Published in final edited form as:

Biol Psychiatry Cogn Neurosci Neuroimaging. 2022 December ; 7(12): 1195–1197. doi:10.1016/j.bpsc.2022.09.009.

Diversity, equity, and inclusivity in biological psychiatry research

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Keywords

diversity; equity; inclusivity; biological psychiatry; neuroscience; health inequities; health disparities

Recent societal events in the United States – such as the lethal impact of police violence against Black men, the disruptions in the lives of migrant children and families, and the growing legal blockade to medical care for transgender and gender diverse youth - has sparked much reflection within professions dedicated to alleviating human suffering and promoting health. Biological psychiatry is committed to understanding the "nature, causes, mechanisms and treatments of disorders of thought, emotion, and behavior" to promote the prevention, recovery, and cure of mental health disorders. Yet while emerging evidence demonstrates that police violence, parental separation and confinement, and restrictive gender affirming care are causes of significant, detrimental impacts on mental health, there remains uncertainty as to how biological psychiatry can address or help prevent such events. At the same time, leaders across public health, regulatory bodies, ethnicity and race studies, gender studies, philosophy, ethics, and implementation science have generated health equity models and frameworks that are ripe for translation into biological psychiatry. This special issue, *Fumbling Toward Equity: Reimagining Biological Psychiatry through a lens of Diversity, Equity, and Inclusivity (DEI)*, explores how interdisciplinary principles of diversity, equity, and inclusivity (DEI) can inform this emerging area in biological psychiatry research.

DEI principles are commonly applied with the intention to ensure just outcomes across recruitment, retention, advancement, and belonging within a defined setting (e.g., school, business, or healthcare setting). When DEI is applied to biological psychiatry research, these goals may shift to justice in the context of optimizing individual or group mental health. Clarity and specificity in DEI processes and outcomes are necessary for understanding the purpose of DEI in biological psychiatry and in order to achieve justice in mental health. In the context of this special issue, justice in mental health may encompass three broad concepts: (1) that there are *inequities* in mental health, where inequities refer to

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the forces that disproportionately impact the mental health of individuals whose identities or characteristics have historically, or currently, elicit discrimination or exclusion; (2) that restoring *equity* in mental health is necessary to ensure that each individual has fair and just opportunities to experience wellbeing; and (3) that by ensuring mental health equity, we may be able to eliminate the *mental health disparities*, or population-level differences, that plague people or groups who are, or have historically been, disadvantaged, excluded, or disempowered (i.e., marginalized)(1). In this context, DEI refers to intentional processes that ensure biological psychiatry as a field conducts research examining inequities as causes of poorer mental health, builds on understanding of mechanisms by which inequities may operate, and develops systems that provide equitable mental health treatments for diverse individuals and communities.

Biological psychiatry's desire to (re)commit to mental health equity answers the necessary questions of "Who, what, when, and why?" when considering systems-level change. Yet, the critical and collective question of "How?" remains unanswered. Without an answer, this question could become a sticking point that stagnates the desired change in biological psychiatry. Organizational approaches to addressing sticking points highlight two key themes: reconsidering "old" knowledge to develop new ideas and finding stability in effective, potential strategies to promote advancement(2). Reconsidering knowledge and how it is acquired, or questioning what we believe to be true, is a core component of scientific inquiry, yet is often at odds with systems where evidence is believed to accumulate and self-correct over time(3). Anthropologists and implementation scientists point to the role of combining postcolonial and reflexivity theories in research as strategies for reconsidering knowledge with the intention of addressing health equity(4). These theories encourage researchers to explore the juxtaposition between the developing Western world and modern science to understand who was not included in research, what was not measured, and who the research does not serve before examining how scientific beliefs, judgments and customs may perpetuate exclusionary or biased science. Applying these theories may help researchers focus on ways to improve mental health equity by shifting historically prioritized explorations of inherent differences between groups causing disease (i.e., "social selection") toward more compelling evidence for environmental causes that are more frequently experienced by certain social groups mediating health inequities (i.e., "social causation").

Re-examining knowledge must be paired with research leading to effective strategies that promote health equity. Health equity models and frameworks can translate into biological psychiatry, and biological psychiatry can add depth to these frameworks when considering mental health equity. Importantly, comprehensive *health equity* frameworks acknowledge that social relationships and networks, structural forces, individual and physiologic factors across the lifespan or generations can all influence risk for, or protection from, poorer health outcomes(5). These models call for understanding how biological, cognitive, and psychological processes interact with the aforementioned factors to promote interventions that improve individual and physiological factors toward achieving health equity. Other frameworks focus on specific components of health equity models. At systemic levels, *structural violence* frameworks examine how social, economic, and political systems impact individuals and their local neighborhoods/networks to lead to poorer individual health outcomes or syndemics that more commonly affect marginalized people(4). *Social mobility*

theories examine how factors, such as socioeconomic status, associated with being a “lower class” person lead to lifelong and intergenerational patterns of environmental exposures and to socially patterned health risks(6). At an individual level, *minority stress* theory aims to understand how the individual experiences of being a marginalized person, either through external or internal factors, create chronic stress that can lead to poorer health outcomes(7). *Intersectionality* theory highlights how social and structural forces interact to expose particular populations who hold more than one marginalized identity to multiple forms of discrimination(8). These frameworks, which prioritize marginalized voices, has been linked to mental health among marginalized communities. Biological psychiatry can use and adapt these frameworks to understand vulnerabilities, mechanisms, and pathways to understanding risk for, and protection again, poorer mental health and work towards promoting wellbeing for marginalized communities (for example, see Forbes et al., 2021[9]).

Although the broader field of psychiatry is well-poised to continue iterating toward improving mental health equity, researchers in biological psychiatry have some unique and compelling opportunities to adapt research methods that ensure translatability to the populations that are most impacted by the “disorders of thought, emotion, or behavior”. For example, the field of biological psychiatry can apply the same degree of rigor and ethical conduct to DEI in research as is applied to research design, methodology, and interpretation(10). When considering research design, particularly for large-sample and longitudinal studies that are likely to shape biological psychiatry research and health policies for decades to come, researchers can thoughtfully select measures that are accurate for individuals in diverse communities. Such processes include deliberate consideration and reporting of methods for demographic data collection, including being able to articulate why demographic data is being collected or omitted, for which demographics, with what tools and their validity and reproducibility. Researchers could also consider which social and structural factors may influence results and include one or more measurement tools that capture this level of influence. For other measurements, tools that have validity and consistency within diverse populations may be prioritized. When analyzing data, researchers can become familiar with principles of ethical data analysis, including justifying the use of demographic variables in models and acknowledging the unintended consequences, of variable inclusion or exclusion. For models that do include demographic data, researchers may carefully consider any potential biases or implicit messaging when defining a reference group as the majority so as not to perpetuate ideas that majority groups are the standard for comparison. Particular to health equity, it may be helpful to consider within-group designs as analytic strategies that could inform how research impacts marginalized communities directly and not in relation to other groups. Finally, biological psychiatry can consider ethical community-engagement and participatory methods to engage diverse research participation, while simultaneously taking care amidst universal scarcity of treatment resources to not obscure the ethical boundaries between clinical care and research. The more comprehensively biological psychiatry can adopt such practices with humility, trust, and openness to iteration, the quicker we will be able to implement the full breadth of the latest scientific advancements to enhance health for diverse communities.

The articles in this special edition highlight some of these points and frameworks from critical perspectives and disciplines aimed to re-examine knowledge and promote

interventions that improve mental health equity. In their commentary, Arredondo, Garcini, & McLaughlin first discuss the importance on the neurobiological mechanisms linking stigma, discrimination, and social inequality with psychopathology to provide insights into social determinants of neurobiological functioning(11). From contrasting perspectives, reviews from Rosler & Amodio consider the developmental processes by which prejudice is formed, represented in the mind, and expressed in behavior(12) while Uddin & De Los Reyes consider how developmental processes underlying perceptions of identity-related differences may impact risk for and resilience against psychopathology in marginalized communities(13). Hastings, Guyer, & Parra extend this to discuss how social and structural determinants of mental health impact neurobiology within marginalized adult communities broadly(14) while Grasser & Jovanovic specifically examine how determinants associate with race (e.g., racism) can influence mental health through their impact on specific neural networks(15). Using Black feminist and intersectional frameworks, Carter et al. examines how the biological embedding of racism can impact mental health inequities among Black women(16). In parallel, Javanbakht & Grasser examine how combinations of climate change, conflict, and trauma can impact forcibly displaced communities(17). Edmiston & Juster critique neuroimaging studies of sexual and gender minority (SGM) individuals, which have focused on the differences in neural structure and function by sexual orientation identity(18). In an original research paper, Eckstrand et al. uses minority stress and diathesis-stress models to demonstrate that neural reward systems moderate associations between victimization due to sexual orientation (versus sexual orientation identity itself) and depression(19). Several reviews discuss how biological psychiatry research can move towards developing and promoting interventions that can improve health equity. Singh et al considers how social resilience, defined as the power of groups to cultivate, engage in, and sustain positive relationships that endure and recuperate from social adversities may mitigate the impacts of structural racism on mental health(20). Aghi et al examines how animal models of gender affirming hormone therapy can be used as a component of translational research to support transgender, nonbinary, and/or gender diverse individuals(21). Finally, Zurn et al. highlights the importance of reconsidering “psychopathology” in biological psychiatry research in relation to disability, and the need for research processes that include representation and community accountability(22).

We are at a pivotal point. We want to advance mental health equity, to promote thriving in marginalized communities that have been disproportionately affected by disorders of mental health, and to end mental health disparities. Now is the time to engage in critical dialogues between contemporary theories of health equity and the generation of science in biological psychiatry and related fields. We can do this so that we do not repeat our past assumptions that science will self-correct alongside social norms. To truly use biological psychiatry to reduce suffering and promote wellbeing, we have a tremendous opportunity to lead and set the tone for change. We can play to the strengths of our field to help us, including engaging interventions that lead to effective behavior change at individual and social levels or develop methods that enable learning amidst uncertainty. In areas where we may feel we are starting from scratch, let us nurture emerging areas of inquiry, and build collective and collaborative energies to sustain adaptive change.

Acknowledgments:

Society of Biological Psychiatry (SOBP)'s Ambassador Program and its alliance with the Society's Inclusivity Taskforce and Education Committee

Disclosures:

Dr. Eckstrand has received research support from the National Institutes of Health and the Klingenstein Third Generation Foundation. Dr. Singh has received research support from the National Institutes of Health, Patient Centered Outcomes Research Institute, Johnson and Johnson, and the Brain and Behavior Research Foundation. She is on the advisory board for Sunovion and Skyland Trail, is a consultant for Johnson and Johnson, Alkermes, AbbVie, and Neumora. She receives honoraria from the American Academy of Child and Adolescent Psychiatry, and royalties from American Psychiatric Association Publishing and Thrive Global. Dr. Ajilore has received research support from the National Institutes of Health. He is a co-founder of KeyWIse AI. He also serves on the advisory boards of Embodied Labs, Blueprint Health, and Sage Therapeutics.

References

1. Association AP. Inclusive language guidelines. 2021.
2. Rivkin JW, Siggelkow N. Organizing to strategize in the face of interactions: preventing premature lock-in. Long Range Planning. 2006;39(6):591–614.
3. Brownson RC, Fielding JE, Maylahn CM. Evidence-based public health: a fundamental concept for public health practice. Annual review of public health. 2009;30:175–201.
4. Snell-Rood C, Jaramillo ET, Hamilton AB, Raskin SE, Nicosia FM, Willging C. Advancing health equity through a theoretically critical implementation science. Translational behavioral medicine. 2021;11(8):1617–1625. [PubMed: 33904908]
5. Peterson A, Charles V, Yeung D, Coyle K. The Health Equity Framework: A science-and justice-based model for public health researchers and practitioners. Health Promotion Practice. 2021;22(6):741–746. [PubMed: 32814445]
6. Adler NE. Health disparities through a psychological lens. American Psychologist. 2009;64(8):663. [PubMed: 19899862]
7. Meyer IH, Frost DM. Minority stress and the health of sexual minorities. 2013.
8. Crenshaw K. Demarginalizing the intersection of race and sex: A black feminist critique of antidiscrimination doctrine, feminist theory and antiracist politics. u Chi Legal f. 1989:139.
9. Forbes EE, Eckstrand KL, Rofey DL, Silk JS. A Social Affective Neuroscience Model of Risk and Resilience in Adolescent Depression: Preliminary Evidence and Application to Sexual and Gender Minority Adolescents. Biol Psychiatry Cogn Neurosci Neuroimaging. 2021;6(2):188–199. [PubMed: 33097468]
10. Alegría M, NeMoyer A, Falgàs Bagué I, Wang Y, Alvarez K. Social determinants of mental health: where we are and where we need to go. Current psychiatry reports. 2018;20(11):1–13. [PubMed: 29368239]
11. Arredondo MM, Garcini LM, McLaughlin KA (2022): Integration of Equity and Diversity Frameworks to Advance Biological Psychiatry. Biol Psychiatry Cogn Neurosci Neuroimaging 7:XXX–XXX.
12. Rösler IK, Amodio DM (2022): Neural Basis of Prejudice and Prejudice Reduction. Biol Psychiatry Cogn Neurosci Neuroimaging 7:XXX–XXX.
13. Uddin LQ, De Los Reyes A (2022): Developmental Considerations for Understanding Perceptions and Impacts of Identity-Related Differences: Focusing on Adolescence. Biol Psychiatry Cogn Neurosci Neuroimaging 7:XXX–XXX.

14. Hastings PD, Guyer AE, Parra LA (2022): Conceptualizing the Influence of Social and Structural Determinants of Neurobiology and Mental Health: Why and How Biological Psychiatry Can Do Better at Addressing the Consequences of Inequity. Biol Psychiatry Cogn Neurosci Neuroimaging 7:XXX–XXX.
15. Grasser LR, Jovanovic T (2022): Neural Impacts of Stigma, Racism, and Discrimination. Biol Psychiatry Cogn Neurosci Neuroimaging 7:XXX–XXX.
16. Carter S, Mekawi Y, Sheikh I, Sanders AS, Packard G, Harnett N, Metzger IW (2022): Approaching Mental Health Equity in Neuroscience for Black Women Across the Lifespan: Biological Embedding of Racism From Black Feminist Conceptual Frameworks. Biol Psychiatry Cogn Neurosci Neuroimaging 7:XXX–XXX.
17. Javanbakht A, Grasser LR (2022): Biological Psychiatry in Displaced Populations: What We Know, and What We Need to Begin to Learn. Biol Psychiatry Cogn Neurosci Neuroimaging 7:XXX–XXX.
18. Edmiston EK, Juster R-P (2022): Refining Research and Representation of Sexual and Gender Diversity in Neuroscience. Biol Psychiatry Cogn Neurosci Neuroimaging 7:XXX–XXX.
19. Eckstrand KL, Silk JS, Nance M, Wallace ML, Buckley N, Lindenmuth M, et al. (2022): Medial Prefrontal Cortex Activity to Reward Outcome Moderates the Association Between Victimization Due to Sexual Orientation on Depression in Youth. Biol Psychiatry Cogn Neurosci Neuroimaging 7:XXX–XXX.
20. Singh MK, Nimarko A, Bruno J, Anand KJS, Singh SP (2022): Can Translational Social Neuroscience Research Offer Insights to Mitigate Structural Racism in the United States? Biol Psychiatry Cogn Neurosci Neuroimaging 7:XXX–XXX.
21. Aghi K, Goetz TG, Pfau DR, Sun SD, Roepke TA, Guthman EM (2022): Centering the Needs of Transgender, Non-Binary, and Gender-Diverse Populations in Neuroendocrine Models of Gender-Affirming Hormone Therapy. Biol Psychiatry Cogn Neurosci Neuroimaging 7:XXX–XXX.
22. Zurn P, Stramondo J, Reynolds JM, Bassett DS(2022): Expanding DEI to Disability: Opportunities for Biological Psychiatry. Biol Psychiatry Cogn Neurosci Neuroimaging 7:XXX–XXX.