“The train has left the station”: The arrival of the biosocial sciences in education

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The 21st century is saturated with technological advancements that have given rise to a number of scientific efforts aimed at better understanding ourselves. While previously the debate might have been one of ‘nature’ versus ‘nurture,’ the completion of the Human Genome Project in 2003 marked the beginning of the ‘postgenomic era.’ The conversation has since shifted toward one of ‘nature’ and ‘nurture.’ Human behavior is now increasingly studied in the common ground between biology and sociology: the bio-social sciences. This area of research includes fields such as neuroscience, epigenetics, and molecular genetics.

Examples of society’s new relationship with the biosocial sciences abound. Today, easy-to-use tool-kits for under $100 from companies like 23andMe have made genomic data more accessible than ever before (23andMe, n.d.). Researchers are studying the interplay between epigenetics and cancer (Yegnasubramanian et al., 2019) and the neuroscience of addiction (Humphreys and Bickel, 2018). Actress Angelina Jolie announced her decision to have a bilateral mastectomy after genetic testing revealed she had the BRCA1 gene mutation (Igoe, 2016). The UK Biobank contains the health information, including DNA samples, of...
500,000 volunteer participants that are available for researchers (“UK Biobank,” n.d.). The biosocial train has left the station and is embarking on a global journey.

However, this revolution is not just transforming the biomedical and healthcare landscape; it is entering into education research. As the reader will find in this Special Issue, the use of scientific ideologies to make sense of differences between individuals and groups in and out of schools is not new; there is a long and burdened history preceding 21st century biosocial scientific research (e.g. Evrie, 1868; Galton, 1869; Jensen, 1968; Shockley, 1972). Nonetheless, new windows into the study of human behavior and social outcomes are being opened, now possible due to rapidly decreasing costs (National Human Genome Research Institute, n.d.). These developments raise important social and ethical questions: Are the biosocial sciences ushering in a new era of research in education? What does the onslaught of data from the biosocial sciences mean for schools, teachers, and children from the perspectives of both policy and practice?

As researchers turn toward more “molecularized” (Braun, 2007; Fullwiley, 2008; McGonigle and Benjamin, 2016; Rose, 2007), or physiological, explorations of what makes us the same and what makes us different, I began to think about the implications of these developments for education. The idea for this Special Issue was born out of a symposium I organized at the 2016 American Educational Research Association (AERA) annual meeting entitled Dystopian DNA? Public Education, Genetics, and the Popular Imagination. The symposium brought together multiple perspectives to look at the use of Science-informed arguments in education. Dystopian DNA raised larger questions about the hold of historical and new knowledge on the imaginations of educators and educational institutions and the new conceptualizations of social inequality, identity, and policy that might emerge – important questions that required further conversation. I realized that the application of the biosocial sciences within education was far more expansive than the symposium covered. The outlook is also not wholly dystopic – where there is threat, there is also possibility. Where there is an ugly history, the future is uncertain but not predetermined.

As such, the intention behind creating the Special Issue Education, Biosocial Sciences, and the Popular Imagination is to expand the conversation started at AERA. This collection looks at how biosocial sciences are used and could be used within educational spaces and explores the threats and possibilities research in this domain pose to equitable public education. The lens taken within this Special Issue is a wide one, meant to provide a breadth of perspectives on a growing number of biosocial applications within education. Through it all, this Special Issue remains grounded in an awareness of the structural and oppressive inequalities that have always defined our societies. Importantly, this collection does not seek to universalize or legislate findings from the biosocial sciences. Yet, it recognizes the gravitas increasingly affixed to the biosocial sciences and the field’s hold on the popular imagination. By bringing attention to the place the biosocial sciences is taking up in education, this Special Issue hopes to encourage
proactive and cross-disciplinary work that tackles difficult questions around policy, practice, and equity.

This collection of works builds upon previous scholarship on biosociality and education. It intends to further the conversation on the “reverberations, celebrations, repulsions, worries, concerns, excitement at new possibilities, joyful inventions, [and] fears” (Gulson and Baker, 2018: 159) that come hand-in-hand with the uncertainty of the biosocial sciences. The application of biosocial research within education practice and policy is catalyzed by the development and spread of new biological rationalities in education that have generated a series of discourses. New biological rationalities are transforming conversations about stress in high-stakes education environments (Youdell et al., 2018), understandings of mindfulness (Baker and Saari, 2018), and thoughts on how to enhance performance of education systems (Williamson et al., 2018). The biosocial sciences are not just changing the kinds of research we do in education or reframing our approaches to education policy, they are shifting how we think about and understand the student and the teacher and what it means to educate.

The content of this collection

The timely contributions in this Special Issue are international in focus and explore the growing interface between the biosocial sciences and education. The issue begins with papers that are more applied in nature and ends on a conceptual note, leaving the reader with a sense of both the positive and negative possibilities. Over the course of the Special Issue, the reader will get an appreciation for how epigenetics, behavioral genetics and social genomics, sensing technologies, and neuroscience are impacting upon education. It is my hope that this collection also encourages readers to consider the social, ethical, political, and policy implications of such developments. This collection stresses that careful ethical consideration needs to be given to the application of the biosocial sciences in education. Systems built on inequality and the dispossession of racially defined and low-income people have been structured to repeat previous patterns and grievances, proactive measures will need to be taken to resist their reoccurrence, whether in new or familiar forms.

The Special Issue begins by studying the turn towards collecting biometric and environmental data in education. Such a development has given rise to “smart schools” that heighten regulation and monitoring in the educational environment. In *Relational architecture and wearable space: Smart schools and the politics of ubiquitous sensation* (Freitas, Rousell, and Jäger, 2019), a collaborative team of education researchers, critically analyze and re-imagine “the widespread development of smart schools across the UK, many of which are embedded with complex sensor networks that regulate learning environments through context-aware building management systems” (p. 10). Freitas et al. explore the implications of decentralized sensor networks in learning environments by drawing upon a number of recent projects in contemporary art, architecture, and interaction design. In doing so, the
authors elucidate a certain tension that is woven throughout much of this Special Issue: the perils and promise of the biosocial. The authors show that the amassing of biometric and environmental data raise key political and ethical questions about privacy and surveillance but also highlight the potential to enhance somatic, social, and environmental sensibility among young people.

As Freitas et al. demonstrate, the “nature–nurture” binary is dissolving in the post-genomic biosocial era we find ourselves in today and altering our understandings of education and what is possible in ways previously unimaginable. ‘DNA Dreams’: Teacher Perspectives on the Role and Relevance of Genetics for Education (Martschenko, 2019) looks at one proposed application of behavioral genetics in education: precision education. Precision education constitutes a proposed education system (Asbury and Plomin, 2013) in which genetic data are used to shape students’ Individualized Education Plans. This paper casts its gaze on the American educational system, an institution marred by racial and socioeconomic inequality. Focusing on primary and secondary school teachers, the paper examines how developments in the field of behavioral genetics interact with teacher perceptions of intelligence and seeks to capture teacher views on the role and relevance of genetic data in their educational practice. While teachers saw promise in the use of genetic data in education, they also harbored anxiety about equitable application and expressed fear of misuse. These valid concerns contribute to the host of ethical considerations raised in this paper for educators, policy-makers, and researchers to consider.

Previous patterns and grievances that give rise to ethical considerations pertaining to the biosocial sciences are partially rooted in the tendencies of individuals and communities to understand themselves in relation to an “other” (Douglas, 1966). The practice of differentiation has historically been a blessing and a curse. On the one hand individuals celebrate difference – the consumer genetics movement is a prime example of the desire to understand one’s unique ancestral background (e.g. 23andMe, n.d.; New Life Genetics, n.d.). On the other, however, is the use of “difference” to legitimize inequality and validate marginalization. In his contribution, sociologist of education Martin Myers looks at an increasing body of academic work using genetic studies of Roma. These genetic studies are employed to try and understand the lives and histories of Roma. For instance, Myers stresses that work in population genetics linking the descendants of the Roma to the Indian subcontinent and research in molecular genetics on common health issues in Roma communities such as obesity or high cholesterol levels need “to be contextualised within the wide-ranging historical oppression of Roma people” and the “denial of human rights and a lack of access to education” (p. 55). An Inheritance of Exclusion: Roma education and the turn to biosocial solutions considers (Myers, 2019) the possible application of these genetics studies to educational interventions aimed at improving the educational outcomes of Roma students. Myers concludes that a failure to recognize the wider historical context will simply maintain centuries of racism and exclusion in and out of schools.
Given the need for proactive measures to avoid the repetition of past injustices, what should education researchers do to prevent the biosocial sciences from perpetuating inequitable educational structures? In *Epigenetics, education, and the plastic body: Changing concepts and new engagements* (Pickersgill, 2019), Martin Pickersgill, the Wellcome Trust Reader in Social Studies of Biomedicine, calls for “reciprocal, thoughtful, and critical exchange with bioscientists who seek to address educational issues, or whose work is being enrolled by others to do so” (p. 72). The paper is framed around an exploration of epigenetics and the production of more plastic, or malleable understandings of the human body. Outside of biomedicine, epigenetics and its accompanying perspective on plasticity is gaining ground. One field in which it appears to be making headway is education. Pickersgill draws upon biomedical and education-related texts that to varying extents stand in conversation with each other to show the emergence of a budding discourse between education and epigenetics. In order to achieve the ‘promise of plasticity,’ Pickersgill highlights the need for open, critical, and socially responsible engagement and communication, a message that lies at the heart of this Special Issue.

**All aboard**

The reorientation to biological and physiological processes opens new avenues for education researchers and alongside it new threats and possibilities for education policy, educators, and students. In exploring practical applications, possible applications, and the ensuing implications, this Special Issue holds a certain ‘trifocality,’ looking at the past, present, and future.

As the appeal of the biosocial sciences continues, researchers should avoid narrowing their lens from a number of angles. First, employing a tri-focal perspective will remain critical for those striving for the still-illusive aim of educational equity. Second, within the biosocial sciences, researchers should avoid constricting their gaze to the bio component of the bio-social. The biosocial sciences are interdisciplinary, encapsulating a number of fields of scientific inquiry that seem to offer new ways for thinking about, understanding, and addressing timeless issues in education.

Viewing each individual as unique and offering personalization could afford many benefits to education systems that often times provide cookie-cutter approaches that are a disservice to students. In other ways, however, the biosocial sciences could encourage researchers to over-molecularize and build education interventions or policies that see students as sets of dynamic physiological processes rather than beings informed and shaped by societies steeped in structural inequality. More worrisome is the application of the biosocial sciences in a world rife with racial and social inequality. A history of research abuse (Brandt, 1978) and the deployment of unsubstantiated arguments about the biological nature of racial (Evrie, 1868) and socioeconomic (*Buck v. Bell*, 1927) inequality means that cautious and proactive measures are needed to ensure today’s biosocial research does not follow the poisoned paths of previous eras.
As this Special Issue reveals, the biosocial train is en route. It will be up to the education research community to foster interdisciplinary and multi-discursive conversations that prevent these new technologies from obscuring ethical uncertainties and reconstituting sociocultural assumptions. The biosocial sciences can be contested and charged. Creating constructive avenues for communication that keep equity in mind will mean talking together rather than apart. I intend this Special Issue to invite more into the conversation. The biosocial train may have left the station, but there is a long and uncertain journey ahead.

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