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Genomic Contextualism, Genetic Determinism, and Causal Models

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Garrison et al (2018) provide an insightful critique of the unproductive debates within the policy idiom of genetic exceptionalism. The authors clearly define a new idiom of genomic contextualism as a concept highlighting the importance of considering how genomic information is both similar to and distinct from other medical areas when making policy and practice decisions. By employing systematic rhetorical analysis and stasis theory they illustrate how genomic contextualism can operate as a productive framework for assessing genetics and genomics and move beyond the limits of genetic exceptionalism. However, their focus is solely on *use* contexts for genomic information. Despite the clarity of their conceptual definition, the notion of genomic contextualism could be expanded to also serve as a conceptual tool for intervening in polarized policy debates about genetic determinism. Genetic exceptionalism and genetic determinism have different meanings but there are shared or synergistic aspects; genetic determinism has been called an “extreme form” of genetic exceptionalism because the idea that genes determine who you are can help lead to a focus on genetics to the exclusion of other causal factors (Minor 2015). There is a risk of muddying the conceptual waters with an expanded definition, but genomic contextualism could also serve as a helpful idiom within contentious debates about the causal relationship between genes, environments, and social forces, and the social and health policy decisions made based on beliefs about causality. Disease causality is a notoriously difficult topic to discuss within and across disciplines and expert and public domains. Genomic contextualism has promise as a new policy idiom highlighting the context dependency of ‘what causation is,’ since different fields adopt fundamentally different causal models (Smart, 2016).

Fighting against genetic determinism has been called a battling of the undead (Oyama 2001, Kitcher 2002). Diagnoses of the root cause differ, but overall this “zombie” frame captures the indelible persistence of the problem of ascribing too much power to the causal role of genes, with socially detrimental effects. As Griffiths (2002) explains, there is disagreement as to whether the problems with genetic determinism are attributable to scientists’ limitations in causal thinking (Oyama 2001) or the challenges of communicating complexity to wider publics when the desire for simpler explanations abound (Kitcher 2002). While there has been hope that frameworks for gene-environment interaction could combat genetic determinism, it has been suggested that “interactionist talk” is not sufficient for challenging genetic determinism because it still privileges the causal status of genes (de Melo-Martín 2005) and further that gene-environment interaction and social determinism frameworks use

a proximal-distal divide which distort and conflate space, time, level, and causal strength (Krieger 2008).

This commentary makes a case for broadening the policy idiom of genomic contextualism to address not only limitations with rhetoric surrounding genetic exceptionalism, but also genetic determinism and gene-environment interaction. Not only could genomic contextualism highlight the importance of making judgments about how genomic information is both similar to and distinct from other medical areas in various use contexts as Garrison et al suggest, but it is an idiom that could also highlight the making of judgments evaluating the causal role of genomics in different contexts, and when genomics is given too much, or not enough, ‘causal salience’ (Furman 2017). To make the case for a broader definition of genomic contextualism, I will briefly describe an impasse in causal debates about HIV/AIDS as an example of what the idiom of genomic contextualism can offer to policy debates over and above genetic determinism.

HIV/AIDS has been a site where causal dueling has had catastrophic health effects; in the 2000s as viral determinism emerged as the dominant paradigm, it clashed with accounts that not only emphasized socioeconomic factors like poverty and malnutrition but rejected the role of the virus, resulting in an AIDS denialism policy which ultimately caused hundreds of thousands of illnesses and deaths in South Africa (Furman 2017). While genetic determinism has not been an overriding moral concern in the HIV/AIDS space, HIV/AIDS has one of the best known examples of genetics playing a highly causal role in infectious disease--the CCR5delta32 mutation, often called the “HIV resistance gene” (Jackson 2015). CCR5 is a co-receptor on the surface of cells, and the delta32 mutation prevents HIV-1 from entering the cell. CCR5delta32 intersects with the ethics and politics of race and ethnicity in biomedicine, because it is more common in Northern Europeans and rare or absent in other populations (Jackson 2015). The idiom of genetic determinism would rightfully question whether the genetics of HIV is given too much focus, policy emphasis, and resources over other strategies for addressing the disease, such as prevention programs targeting transmission behaviors. Because the human genetics of HIV is dwarfed by research on the virus, genetic determinism has not been a major problem in HIV/AIDS. However, the CCR5delta32 mutation is at the center of HIV cure research, and may see more focus, policy emphasis, and funding as stem cell research and gene editing techniques continue to expand.

Especially in cases where genetics is not overemphasized, the idiom of genomic contextualism holds advantages over genetic determinism, by drawing our attention to questions to how genomic information is being used in different contexts and whether those contexts have different causal frameworks at play. Applied to the CCR5delta32 case, genomic contextualism would highlight specific ethical issues that arise in policy and practice, such as the challenges of targeted recruiting of homozygous carriers for research and donation of stem cells and the social and behavioral implications of returning genetic results about HIV resistance. In its expanded form, it also sheds light on why genomics has much greater causal salience in biomedical policy contexts that focus on treatments and cures, and less causal salience in public health contexts where prevention-oriented strategies predominate. In each context, causal pragmatism--the prioritization on what professionals in each domain can control (Krieger 2008)--influences the causal salience of genomics in

different environments. Recognizing differences in causal frameworks may be sufficient for resolving translative stasis; disputants can agree on what actions should be taken, without trying to resolve underlying (and perhaps incommensurable) philosophical differences in causal frameworks.

Many trends make genomic contextualism a timely intervention in policy debates about ethics of regulating genomic information. With the rise of precision medicine and precision public health; big data and the increasing aggregation of multiple data streams, genetic and non-genetic; and transdisciplinary efforts to untangle the etiology of complex polygenic diseases, it will be especially important to understand the changes in the contexts, forms, and uses for genomic information with nuanced and systematic approaches like genomic contextualism.

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