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The Funding is the Science: Racial Inequity of NIH Funding for Substance Use Disorder Topics Should Be Abolished

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1. Overview.

Analysis of grant funding trends at the National Institutes of Health (NIH) shows that a substantial disadvantage in overall grant award probability suffered by Black applicants remained unchanged from 2011 to 2019 (Ginther et al., 2011; Hoppe et al., 2019). The most recent report further indicated that applications focused on research topics that are of particular interest to African-American / Black Principal Investigators (PIs) are less likely to receive funding, whether the PI of that specific application is white or Black (Hoppe et al., 2019). One contributing factor is that grant proposals with research topics of highest interest to African-American / Black PIs were disproportionately being considered for possible funding by the NIH Institutes or Centers (ICs) with the lowest success rates and the smallest share of the NIH budget (Lauer et al., 2021). One of the Executive Orders signed by President Joseph R. Biden on his inauguration day (January 20, 2021) called for all government agencies to review their practices for disparities of opportunity and service which affect people of color and other historically underserved communities (Biden, 2021). President Biden also charged the White House Domestic Policy Council with the tasks of removing systemic barriers to equity and developing policies which advance equity. The

publications from the NIH show unequivocally that this government agency is built upon systemic barriers to equity, exhibits bias against underserved communities and that it must act to develop policies which advance equity.

In this piece, we outline why this funding disparity is of specific concern for the research interests of the members of the College on Problems of Drug Dependence (CPDD), we recommend that the CPDD demand more specific information from the ICs which fund drug-abuse related research, and we advocate for the NIH to immediately ameliorate the funding disparity which disadvantages both Black PIs and research on topics of interest to communities of color, including the topic of substance abuse. Our primary focus here is necessarily on disparities that have been identified for Black applicants to the NIH, and for the topics that are favored by those applicants, because that has been the focus of the most comprehensive recent analysis from the NIH (Hoppe et al., 2019; Lauer et al., 2021). However, the original reports from Ginther and colleagues (Ginther et al., 2018; Ginther et al., 2016; Ginther et al., 2011) confirmed some funding disparities, albeit of smaller magnitude, associated with applications with Hispanic and Asian PIs. The issues discussed herein regarding the African-American/Black funding disparity likely extend to other ethnic or racial groups.

2. Generic statements of support are insufficient.

In the wake of the murder of George Floyd at the hands of the Minneapolis Police in May of 2020 (Hill et al., 2020), and of Breonna Taylor at the hands of the Louisville Metro Police in March of 2020 (Eby, 2021; Esquierdo-Leal and Housmanfar, 2021; Hoofnagle et al., 2020; Nguyen et al., 2021; Talley et al., 2021), there is currently a broader recognition of the systemic racism that pervades all aspects of American society. In biomedical research, this recognition has largely been related to significant disparities of opportunity for underrepresented scientists; a relevant reading list was curated by N. Bhalla (Bhalla, 2020). Policy statements, Op/Eds and reviews on this topic have been published in numerous scientific and medical fields (Carlezon and Team, 2020; Flores et al., 2019; Gilpin and Taffe, 2021; Henningfield et al., 2020; Mohile et al., 2021; Olzmann, 2020; Segarra et al., 2020; Tulloch, 2020), and academic societies and academic publishing entities have issued statements of commitment to diversity, equity and inclusion (DEI) (Choudhury and Aggarwal, 2020; Hart and Cadet, 2020; Matthews et al., 2019). The scientific community has called on biomedical institutions to address DEI with data,

transparency and improved policies in federal grant awards (Stevens et al., 2021; Taffe and Gilpin, 2021), in membership selection and honorifics (Choudhury and Aggarwal, 2020; Hart and Cadet, 2020), and in the practices of biomedical journals (Carlezon and Team, 2020; Leibenluft, 2020). It is clear that the scientific community expects these statements to be followed by actions (Hart and Cadet, 2020).

The About page of the CPDD (CPDD, 2020) currently contains a one-sentence commitment to diversity *“The College and its members actively promote diversity and inclusion within the College and within our field not limited to race, ethnicity, religion, disability, age, sex, gender identity, or sexual orientation.”* A statement issued by the leadership of CPDD (Weerts et al., 2020), while well meaning, also provided few clearly actionable proposals, lacked specifics about what actions will be taken by the College to combat racial disparities, and lacked recognition of the ways in which entrenched racism is of specific interest to an academic society focused on investigating psychoactive drug use, its harms and its treatments. It should be noted that even the deaths of George Floyd and Breonna Taylor involved substance use; to wit, an allegation of drug ingestion as a causal factor in the death of the former and a no-knock police raid for a suspected illicit drug provider as the cause in the death of the latter. Here, we aim to provide concrete suggestions for direct actions that can be taken by individual scientists, and the College as a whole, to combat racial disparities in biomedical research at large, and more specifically in the field of substance abuse research.

3. Drug abuse research is connected to racial disparities and is important for communities of color.

Substance abuse and substance abuse research are intimately connected to racial disparities in social structures, public policy, health care access. There are also racial disparities explicated within individual substance abuse research domains: for example, the cigarette marketing practices (Lee et al., 2015), possible genetic links (Pagano et al., 2018; Rath et al., 2016) and potential molecular mechanisms (Henderson et al., 2018; Henderson et al., 2017) related to differences in the effects of menthol on smoking behavior. Numerous other mental health topics which influence substance use, including anxiety, depression, post-traumatic stress disorder, etc., are also themselves influenced by race and by racism, as was described by Harnett (Harnett, 2020). Thus, any barriers or

limitations to funding investigations on the role played by race, racism, entrenched disparities, etc, on substance use disorders hampers the mission of the CPDD.

One critical outcome of the recent analyses of NIH grant funding, contrasting applications with white versus African-American/Black (AA/B) Principal Investigators, was the realization that proposals on certain topics, or using particular approaches, are differentially favored (or disfavored) for funding. One such example is the term “substance use”, which appears in one AA/B-preferred word cluster but not in any of the eight word clusters receiving no AA/B applications. Interestingly, the term “*mechanism*” appears prominently enough to be seen in all eight of the clusters receiving no AA/B applications, but in none of the most AA/B favored clusters. This is the first and only such analysis available so, obviously, the specific details may depend on the methodological approaches used in that report. Nevertheless, it suggests that the research and health interests of Black individuals and scientists are being disfavored at the NIH, which has numerous implications.

One of the most powerful translational products of substance abuse science continues to be information (Taffe, 2015). It is therefore important that the information we generate is relevant to the needs of all communities and gains credibility with members of those communities. Correspondingly, we need to assess the degree to which our science is used for what may be unintentionally biased policies which adversely affect communities of color, as outlined by Professor Carl Hart (Hart, 2020). More specifically, we need to advance scientific findings which directly impact the health of traditionally marginalized populations. For example, the FDA banned most e-cigarette flavorants in early 2020 but left menthol untouched, leading to increased sales for this remaining legal flavorant (Diaz et al., 2020). This “flavorant” is in fact a pharmacologically active ingredient of cigarettes which enhances the addictive impact of nicotine by mechanisms (Henderson et al., 2018; Henderson et al., 2016) which may increase vulnerability for nicotine addiction in Black individuals (Abbasi, 2019; Kozlitina et al., 2019). This scientific evidence was not sufficient to persuade the FDA to ban menthol flavorants in e-cigarette liquids. It is not a stretch to suggest that this topic, which has clear implications for broad scale harm reduction, may be of particular interest to AA/B scientists. While the available information on potential racial or ethnic disparities may, at times, fail to influence policy as much as it should, it is obvious that when such information does not even exist, due to research funding bias, it *cannot* influence decision making with respect to different aspects of the substance use problem.

In general, it is critical for the field to know whether there is a neuropharmacological underpinning for differences in addiction rates between subpopulations (including different races), and whether misuse of specific drugs or specific drug combinations produce different rates or severity of negative health outcomes in subpopulations (including different races). It is likewise critical to know whether social, experiential or environmental contributors to substance use disorders interact with race or ethnicity. In fact, research into subpopulation and individual differences in drug use propensity and drug-related health effects has recently become a “hot topic” in addiction neuroscience research, therefore it should follow logically that the field would work to understand, and be funded to investigate, racial (and racist) differences in these outcome measures.

As we expand upon below, the College should demand answers from the NIH if it is indeed serious about addressing broader issues of diversity, equity and inclusion in academic science. The Hoppe et al. (2019) report lacks sufficient granularity on the funding of grants related to aspects of substance use morbidity. Some obvious questions are:

- How successful are grant applications on specific drug addiction-related topics?
- How successful are PIs who are white versus Black when proposing research on specific drug addiction-related topics?
- How are the NIH Institutes of closest interest to the goals of the College acting to ensure that addiction researchers and drug addiction-related research topics are receiving equitable consideration for funding?

4. Lower rates of drug use or drug-related harm in communities of color are also important for majority communities.

One important realization when considering DEI efforts in substance-abuse related research is that it is a mistake to view research on topics of interest to communities of color, and research on the health implications of drug use for historically marginalized / minority populations within the USA, as being only “for” those communities. The prevalence rates of specific mental health and neurological disorders can be lower (e.g., for alcohol use disorder, prescription opioid overdose and misuse, adolescent cigarette smoking) or higher (e.g., marijuana use, major depressive disorder) in Black Americans than they are in the general population (SAMHSA, 2018). As specific examples, Black

individuals are less likely than white individuals to use methamphetamine (Borders et al., 2008; Sexton et al., 2005) and Black substance users receiving treatment for methamphetamine use initiated at an older age than white users (Brecht et al., 2007). In a related vein, lower rates of teenage cigarette smoking are observed in Black youth (Alexander et al., 2016; Feigelman and Lee, 1995), although they are less likely to quit smoking in adulthood (Feigelman and Lee, 1995) and morbidity and mortality related to tobacco use is higher in Black Americans (Alexander et al., 2016). White mothers who use substances are at higher risk of dying than are African-American (0.59 hazard ratio relative to white mothers) or Hispanic (0.66 hazard ratio) mothers (Hser et al., 2012). Lower rates of e.g., heroin overdose in African-Americans (Shiels et al., 2018) may be in part related to a higher proportion of low-frequency versus high-frequency use of injected heroin, compared with white users (Harris et al., 2013). Learning more about the resilience exhibited by *minority* populations may lead to better understanding of social, environmental, psychotherapeutic or pharmacotherapeutic interventions that might help *majority* populations. It is not difficult to reach the conclusion that investigation of differences in drug use rates, drug harms, liabilities and resilience in communities of color may allow greater insight into pharmacological, psychological and/or social interventions which will improve the health of white individuals in addition to that of those from historically marginalized communities.

5. The Funding is the Science

The National Institutes of Health (NIH) provide substantial funding of the research conducted by the members of CPDD, has done so for many decades, and it is indisputable that the funding of research grants in large part determines what research is being conducted. In light of a persisting racial disparity in NIH grant award, referenced in the Overview and discussed previously at length (Taffe, 2021; Taffe and Gilpin, 2020, 2021), one of the most concrete and potentially impactful ways the College can act on their commitments to equity is to demand that the NIH address this grant award disparity. There have been, and are, a growing number of calls to action from NIH to address racial disparities but it is notable and obvious that *these calls for action are coming from individual scientists (Dzirasa, 2020; Gilpin and Taffe, 2021; Stevens et al., 2021; Taffe and Gilpin, 2021), not from institutions (e.g., scientific societies)*. Notably, in a session organized at the 2020 American College of Neuropsychopharmacology (ACNP) meeting aimed at discussing this specific topic, most IC Directors (including the NIDA Director) did

not present, and were not able to produce, race-based funding rates for their respective individual ICs.

If the CPDD is serious about promoting diversity and inclusion, it must:

- take concrete steps to advocate that the NIH redress a clearly identified funding disparity which disadvantages Black PIs.
- demand that the NIH address disparities in the funding rates for research grants aimed at addressing topics of disproportionately higher interest to communities of color, to Black PIs and to the CPDD membership.
- demand that NIDA and NIAAA collect and disseminate data with respect to funding rates according to the race and ethnicity of the PI.
- Demand that NIDA and NIAAA more fully incorporate drug abuse research related to minority health disparities within its usual portfolios across Divisions and Branches, instead of sending grants focused on these topics to the National Institute on Minority Health and Health Disparities (NIMHD), where they compete for funding with proposals on topics unrelated to substance use and where funding rates are lower relative to NIDA or NIAAA.

The questions we should be asking of NIDA, NIAAA, and indeed NCI, NIMH and other CPDD-relevant IC Program Staff, can be derived from the issues addressed by the Ginther and Hoppe studies (Ginther et al., 2018; Ginther et al., 2011; Hoppe et al., 2019). Most critically:

- What are the funding success rates for applications with Black versus white PIs within the Institute or Center?
- What are the success rates within each Division and Branch?
- What are the funding success rates by percentile score and how many applications are selected for funding outside of the order of review (i.e., above the payline)? We must not be misled by the claim of an Institute/Center not having a formal payline (Kienholz and Berg, 2013), and we must insist on analysis that clearly isolates the nearly-inevitably-funded rank grants from those in the less-than-inevitable percentile ranks.

A recent report from the Office of Extramural Research at the NIH (Lauer et al., 2021) shows that when ranking ICs on the proportion of applications received with topics disproportionately mentioned by AA/B applicants, NIDA is 5th and NIAAA is 6th. NIMHD has a

comparatively small budget, 23% of the NIDA budget and just 0.81% of the overall NIH budget in 2020 (NIH, 2021a, b), and yet it is expected to cover health-disparities research across all of the NIH-funded topic domains. The portfolio of NIMHD contains many funded proposals that are remarkably similar in overall topic and methods to other proposals funded by the topic-associated Institute or Center (IC)...save that they focus on minority populations as research subjects or health-related targets. (Interested parties can search for funded proposals by the funding Institute or Center at NIH's RePORTER site <https://reporter.nih.gov/>). In many cases, it appears that the work of a given PI that is funded by NIMHD is extremely similar to that same PI's other work being supported by the topic-specific (or "parent") IC. This creates a situation in which PIs may "double dip" by proposing similar work to NIMHD and the parent IC, but simply add a "minority" or "disparities" twist; whether such health disparities are the essential goal of the research program, or a minor side motivation, cannot be determined. Obviously, these proposals could be funded by the "parent" IC which has better funding rates (Lauer et al., 2021) overall and a much larger budget devoted to the specific health topic at hand. NIMHD in FY2020 had the 4th lowest allocation of funds across all ICs with funding authority, the 2nd lowest funding rate, and by far the highest percentage of applications coming from Black PIs. This is a clear example of entrenched racism in the system, especially when one considers that the shuttling of minority and health disparities grants from the parent IC to NIMHD is made on a case-by-case basis allowing for the introduction of further bias.

The NCI is the NIH IC with the largest share of the budget, amounting to 15.5% of the FY2020 allocation to the NIH. Thus, when representatives of the NIH point to the fact that many AA/B investigators seek funding from the NIH ICs with the lowest funding rates, this should be met with inquiry as to why these topics are underfunded in comparison with demand. And more specifically, it should be questioned why applications that include questions of health disparities and could very easily be funded by the parent IC are being de-prioritized or referred to NIMHD (a decision that is made by the NIH, although the submitting PI may request an assignment for funding consideration) where funding rates are much lower. NIMHD should receive a percentage of the overall NIH budget that is congruent with the number of health disparities applications that it receives, to better align success rates with those of the other Institutes or Centers.

The members of the College should also be asking questions of the NIH study sections that handle a large number of substance abuse-related grants, such as Neurobiology of Motivated Behavior (NMB), Neurotoxicology and Alcohol (NAL),

Biobehavioral Regulation, Learning and Ethology (BRLE), Pathophysiological Basis of Mental Disorders and Addictions (PMDA) study sections, and any study sections administered in-house at the relevant ICs. In-house study sections are particularly important for assessment of the review and award of individual and institutional fellowship proposals, for the large budget/scope P-mechanism Program Projects and Centers and for large U-mechanisms; none of these have been included in prior reports regarding NIH funding disparity (Ginther et al., 2011; Hoppe et al., 2019; Lauer et al., 2021). Some obvious questions to ask are:

- What are the success rates for applications with Black and white PIs within each study section?
- What are the rates of Not Discussed versus Discussed for applications with Black and white PIs within each study section?
- What are the rates of re-submission after an initial version of the application is not funded for applications with Black and white PIs within each study section?
- What is the racial distribution of research component and core leaders in team applications?
- What is the relative participation of Black versus white reviewers in each study section, whether empaneled member or ad hoc?

In short, we should be asking for analyses that were conducted NIH-wide by Ginther, Hoppe and their respective colleagues (Ginther et al., 2018; Ginther et al., 2016; Ginther et al., 2011; Hoppe et al., 2019) to be directed specifically at topics of interest to the members of the CPDD. Again, presentations of IC-specific data on these questions have been scarce to non-existent and we should make it clear that this is unacceptable almost a decade after the initial report was conducted (Ginther et al., 2011).

6. We are peer review

Importantly, the members of the CPDD should also be asking these questions of ourselves. The primary input to the funding of NIH grants is the opinion of the peer reviewers serving on study sections who are often, in the case of substance use disorder research proposals, the members of the CPDD. *We* are the study section reviewers in question. For that matter, we are the grant *applicants* in question. We must understand the degree to which we are implicitly (or explicitly) contributing to the problem. Are we

undervaluing the likely impact of research on topics that are of disproportionately high interest to communities of color? Are we contributing to the inherent circular conservatism of review, e.g., are the proposals that seem most familiar, written in ways we expect to see, using familiar methods, from investigators with training pedigrees we know and revere, the ones that get the benefit of the doubt? Most concerningly, does this lead to less funding of innovative or paradigm shifting work (Stevens et al., 2021) and therefore slow the pace of scientific advance in the fields most of interest to the College? Many of us with NIH study section experience will reflect in private that any grant application up to at least the 33rd percentile (or higher) could be funded with no real objective change in scientific quality or likely impact. Or, put another way, two to three times the number of grants that are awarded could be funded, and all of these would be equally likely to produce tremendously important outcomes. The minor differences that separate clearly fundable scores from ones that require an exception pay decision are almost entirely subjective, in the sense that they result from the accident of the scientific interests and biases specific reviewers assigned to the proposal. This is a time for the members of the College to think harder about how their own scientific biases may be contributing to the broader systemic problem.

7. Publication matters

Publication practices fundamentally influence what scientific research gets conducted because of the role that “productivity” and the assessment of journal prestige play in the career progression of academic scientists. This can lead to a Catch-22 for scientific *topics* that are disfavored for funding and a similar circular trap for Black PIs seeking funding from the NIH. The reports on disparity of grant award often touch on supposedly objective measures of scientific output. The original Ginther study reported no significant impact of the supposedly objective measures of PI scientific productivity (first/last author papers, citations, journal impact factor, etc) on grant success rates (Ginther et al., 2011). However, a follow-up study focused on a random subsample of only half of the original sample concluded that approximately 20% of the Black/white funding disparity could indeed be “explained” by publication metrics (Ginther et al., 2018). These reports ignored, however, the inherent circularity of many supposed objective measures. The number of citations of individual scientific papers is related to the vigor of a given sub-field, meaning the number of publications that appear in that field over time and cite prior publications. Journal prestige, as operationalized by the Journal Impact Factor, is

determined by citations as well. The number of publications that appear in a given sub-specialty of science is related to the amount of funding in both the acute/immediate sense and over time. In this way, academic dynasties which create a cascading family of like-minded and like-interested researchers can greatly influence citations, perceived importance of topic domains by virtue of the peers who are reviewing manuscripts, grants and tenure files for years and indeed decades. Interestingly, a recent report in pre-print form shows that white authors in the neurosciences drive a citation imbalance based on race and co-author networks are more segregated than in the past (Bertolero et al., 2020). It is thus unsurprising that the number of citations of a specific investigator's papers would be related to the overall level of funding in the sub-field in which that author works. Lower productivity metrics are therefore likely a *symptom* of the disparity of NIH funding to topic domains, rather than the *cause*.

To ensure that the CPDD is not further contributing to racial disparity via its journals, the leadership of the flagship *Drug and Alcohol Dependence*, and the new open access journal *Drug and Alcohol Dependence Reports*, should review rejected and accepted manuscripts to determine if there is any undue bias against manuscripts submitted by AA/B first or senior authors and/or against topics that are disproportionately submitted to the journals by AA/B first or senior authors (regardless of author identity), in an approach similar to the related NIH investigations of funding disparities (Ginther et al., 2018; Ginther et al., 2011; Hoppe et al., 2019). The Editorial Board (particularly the decision making Associate Editors) should be evaluated for diversity in expertise, identity and topic interests that are critical to communities of color. Transparency on this matter may reveal that the College is doing much better than other sub-fields. If so, then other academic societies can follow the strategies and approaches of the College to improve (Taffe, 2021) their own self-declared (e.g. (Carlezon and Team, 2020; Henningfield et al., 2020) DEI efforts.

8. Summary

The NIH disparity in funding to both Black PIs (Ginther et al., 2011) and to the topics that are preferentially the subject of proposals from Black PIs (Hoppe et al., 2019; Lauer et al., 2021) is of critical importance to advance our understanding of substance use disorders, and therefore, it is also of critical importance to the College. The NIH has not, as yet, provided information with sufficient granularity to understand how the NIH-wide

problem may be replicated at the level of key ICs that fund grants on substance use disorders, at the level of relevant study sections that review these proposals or at the level of specific topics within the domain of drug dependence and substance use. The Members of the College are therefore encouraged to demand better of publicly funded research-granting Institutes, to determine ways in which the College and the DAD Journals can work to ameliorate the effects of existing disparities, and to re-commit themselves to prioritizing research on topics that are traditionally underserved. In this effort, we have the support of the President of the United States, Joseph Biden, who issued an Executive Order to improve equity and opportunity across all government agencies, as a matter of first-day priority (Biden, 2021).

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Both authors have served as PIs (as well as co-investigators) on numerous NIH-funded research grants and were awarded NIH fellowship/traineeship funding prior to obtaining independent professorial appointments. Dr. Taffe is a current member of CPDD and he serves on the CPDD Board of Directors; these comments reflect only his own viewpoints and not any official views of the CPDD. Dr. Taffe also served a 4-year appointed term on a NIH study section (2005-2009) and has reviewed occasionally as an *ad hoc* reviewer from that time until the present on panels variously reviewing research grants, centers and training mechanisms. Dr. Gilpin is a former member of CPDD, and he has served for the last 4 years as a standing member on a NIH study section and has participated as an *ad hoc* reviewer on various other panels reviewing research grants, centers, consortia, and training fellowships. Dr. Gilpin founded and oversees a Google Slack forum that focuses on “Racial Equity in Science.” Dr. Taffe has discussed numerous themes and statistics related to these topics writing under the pseudonym Drugmonkey, in the eponymous blog (currently available at <https://drugmonkey.scientopia.org>) and the associated Twitter account @drugmonkeyblog. Dr. Taffe also discusses some of these issues under the Twitter account @effatma. Dr. Gilpin discusses these issues under the Twitter account @The_Gilp.

Conflict of interest

The authors are academic research scientists who regularly seek funding from the NIH and are thus professionally impacted by NIH grant award procedures, policies and outcomes. Dr. Gilpin owns shares in Glauser Life Sciences, Inc., a company with interest in developing therapeutics for mental health disorders. There is no direct link between those interests and the work contained herein. Dr. Taffe has no additional financial conflicts of interest to report.

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