this fact: migrations, Marco Polo and the Silk Road, seafaring explorations, advances in agriculture (i.e. the Green Revolution), invention of life-saving medical interventions (i.e. the vaccine for Polio), establishing robust commerce and economies, and establishing nation-states and city-states are some of the benign examples. Wars, genocides, threats of physical harm, The Crusades (especially The Children's Crusade), collateral damage from "surgical strikes" ordered by Nobel peace prize-winning heads of state, codified discrimination against groups of humans for all sorts of various reasons, systematic exclusion of groups of humans from particular sectors of the workforce for extended periods of time, glass ceilings imposed on subsets of people, religious persecution, the Black Plague, famines and critical food/water/resource shortages, political strife and corruption, indentured servitude and chattel slavery, and forced migration are all contained in the not-so-benign set of examples. Even though it should be noted and

²⁴ See Byrd and Hughey (2015), Harrison (2016), Ryan and Moras (2017), Russell (2018), and Walther (2014) for further discussions of this phenomenon.

granted that if the evolutionary history of human beings resembles more contemporary hunter-gatherer cultures, then rates of survival interactions within groups would be larger than rates across groups—in the current time, that is not the case.

What is interesting about CIPC is that survival interactions are not limited to those on the level of social-to-social interactions. One class of survival interactions that are particularly important (ecologically speaking) are the survival interactions that operate in a social-to-environment kind of way. Consider the types of things that the human species has done to affect the environment (with obviously mixed results): The Green Revolution, the BP oil disaster, advances in nuclear-energy technology (along with the ramifications of failures in execution of those technologies), fossil fuel technology, dredging of canals and waterways, advancement of pesticides and other chemical agents, commercial agriculture, meat production, and aquaculture, and overall climate change. All of these episodes have affected humans *in just the exact way* that fulfills CIPC: these episodes have affected (and continue to affect) how humans compete for “limited resources” and how humans “compete directly.”²⁵ Especially important is how the aforementioned events can affect how humans “struggle together”—Millstein re-emphasizes this by stating that:

The point is that survival interactions, such as those invoked by Darwin, are relevant to the cohesiveness of organism groupings and affect their ecological and evolutionary trajectories.²⁶

Large scale events that have long durations, whether they operate from the social-to-environmental (Chernobyl, The Exxon Valdez Oil Spill, The Deepwater Horizon Spill.) or environmental-to-social (The Haitian Earthquake of 2010, Typhoon Haiyan, the US Drought of 2012, The Australian “Federation Drought”, the California Rim Fire of 2013, Hurricane María, The 1906 San Francisco Earthquake, Japan’s 2011 Earthquake and Tsunami, The Smokehouse Creek Fire of 2024) are clear instances where humans have “struggled together”. Millstein’s point should be kept at the fore: all of these events are undoubtedly relevant to the cohesiveness of human beings and have also undoubtedly affected the ecological and evolutionary trajectories of human beings. The main point here is to capture how organisms interact; if they do, then “their fates are (to some extent) linked, so that they form a biological whole.”²⁷ Lastly, it is important to not under-estimate the survival interactions that are in play: interactions between individual humans, humans and governments of all sizes (local, provincial, federal, etc.) and the interactions between large-scale institutions themselves all have causal import for survival interactions.

Time may be a boundary condition for the considerations regarding migratory movements of an individual conspecific organism, but it becomes less of a boundary position as the number of populations that a conspecific organism interacts with increases. Millstein (2015) states that, with respect to human beings and population membership, that the following holds (emphasis original):

²⁵ Millstein (2010), pg. 68.

²⁶ *Op Cit*, pg. 68.

²⁷ *Ibid*, pg. 69.

[A] person can be *formerly* a member of one population and *currently* a member of a new population. The exception is when many such people are interacting between what would otherwise be separate populations...if a person begins interacting with a new population, then that person *was* a member of population *a* during time span *x* and is a member of population *b* during time span *y*.²⁸

Arguments can be advanced that rates of survival interactions are higher locally and that the valence is stronger at these local points. However, considering large scale events like economic globalization (supply chains running across a number of different countries; financial market manipulation—one example being the LIBOR scandal that affected lending interest rates which, in turn, greatly affected the citizens of multiple countries; and shady and underhanded business and economics practices that caused the 2008 financial crisis and depression that affected the *entire* world in ways that *many* places are yet to recover fully) and global climate change (extreme fluctuations in weather patterns that affect large swaths of the planet; the increase in acidity and lowering of dissolved oxygen levels in oceans that are positive causal factors for decreases in oceanic populations; fluctuations in habitable zones for all sorts of flora and fauna) it seems epistemically unjustifiable to state that, currently, survival interactions have a higher valence at the local level.

This is especially so given the fact that human beings find themselves *born into* economic, political, and socio-cultural systems, and that these particular systems range over the entire planet. Before one dismisses this kind of observation, it should be noted that there have been numerous works and writings that support it: Weber specifically noted how Puritanism contributed to the “iron cage” which we find ourselves in²⁹; Aristotle wrote about it in his *Politics*—“Every state is a community of some kind, and every community is established with a view to some good.”³⁰ These are just a couple of examples that merely scratch the surface. To deny this would be to assert that John Donne was incorrect—and it seems to be an insurmountable task for a collection of people to do, let alone one who purports to be the only island in the sea.³¹

One potential worry about my claim regarding the aforementioned examples in this section is that while human beings have had a number of incredibly important survival interactions that reach across the globe, the examples still do not show that the rate of survival interactions is higher globally rather than locally. This is a position that is completely consistent with the magnitude and strength of the examples of survival interactions listed above. In order to make my case stronger, it would be helpful to provide a particular measure for survival rates and interactions that can justify my claims, along with evidence that things will come out correct when using that measure. What I can do at this point is to provide a sketch of how a measure can

²⁸ Millstein (2015), pg. 4.

²⁹ Weber (2001), pg. 123.

³⁰ Aristotle (1998), pg. 1.

³¹ Donne (1923), Meditation 17.

be used to strengthen my claim. Firstly, the measure would combine both quantitative *and* qualitative data—the belief that quantitative data reigns supreme when considering a measure is short-sighted and misses crucial information on how human beings struggle to survive in the Darwinian sense. Secondly, there is one aspect of survival interactions that seems to be highly resistant to quantitative measurement, yet is clearly influential: social frameworks that are incredibly broad.

One immediate example are broadly political frameworks. Included are things like *monarchies*, *capitalism*, *communism*, and *nationality*. From a qualitative standpoint, the ways in which the political world has been organised (and continues to be organised) seems to have an incredibly strong effect on the survival interactions of all human beings, even though these are hard to capture quantitatively. Counterfactually, we also seem to have evidence that these ways of framing survival interactions has a profound impact upon human beings. Consider the utterance “If person X had citizenship of a non-muslim majority country, then they could come to country Y and escape persecution”: this claim seems to be true even though one cannot provide a counterfactual *quantitative* rate for this type of survival interaction. Lastly, while it is important that this sketch of a solution should be developed in future work, the case that I have made is not fatally undermined by having a lack of a ready-made robust solution. The onus is not solely on my argument to come up with a satisfactory measure; those who claim that the rates of survival interactions for human beings are larger within groups at the local level rather than at the global level *also* face the burden of providing a measure to justify that claim, as well as evidence that their claims will be reliably supported by that measure.

This is a departure from Millstein (2015), in two important ways. The first is that the qualitative and historical evidence that I draw upon for classifying human beings as one continuous population appears to be interpreted as evidence for classifying human beings as a patchy population:

Finally, we might consider the case of someone who is interacting with more than one purported population at the same time. It is difficult to come up with examples that would not also imply other interactions between the two groupings, making them one patchy population rather than two: the dropping of a nuclear bomb, the creation of a dump site, or the building of a noisy airport. Perhaps there are such cases, but I suspect they are rare.³²

The qualitative examples that Millstein (2015) highlights provide justifiable support for the classification *patchy population* for human beings. The qualitative examples that I have provided appear to include the class of examples that Millstein (2015) discusses *along with* other examples that have broad and long-lasting global effects. The second way that this departs from Millstein (2015) is with respect to the frequency of these examples. My classification of human beings as one continuous population takes it that the frequency of the examples is *not* rare, but rather frequent. This is a point that I take to be more of an intramural discussion, as I agree wholeheartedly with Millstein (2015) that CIPC “is a concept that can be applied to

³² Millstein (2015) pg. 4.

various cases, i.e., various groupings of organisms in nature, fitting them more or less well.³³ If future evidential considerations favour human beings as being better classified as a patchy population rather than one continuous population, I would happily accept the outcome. Nevertheless, as things currently stand, I believe the considerations of the example cases in Sect. 4, along with the examples posited in this current section, provide the best support for human beings as one continuous population.

Ramification #2: individual human beings have no race

A second conclusion that can be drawn is that human *individuals* do not have races, irrespective of whether or not races are human *populations*. The reason for this is the following: CIPC notes that (emphasis mine) “organisms in the same spatial area (*including recent migrants*) are part of the population” if and only if they interact with other conspecific organisms.³⁴ If one individual migrates from population A to population B and has causal interactions with other conspecifics in population B while ceasing to have causal interactions with population A, then that migrant has become part of population B. This outcome has a very interesting ramification: speculatively speaking, *if* races are populations, then individuals can move from one racial population to another (and then back) as many times as they want and be considered to be a member of different races. This potential incongruity is discussed in Millstein (2015):

If we want to maintain the claim that a person can be of more than one race while incorporating a population concept into the race concept, we should likewise be clear about which population they are currently a member of and which populations they are descended from—and when. To do otherwise is to potentially confuse past population membership with present. And we would need to reconcile the fact that someone can change the population that they are a member of (i.e., are a part of), but we generally don’t think that someone can change their race.³⁵

This may seem to be bizarre, but bizarreness is not necessarily an indicator that something is wrong; in this case I contend that it is right. A number of pieces of scientific inquiries have had ramifications that do not comport with views that the general public may hold (or have held at some time)—examples include *jade* is not one substance but two (*jadeite* and *nephrite*), and that the duck-billed platypus is actually a mammal. We should *expect* that our scientific inquiries will turn up some initially strange things once in a while; such is the nature of empirical research. The reason why this may seem so strange is *not* that the concept is incorrect; it is rather that decades of biological research into whether *race* is biologically real (or structured, etc.) has been carrying the pre-theoretical and pre-scientific baggage that

³³ Millstein (2015), pg. 4.

³⁴ Millstein (2010), pg. 67.

³⁵ Millstein (2015) pg. 5.

comes along with supposed “common sense” or “conventional” racial terms. What needs to be reiterated is that the application of a robust, coherent population concept can radically reorganise how one conceives of biological populations and their members. According to a principled application of CIPC, individuals can be part of different populations at different times throughout their life-span. How individual human beings see their racial identification (on a social level) is different from what applying CIPC tells us.³⁶

The speculative discussion that individual human beings could have multiple *biological* races based on which population they are causally interacting with is a moot point: Given Millstein’s CIPC concept, its application to human beings and the race-as-biological population hypothesis, there is only one race anyway, since there is no better way to draw the boundaries of the human species in a way that respects *all* of the features of CIPC and that adheres to the attempt to identify race as a *population* concept. In order for an *individual* to have a race, there needs to be a biologically coherent account that connects CIPC with individual human beings. No such account exists, and given the features of CIPC, *populations*—not *individuals*—are the bearers of *biological* race. Given the facts about the actual world, the scope of human survival interactions and CIPC, it follows that human *individuals* have no biological race. Is it possible that human beings could form different populations (or a meta-population)? Of course—one way would be the following: the survival interactions were greater for groupings of humans *within* these groupings as compared to the survival interactions *across* groupings. Millstein’s CIPC offers a number of these cases; it just happens to be that in *this* world human beings—as a *biological population*—have only one biological race. This saves other biological

³⁶ A nuanced point regarding Millstein’s (2015) claim about “we generally don’t think that someone can change their race” (pg. 5): whilst it may be speculated that the claim is correct, the history of people who have “changed race” is actually quite robust. Even though examples of this may not be found in the *philosophical* literature, looking at the phenomenon in other academic disciplines brings this to fore. It is important to note that not only are there positions that hold that individual human beings *can* change their race, but that human beings (in general) do so more often than one may think. From an institutional standpoint, this happens for large numbers of people across iterations of partaking in national census instruments. The US Census Bureau has particular methodological assumptions and modifications for people who “change race” from one iteration of a census to another (see <https://www2.census.gov/programs-surveys/popest/technical-documentation/methodology/modified-race-summary-file-method/mrsf2010.pdf> [Accessed March. 6th, 2024]) For more on this phenomenon, see Eschbach (1993), Liebler et al. (2017), Alba et al. (2018), Bratter (2018), Morning and Saperstein (2018), and Roth (2018). There are plenty of historical examples of people who “changed race”, including Ellen and William Craft, Bella da Costa Greene, Dr. Albert C. Johnston, Merle Oberon, and Elsie Roxborough (to name a few). This is also a *very* common experience of immigrants who move from one country with a particular understanding of racial schema to a different country with different racial categories. Examples in academic literature include the following: Gerstle (2017), Perlmann (2018), Loveman and Muniz (2007), Penner and Saperstein (2013), Roth (2012), Roth et al. (2022), Telles and Paschel (2014), and Wade (2017). Last, there are plenty of examples of “changing race” in literature and fiction, including the following: Sam Merwin Jr.’s *The Passer* (1962), Nella Larsen’s *Passing* (1929), Brit Bennett’s *The Vanishing Half* (2020), Sinclair Lewis’ *Kingsblood Royal* (1947), Jessie Redmon Fauset’s *Plum Bun* (1929), J. Saunders Redding’s *Stranger and Alone* (1951); in films like *Imitation of Life* (1934) and *Lost Boundaries* (1949); and the non-fiction books *We Wear The Mask* (Skyhorse and Page, Eds. 2017), Lukasik’s *White Like Her* (2017), Valentine’s memoir *When I Was White* (2017), and Leibman’s *Once We Were Slaves* (2021).

attempts to define race-as-biological-populations the worry of trying to account for the mobility of human individuals.

Ramification #3: pluralism is still an option

The next conclusion drawn is that Millstein's CIPC concept deals with "the practice and understanding of evolution and ecology."³⁷ Millstein notes that there are different population concepts in fields like sociology and biomedicine; if it is correct that (A) human beings are, under Millstein's CIPC, one continuous biological population (and hence, at the level of *populations*, one biological race) and (B) no human *individuals* have a race when using Millstein's CIPC, this does not preclude the possibility that human individuals (or human populations) have a race in other fields. The racial anti-realist—biological or otherwise—will require a different tack for arguing against racial realism in other fields. As Winther et al. have posited, "The concept of 'population' in ecology and evolution is a potentially useful case study of model, concept, and ontology pluralism in science."³⁸ While it would be pretty convenient for the racial anti-realist to strike a decisive blow in that manner, one consequence for racial pluralists is that race(s) *may* exist socially (and potentially biologically) even if they do not exist as a viable biological kind *within* discussions of evolution and ecology. Conversely, this should serve as a warning to those who think that biological races can generalize from one sub-field to the entirety of biological enquiry. Different biological sub-fields deal with organisms that differ by degree; the fact that biology is messy should be a clear enough indicator that any attempt to over-generalize is futile.

As noted in Winther and Kaplan (2013), the authors highlight how "genuine, reasonable, and irreducible disagreements in biology regarding the ontological status of particular sub-populations are common. Furthermore, these disagreements are not generally the result of disagreements over the basic biological facts, but rather over the correct interpretations of complex genomic data and models."³⁹ My view attempts to hold this line by conservatively keeping the scope of the discussion and argument to evolution and ecology. Biologists in different fields not only utilise different concepts and aims, but they also utilise different models and methods. With respect to different discussions concerning the (purported) biological reality of race, "These sub-disciplines matter because they are crucibles of practice shaping different understandings of racial realities. Indeed, each sub-discipline takes race to be real or not, according to its concepts and aims, and measures and models."⁴⁰

One important challenge to the argument presented in the paper is that there may be different metrics for measuring the integration of both survival and reproductive interactions. If this is the case, then it could also lead to population pluralism (and therefore, biological race pluralism) within an evolutionary and ecological

³⁷ Millstein (2010), pg. 65.

³⁸ Winther et al. (2015), pg. 19.

³⁹ Winther and Kaplan (2013) pg. 60.

⁴⁰ Ibid, pg. 59.

paradigm. If pluralism does extend in this manner, then not only would this be a novel development, but it would run contrary to the argumentative claim that this paper makes: that within the confines of evolution and ecology, that human beings are one continuous population. To further elaborate the point: a set of metrics (that are different to the ones that have been mentioned in the paper) could lead to the conclusion that human beings are a patchy population (in line with Millstein's position).⁴¹ This is a challenge that is taken seriously—as mentioned in the discussion of ramification #1, I provided a sketch of how a measure would help to bolster my claim. Given that I have provided a sketch (or speculative solution), the strength of my argument rests on a conditional claim that I have (or am able to develop) a measure that is successful in providing the strength that would be needed to rule out pluralism in evolution and ecology. I do acknowledge that this is a possibility, but I have hoped to illustrate that (A) that this is beyond the scope of the current discussion; and (B) a development that may not have as much of an impact on some of the other ramifications mentioned in this paper.

One way that this plays out is the following: even if it is the case that there is pluralism within the confines of evolution and ecology, it still seems to be the case that *individual* human beings do not themselves have races. Again, whether human beings are one continuous population (as I have argued), or they are a patchy population (which is Millstein's position), the bearer of races is at the population level, and not at the level of the individual. This is because of the features of Millstein's CIPC, and this would hold if any of the cases that were discussed earlier obtained.

Ramification #4: biological racial terms go beyond “common sense”

While it should be clearly and forcefully noted that Millstein does not use the term *race*, I believe that the preceding point needs to be reiterated in the strongest sense. From the aforementioned exploration and arguments put forward in this paper, *even if* human beings have biological races, there is no empirically justified reason to think that they correspond with racial terms that are in use by some subset of the general public. My account has notably left absent any discussion of “common sense”⁴², “predefined”⁴³, “classical”⁴⁴ or any other so-called “basic” or “fundamental” racial categories. This has been deliberate: if we are to truly make progress on this question, we (as an epistemic body) need to challenge the direct importation of these naïve racial categories into technical discussions of the empirical world.

In this regard, an incredibly good example of this is found in Pigliucci and Kaplan (2003)—the authors provide an argument that considers whether some human populations can have ecotypes, albeit absent any use of “common sense” racial terminology. In the academic literature, there is a plethora of evidence (both recent and historical) that illustrate how there are no cross-cultural, universal, or time-invariant

⁴¹ The author thanks an anonymous reviewer for their comment.

⁴² Andreasen (1998, 2004, 2005).

⁴³ Rosenberg (2002).

⁴⁴ Lewontin (1972).

racial concepts.⁴⁵ To illustrate this point further, consider Darwin's (1871 [2009]) cataloguing of the debate about human races in *The Descent of Man and Selection in Relation to Sex, Volume 1*. Darwin noted that there was deep disagreement amongst scholars regarding the exact number of human races were in existence. At the lower end were Virey (2 races), Jacquinet (3 races), and Kant (4 races); at the higher end were Morton (22 races), Crawfurd (60 races) and Burke (63 races).⁴⁶ The fact that there was absolutely no consensus then (as today) should give serious pause to anyone who makes the claim (without a sufficiently well-articulated and strong argument) that they know how many biological races there happens to be in existence.

Given the contemporary sociological and linguistic evidence, along with historical evidence from Darwin himself, it would be *contra* empirical facts—and incredibly ethnocentric, ahistorical, epistemically irresponsible, and intellectually bankrupt—to hold the view that (A) racial categories are the same for all linguistic contexts; (B) these same racial categories are time-invariant; (C) contemporary racial categories in various socio-linguistic contexts have the ability to accurately and consistently capture phenomena in the past; (D) contemporary racial categories in various socio-linguistic contexts have the ability to accurately describe and refer to phenomena in the future; and (E) that these categories can be imported into technical biological contexts and be used in ways that accurately capture *biological* phenomena.

This bears repeating: racial concepts and terms *unsurprisingly* vary across linguistic communities both inside and outside of the USA.⁴⁷ Attempted uses of racial terms or categories that are used by the “general public” as valid *biological* categories is problematic. Arguably, given the focus on US racial discourse that was recently reprised in Spencer (2019), the framing of US racial discourse as the “only” or “major” discourse for philosophical investigation can be seen as utterly hegemonic. Given what we know about how human “races” have been constructed in biology⁴⁸, it would make sense to cleave racial categories in use by the general public—which has been predominantly US-based in the philosophical literature, but has been more sensitive to other socio-linguistic communities in other fields like sociology—from the attempt to ascertain if *race* is a viable biological kind.⁴⁹ If previous accounts were *really* interested in figuring out if races existed at the level of populations, they would forgo the temptation of using non-technical terms which bring in historical baggage that has, in the best-case, previously tainted efforts at classification; and in the worst-case, has helped to solidify completely unjust hierarchical power structures, imperialistic mantras, and doctrines that have discriminated against the liberty and freedom of individuals to pursue their own ends in light of

⁴⁵ For a non-exhaustive list, see Aspinall and Song (2013), Davis (2001), Gannett (2000, 2004, 2010), Glasgow (2003, 2008, 2009), Diamond-Hunter (2020), Kaplan and Winther (2014), Loveman (2014), Omi and Winant (1994), Perlmann (2018), Prewitt (2013), Rodríguez (2000), Sansone (2003), Shulman et al. (2009), Shulman and Glasgow (2010), Thompson (2016); Roth (2016).

⁴⁶ Darwin (1871 [2009]), pg. 226.

⁴⁷ Appiah (2006), pg. 369.

⁴⁸ Gannett (2004).

⁴⁹ Spencer (2012)

their purported group membership.⁵⁰ As noted in the previous section, this ramification would hold even if it is found that within an evolutionary and ecological paradigm, that pluralism exists. Nothing about this hypothetical change would alter the conclusion that biological racial terms go beyond “common sense.”

Conclusion

Given a thorough exploration of Millstein’s CIPC, it has been conditionally shown that human beings form one continuous population, based on the fact that the survival interactions and reproductive interactions are greatest when considering them in a context that includes *all* human beings as opposed to any smaller grouping of human beings. If races are populations, it follows that there is only one biological race with respect to “the practice and understanding of evolution and ecology.”⁵¹ For biological racial realists, this is a burden: the belief that races are populations (including the belief that supposed “common sense” races *are* those populations) has been eliminated. The best that a biological racial realist can now do is to be *pluralistic* regarding biological races. Biological racial realists will have to come up with a different race concept that answers a different research question, for if Millstein’s CIPC concept is correct, evolution and ecology is covered.

If my argument holds, it is a boon for anti-realists: if human beings, at the level of populations have only one race, but at the level of the individual have *no* race, then this is the start of eliminating some types of biological racial realism *on biology’s own terms*. For proponents of biological racial realism, this is a disappointing outcome. This is especially so given that the claim has been advanced that race “routinely arises as a level of human genetic clustering”, likened to steam whistling from a tea kettle.⁵² Given a number of decades’ worth of culturally-laden biological writings on race⁵³, it appears this is (A) the start of the slow (and timely) decline of the notion that there are biologically real races for *individuals* and (B) the eradication of the belief (especially in academic circles) that so-called “common sense” races *are* biologically real.

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⁵⁰ See Gaulton (1909); Adams (1990), Kuehl (2013), Sanger (1950), Paul (2018); Meloni (2016).

⁵¹ Millstein (2010), pg. 65.

⁵² Spencer (2013), pg. 119.

⁵³ See Gannett (2010), Kaplan and Winther (2014).

Declarations

Conflict of interest The author declares that they have no Conflict of interest.

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