Article

Measuring and Resolving LGBTQ Disparities in STEM

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Abstract

LGBTQ people have pioneered major scientific advances, but they face challenges in STEM that ultimately waste human talent and hinder scientific progress. Growing evidence suggests that LGBTQ people in STEM are statistically underrepresented, encounter non-supportive environments, and leave STEM at an alarming rate. Potential factors driving LGBTQ disparities in STEM include bias and discrimination, misalignments of occupational interests with STEM stereotypes, and STEM norms of impersonality that isolate LGBTQ people. LGBTQ retention shares common psychological processes with female and racial minority retention such as STEM identification and belonging. The key barrier to better understanding and addressing LGBTQ challenges in STEM is the lack of sexual orientation or gender identity (SO/GI) demographic data on the U.S. STEM workforce. Policy recommendations include (a) adding SO/GI measures to federal STEM-census surveys; (b) broadening agencies' definition of underrepresented groups to include LGBTQ people; and (c) incorporating LGBTQ identity into accountability systems and diversity programs at STEM institutions.

Keywords

STEM, science, education, workforce, LGBTQ, disparities

Tweet

We cannot reduce disparities if we refuse to measure them. LGBTQ people are underrepresented in the STEM workforce, but a lack of LGBTQ demographic data hinders understanding and addressing that underrepresentation. Agencies should measure, document, and address LGBTQ disparities.

Key Points

- LGBTQ scientists helped to pioneer major advances such as the central processing unit (CPU), artificial intelligence (AI), and space travel.
- Preliminary estimates from the limited available data suggest the United States has lost tens of thousands of LGBTQ people from the STEM workforce.
- Despite LGBTQ underrepresentation in STEM being similar to other minority groups, few resources are devoted to understanding and addressing why LGBTQ people leak from the STEM pipeline.
- In nationally representative data sets, federal agencies do not currently measure sexual orientation or gender identity (SO/GI), making it difficult to document the problem and to develop appropriate interventions.
- Solutions require measuring SO/GI in federal data collection, documenting LGBTQ disparities in STEM education and the workforce, and incorporating LGBTQ identity into accountability systems and diversity programs.

Introduction

Engineer Lynn Conway helped pioneer the process of how to build millions of components into a tiny integrated CPU and revolutionized the CPU's processing power. But when Conway, assigned male at birth, decided to undergo a gender transition, she was promptly fired on account of being transgender. Mathematician Alan Turing created a machine capable of revealing the absolute limits of computation and inspired a new field—artificial intelligence (AI). But after Turing became known as a gay man, he was sentenced to chemical castration and later committed suicide. Sally Ride was the first female astronaut to travel to space and received the Presidential Medal of Freedom, but less known is she was also a lesbian, revealed posthumously by her partner of 27 years. Experts have noted that if Ride had come out during her career, it would have been "a career-wrecker" (Wolchover, 2012).

Society has certainly moved toward LGBTQ (lesbian, gay, bisexual, transgender, and queer) acceptance since these examples. Indeed, earlier this year, the U.S. Supreme Court ruled it unlawful across all U.S. states for individuals to be discriminated against on the basis of their sexual

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orientation or gender identity (SO/GI). Negative attitudes against gays and lesbians expressed both explicitly and implicitly (or less consciously) have steadily declined in the United States since 2007 (Charlesworth & Banaji, 2019b). Nevertheless, problems remain. Both implicit and explicit anti-LGBTQ attitudes remain strong nationally, and negative attitudes against transgender individuals remain highly prevalent in the United States (Jones et al., 2019). Whether conscious or not, such negative attitudes and other harmful biases create barriers to opportunity and unwelcoming environments that disadvantage LGBTQ people (Freeman, 2018, 2019). Indeed, as will be discussed, LGBTQ people are leaking out of the scientific pipeline and struggling in nonsupportive STEM (science, technology, engineering, and mathematics) environments that ultimately drive LGBTQ people out of STEM fields.

Given LGBTQ challenges in STEM, the U.S. government and STEM institutions (such as universities, funding agencies, and scientific organizations) ought to understand and address them. In 1980, the Science and Engineering Equal Opportunities Act made the National Science Foundation (NSF) responsible for implementing programs and policies that encourage the full participation of women and racial minorities in STEM fields, and for tracking their progress by collecting nationwide data and generating biennial reports. In its signing, Congress explained that,

> it is in the national interest to promote the full use of human resources in science and engineering and to insure the full development and use of the scientific and engineering talents and skills of men and women, equally, of all ethnic, racial, and economic backgrounds. (42 U.S.C. § 1885)

STEM challenges are therefore not only an issue of equal opportunity but of maximizing scientific talents in the U.S. workforce. Given our world's complex and urgent scientific challenges, all individuals wishing to contribute to science, including LGBTQ people, must not be hindered in their opportunity. LGBTQ equity in STEM also contributes to diversifying scientific teams, which consistently generate more advances by bringing new perspectives to scientific problem-solving (Galinsky et al., 2015; Nielsen et al., 2018).

Barriers hindering LGBTQ people in STEM could have a substantial impact on the U.S. STEM workforce. The most current prevalence estimate puts LGBTQ people at 4.5% of the U.S. population, and this number rises to 8.2% for those 18 to 37 years of age (Newport, 2018)—the age bracket spanning early STEM-career stages where career vulnerability is highest. Thus, the prevalence of early-career age LGBTQ people is higher than several other groups whose disparities in STEM have long been studied and tracked in the United States, such as Black women (7.0%), Asians (5.9%), or Native Americans (1.3%) (U.S. Census Bureau, 2020). If LGBTQ people also encounter STEM challenges, from a prevalence standpoint such challenges could have detrimental effects on the STEM workforce that are at least comparable to other well-studied groups. Indeed, LGBTQ people are "one of the largest, but least studied, minority groups in the workforce" (Ragins, 2004, p. 35).

Hundreds of studies have explored how women and racial minorities navigate the STEM pipeline, from early years through college, graduate school, and attaining faculty positions or other STEM occupations. While women and racial minorities have become increasingly represented in STEM over time, they still remain underrepresented in many STEM fields and at key stages (National Academies of Sciences, Engineering, and Medicine, 2011, 2016, 2020). Multiple factors contribute to gender and racial disparities, including faculty and other STEM practitioners' insufficient engagement of women and racial minorities, stereotypes and biases, racial differences in educational opportunities, gender differences in occupational interests and goals, among numerous other factors (Charlesworth & Banaji, 2019a; Cheryan et al., 2017; Diekman et al., 2020; Leslie et al., 2015; Muenks et al., 2020; National Academies of Sciences, Engineering, and Medicine, 2011, 2016; Wang & Degol, 2017).

Students' identification with STEM has consistently been key to successful retention of underrepresented groups, and STEM identity strongly increases motivation to pursue a STEM career (Diekman et al., 2015; Espinosa, 2011). Thus, a common approach toward mitigating gender and racial disparities has been to adopt strategies and interventions that increase women and racial minorities' STEM identification and belonging, thereby facilitating their entry and retention in STEM. Countless correlational and experimental studies have explored the factors that cultivate STEM identification, such as undergraduate research experiences, lab participation, peers and role models, faculty interactions, and supportive and inclusive environments. These are especially important for women and racial minorities, who often have low STEM identification and perceive themselves as ill-fitted for STEM cultures (Cheryan et al., 2017; Diekman et al., 2015; A. L. Griffith, 2010; Thoman et al., 2015; Villarejo et al., 2008). While considerable research, federal resources, and policies have aimed to understand and address the STEM pipeline for women and racial minorities, how LGBTQ people navigate this pipeline has received comparatively little attention.

LGBTQ Disparities in STEM

Few studies address LGBTQ people in STEM, due to several factors. First, the STEM education literature generally regards LGBTQ identity as an irrelevant demographic detail, rather than a social identity subject to similar cognitive and motivational processes important for other underrepresented identities in STEM (American Educational Research Association, 2015). Second, nationally representative data sets regularly collected by NSF that serve as a "gold standard" for STEM education research and policymaking do not currently include SO/GI measures. Thus, researchers lack the basic demographic data needed to test LGBTQ disparities in STEM in a comprehensive, nationally representative manner. Third, researchers may face challenges in obtaining funding to study LGBTQ issues in STEM. For instance, major NSF funding mechanisms for STEM education research are geared toward studying traditionally studied underrepresented groups (i.e., gender and race), with investigators only able to study other groups if they can provide evidence for those groups' underrepresentation. But it is only through such funding opportunities that researchers could provide evidence for LGBTQ underrepresentation in the first place.

The studies that do exist on LGBTQ people in STEM point to numerous problems. Using data from federal employees where SO/GI measures were available, two studies suggested that LGBTQ people are 17-21% less represented in STEM fields than expected based on their prevalence in the U.S. population (Cech, 2015; Cech & Pham, 2017; Freeman, 2018). With a U.S. STEM workforce size of 7 million (National Science Board, 2020), this corresponds to a loss of roughly 54,000 to 121,000 LGBTQ people who would otherwise be in STEM (using LGBTQ prevalence estimates from Newport, 2018). But it may be difficult to generalize such estimates based on federal employees in STEM-related agencies to the rest of the STEM workforce, such as academic STEM departments. Data from the 2009–2018 American Community Survey (ACS) and 2013–2018 National Health Interview Survey (NHIS) showed that men in same-sex couples (ACS) and gay men (NHIS) were less likely to complete a bachelor's degree in STEM and less likely to hold a STEM occupation, relative to their other-sex couple or heterosexual counterparts (Sansone & Carpenter, 2020).[1] Women in same-sex couples (ACS) and lesbians (NHIS) did not show this pattern of underrepresentation. The size of the male sexual orientation gap for STEM degrees earned was smaller than the gender gap (i.e., women earning fewer STEM degrees than men) but larger than the race gap (i.e., Black people earning fewer STEM degrees than White people).

A study of 87,996 undergraduates across 18 research universities found that LGBTQ students were significantly less likely to major in STEM fields than their non-LGBTQ peers (Greathouse et al., 2018). Among undergraduates at 78 universities who declared a STEM major in their freshman year, sexual-minority male students (i.e., gay, bisexual, and queer) were more likely than their heterosexual peers to leave STEM for a non-STEM major by their senior year (Hughes, 2018). This retention gap held even when accounting for other demographic and educational factors (e.g., GPA, academic preparedness). Mirroring the STEM degree and occupation findings above, this effect was not observed for sexual-minority women (i.e., lesbian, bisexual, or queer). Critically, sexual-minority students also showed greater signs of interest in STEM than their heterosexual peers in terms of more research/lab experiences. Research/lab experiences were the strongest positive predictor of STEM retention (as is commonly the case in undergraduate STEM studies), but it is remarkable here, as sexual-minority students should have therefore been more likely (rather than less likely) to stay in STEM. Potentially, research/lab experiences may have actually hurt rather than helped sexual-minority students, which may implicate STEM faculty and lab members in how they mentor and engage with these students. Other factors also could drive these students to perceive their STEM environments as unwelcoming or as a place they do not belong. Indeed, LGBTQ students in computing were more likely than their non-LGBTQ peers to have thoughts of leaving STEM, which was explained by their reduced sense of belonging (Stout & Wright, 2016).

Studies suggest that LGBTQ individuals do regularly encounter negative educational, training, and workplace experiences in STEM. LGBTQ federal workers in STEM-related agencies reported more negative workplace experiences than did non-LGBTQ workers in those same agencies, or than did LGBTQ workers in non-STEM agencies (Cech & Pham, 2017). Not only are LGBTQ people facing difficulties in STEM workplaces but some of these challenges may be unique to STEM. In academic STEM fields, roughly 70% of sexual-minority STEM faculty members who are out at work report feeling uncomfortable in their academic department, according to one study (Patridge et al., 2014). Some STEM fields have conducted internal surveys of their fields that have included SO/GI measures. For instance, in physics in the United States, more than 20% of LGBTQ people reported being excluded, intimidated, or harassed at work due to their LGBTQ identity. Moreover, 15-30% of LGBTQ people reported feeling uncomfortable at work, and together these negative experiences strongly predicted a desire to leave the field (American Physical Society, 2016); see also a recent U.K. survey in physics (Institute of Physics, 2019). Several factors may contribute to such negative STEM environments and to LGBTQ disparities in STEM more generally.

Bias and Discrimination

As noted, anti-LGBTQ attitudes and stigma remain strong in the United States overall (Charlesworth & Banaji, 2019b; Singh & Durso, 2017), although there is considerable regional variability due to state policies and sociopolitical factors (Ofosu et al., 2019). While direct relationships between STEM field biases and LGBTQ pipeline outcomes have not been formally tested, these mechanisms are well-documented for other underrepresented groups. STEM fields in which scientists harbor stronger stereotypes about gender and racial differences in scientific ability have a lower representation of women and Black people (Leslie et al., 2015). Black scientists tend to be less successful than White scientists in obtaining research grants from the National Institutes of Health (NIH), even after accounting for academic pedigree and publication record (Ginther et al., 2011)—which makes bias a distinct possibility. Implicit stereotypes linking men to science and women to arts emerge very young (Charlesworth & Banaji, 2019a; Cvencek et al., 2011), and the strength of these stereotypes in a given country predicts the gender imbalance in STEM representation in that country (Miller et al., 2015). Several experimental studies have demonstrated a more causal role for these kinds of implicit biases in driving adverse outcomes for women and racial minorities' hiring and compensation, as well as their success in grants, publications, and awards (Charlesworth & Banaji, 2019a; National Academies of Sciences, Engineering, and Medicine, 2016).

In the context of LGBTQ people, negative attitudes drive hostility and discomfort with these individuals in STEM (American Physical Society, 2016; Yoder & Mattheis, 2016), which may lead to patterns of discrimination. Such patterns are clear in the general workforce and may indeed generalize to STEM. In a 2016 survey, 11%–28% of sexual minorities reported losing a promotion due to their sexual orientation, and 27% of transgender individuals reported being fired, denied promotion, or not hired due to their gender identity (Singh & Durso, 2017). Over 22% of LGBTQ workers face pay and promotion disparities, which are highest for LGBTQ people of color and sexual-minority women (National Public Radio, 2017; Prudential, 2017). In one survey, 25% of LGBTQ people reported discriminatory behaviors in the workplace, and these adversely affected the work environment and psychological well-being (Singh & Durso, 2017). Whether these workplace disparities apply specifically to STEM fields needs direct testing, but there is no theoretical basis to suggest otherwise.

Other biased assumptions can affect decision-making in ways that drive LGBTQ people out of the STEM pipeline (Freeman, 2018, 2019). For instance, LGBTQ candidates for faculty appointments or lab personnel jobs, or prospective LGBTQ graduate students, may be rejected or passed over due to seemingly benign, well-intentioned concerns about a candidate's fit for the departmental, institutional, or local culture. As one example, LGBTQ candidates may be perceived as lacking fit in departments with a strong family-oriented culture or at universities in non-urban locations, due to stereotypes of LGBTQ people as non-family-oriented or as urbanites; they may also be implicitly judged as unprofessional or off-putting for being out or open about their LGBTQ identity (American Physical Society, 2016).

STEM Stereotypes and Variability in Occupational Interests

LGBTQ people could differ from non-LGBTQ people in their occupational interests and goals, which could shape LGBTQ entry and retention in STEM depending on those interests and goals' alignment with STEM stereotypes. Such "goal congruity" has received considerable attention in the literature on women in STEM. For instance, masculine STEM stereotypes—including beliefs and expectations that the ideal "scientist" possess stereotypically masculine attributes (e.g., brilliant, results-oriented, apathetic, nerdy, disorganized)—decrease women's identification with STEM and drive down retention (Cheryan et al., 2017; Diekman et al., 2015, 2020). This occurs in two ways: others perceive women (and stereotypically feminine interests and goals) as having poor fit in STEM, while women also perceive themselves (and their own interests and goals) as having poor fit. This marginalizes women, hurts their STEM identification, and negatively affects women's entry and retention in STEM (Diekman et al., 2020).

These effects are exacerbated by the fact that men and women do tend to differ in their occupational interests and goals. For instance, women tend to prefer "people" and people-oriented goals in choosing a career (inconsistent with STEM stereotypes), while men tend to prefer "things" (consistent with STEM stereotypes) (Diekman et al., 2015; Lippa, 2010). Thus, women are especially likely to be perceived and to perceive themselves as poorly aligned with STEM careers. However, researchers can successfully shift individuals' stereotypes about STEM, increasing women's identification with STEM and their retention. For instance, when STEM fields are framed around more communal, people-oriented goals, or when stereotypically masculine signals in STEM environments (e.g., Star Trek posters and video games) are replaced by more gender-neutral ones (e.g., nature posters and magazines), women are more likely to pursue STEM careers (Cheryan et al., 2011; Diekman et al., 2020).

Heterosexual and cisgender stereotypes affect LGBTQ people's STEM identification and likely contribute to LGBTQ disparities (American Physical Society, 2016; Cech & Waidzunas, 2011; Hughes, 2017). In addition, the masculine STEM stereotypes just described are likely to play a role as well. Gays and lesbians, as a whole, tend to gravitate toward occupations that are typically favored by heterosexual members of the other sex (Ellis et al., 2012; Lippa, 2000, 2008). U.S. Census data show that men in same-sex couples are more likely to hold female-majority occupations and women in same-sex couples more likely to hold male-majority occupations (Baumle et al., 2009; Tilcsik et al., 2015). (see Footnote 1). In theory, if sexual-minority men's occupational interests approximate those of heterosexual women, then the masculine STEM stereotypes known to marginalize women and their interests may also be a deterrent for sexual-minority men. This may arise through both routes: other people may perceive sexual-minority men as having poor fit in STEM, and sexual-minority men may also perceive themselves as having poor fit as well (American Physical Society, 2016; Cech & Waidzunas, 2011; Clarke & Arnold, 2018). This would not be the case for sexual-minority women, given that their pattern of occupational interests is more consistent with masculine STEM cultures. Indeed, findings described earlier are consistent with such an asymmetric pattern: Sexual-minority men (or men in same-sex couples) were less likely than their heterosexual (or other-sex couple) counterparts to complete STEM degrees, hold STEM occupations, and stay in a STEM major, while sexual-minority women (or women in same-sex couples) did not show these disparities.

STEM Norms of Impersonality

While norms of professionalism are ubiquitous across industries, STEM fields have unique norms of impersonality that have a pronounced impact on LGBTQ people. Scientific ideals include being impersonal, objective, data-driven, emotionless, apolitical, and non-ideological; practical elements of academia only magnify this (Cech & Waidzunas, 2011). For instance, scientists are often expected to adhere to a higher scientific purpose regardless of personal circumstances, for example, taking a potentially lifelong faculty position in an undesired location for the sake of advancing one's science. As LGBTQ identity is often not visibly apparent, norms to compartmentalize one's personal from professional life can be especially detrimental for LGBTQ people, discouraging identity disclosure and openness and driving feelings of isolation (Cech & Waidzunas, 2011; Yoder & Mattheis, 2016). Together with non-supportive STEM environments that may lack clear cues of LGBTQ acceptance or inclusion (or have cues to the contrary), norms of impersonality can lead LGBTQ people to remain closed off or excessively private in fear of hostility or reduced career opportunities in STEM. This has clear negative consequences; for instance, studies of the general workforce find that sexual minorities who do not disclose their identities at work have considerably lower rates of job satisfaction and higher rates of self-reported anxiety (K. H. Griffith & Hebl, 2002).

Indeed, LGBTQ people are often encouraged by faculty or other STEM practitioners to remain closeted or private (American Physical Society, 2016). One survey suggests that more than 40% of LGBTQ workers in STEM are not open about their LGBTQ identity with colleagues (Yoder & Mattheis, 2016). For women and racial minorities in STEM, same-gender and same-race peers and role models have long been known to be important factors that can increase their sense of belonging and retention (National Academies of Sciences, Engineering, and Medicine, 2016). However, finding such role models or peers may be uniquely challenging for LGBTQ people, as LGBTQ identity is often not visibly apparent and impersonality norms discourage identity disclosures. Thus, these norms tend to exacerbate STEM environments that may already be non-supportive, stymieing LGBTQ people's identification with STEM and increasing their thoughts of leaving (American Physical Society, 2016; Yoder & Mattheis, 2016).

Summary and Further Questions

Overall, studies suggest that LGBTQ people are less represented in STEM fields than statistically expected, encountering non-supportive STEM environments, and despite signs of interest do not remain in STEM. Contributing factors to LGBTQ disparities in STEM plausibly include bias and discrimination, misalignments of occupational interests with STEM stereotypes, and STEM norms of impersonality that isolate LGBTQ people. But understanding LGBTQ educational and career trajectories in STEM is only preliminary, mainly due to policies that limit this research. With increased SO/GI data availability, more comprehensive studies could further establish LGBTQ disparities and test underlying mechanisms. Investigations into both common and distinctive processes among specific LGBTQ subgroups, and potential intersections with gender, race, and economic background, will also require attention. Understanding STEM field variability will be key, particularly given that variability in STEM fields' biases predict gender and racial disparities in those fields (Cheryan et al., 2017; Leslie et al., 2015). Where LGBTQ disparities reproducibly occur, potential individual- or organization-level strategies and interventions could be developed. Direct tests of empirical (and ultimately causal) relationships between contributing factors and LGBTQ pipeline outcomes will be necessary to inform such interventions. As LGBTQ retention appears to share some common psychological factors with female and racial minority retention in STEM, researchers could draw on an extensive STEM education literature studying these other underrepresented groups to inspire possible strategies and interventions.

Policy Recommendations

Policymakers can help address the challenges that LGBTQ people are facing in STEM. Disparities cannot be reduced if we refuse to measure them, and the lack of SO/GI measures in any major data collections used to track the STEM pipeline from U.S. undergraduate and graduate programs through to the workforce is the most critical barrier to progress. As part of NSF's responsibility to ensure the participation of underrepresented groups in STEM fields, since 1957, NSF has collected nationwide data using several surveys that serve as a kind of a "STEM census," including the National Survey of College Graduates, Survey of Doctorate Recipients, and Survey of Earned Doctorates. These surveys track college graduates and doctoral degree holders across STEM fields, and the data feed into congressionally mandated reports used by universities and funding agencies (e.g., the biennial *Women, Minorities, and People with Disabilities in Science & Engineering Report*). Policies in higher education and diversity efforts depend on these data and reports, and they expose critical information. For instance, they are the only way we know that over the past 20 years, female and Black undergraduates have actually become less represented in the fields of math and statistics; that although in most other STEM fields Black people are increasingly represented, they still experience pay inequality; or that computer science suffers from the worst underrepresentation of women (NSF, 2019).

The STEM census collects information on countless demographic measures (e.g., gender, race, ethnicity, disability, and income), but not SO/GI. Some may think that SO/GI measures are too personal or sensitive to include. But numerous government surveys on the U.S. population have successfully collected SO/GI data for years (Freeman et al., 2018). Indeed, the Federal Interagency Working Group on Improving Measurement of SO/GI in Federal Surveys has warned that federal agencies may perceive SO/GI questions as overly sensitive, which hinders them from adopting SO/GI measures even when "inclusion of these measures would support agency mission and data needs" and even though that perception is inconsistent with past survey experience (Federal Committee on Statistical Methodology, 2016, p. 11). For instance, SO/GI measures do not cause issues such as survey break-off or high non-response rates (which would suggest issues of sensitivity), and they are just as voluntary as other demographic questions. Options such as "I don't know" or "I don't wish to respond" are always available; and for those who do wish to respond, federal law protects the confidentiality of individually identifiable data (Freeman et al., 2018). Thus, SO/GI questions cannot expose respondents to potential discrimination.

Policy efforts seeking the inclusion of SO/GI measures in federal STEM surveys have been underway since 2018, supported by major scientific organizations and authorities in higher education research such as the American Association for the Advancement of Science and the American Educational Research Association (Freeman, 2018, 2019; Freeman et al., 2018; Freeman et al., 2020). Given the accumulating evidence of LGBTQ disparities in STEM, the National Academies of Sciences, Engineering, and Medicine (2020) report on *Understanding the Status and Well-Being of Sexual and Gender Diverse Populations* has explicitly recommended that SO/GI measures be added to federal STEM surveys. SO/GI measures would allow not only researchers but also policymakers, universities, funding agencies, and scientific organizations to assess and track over time the educational and career barriers LGBTQ people face in STEM. Disparities could be examined across STEM fields, career stage, region, and other factors (including intersections of gender, race, or economic background). Variability in the support of LGBTQ people in STEM—from both regional laws (e.g., non-discrimination) and university policies (e.g., same-sex partner benefits; allowable name changes during a gender transition)—may contribute to LGBTQ people's negative STEM experiences (American Physical Society, 2016; Yoder & Mattheis, 2016); this further underscores the importance of nationwide data. Of course, prior to any federal changes, STEM education researchers could immediately adopt SO/GI measures in their own data collection processes (e.g., surveys of the Higher Education Research Institute are a recent example).

Another issue is that priorities for STEM education and workforce research set by funding agencies and scientific organizations often have narrow definitions of what constitutes an underrepresented group that exclude LGBTQ identity. This has the effect of disqualifying potential funding proposals that wish to study LGBTQ underrepresentation in STEM. In their funding opportunities for STEM education and workforce research, NSF and NIH could consider broadening their definition of underrepresented groups to include LGBTQ people, which would allow proposals seeking to study LGBTQ disparities in STEM to be eligible rather than excluded. As with the study of other underrepresented groups in STEM, these research grants could aim to better understand the LGBTQ STEM pipeline and the development and assessment of strategies to increase the retention and advancement of LGBTQ individuals in STEM careers.

STEM institutions, including universities, funding agencies, and scientific organizations, also could immediately benefit from SO/GI data collection in their demographic surveys. As has long been the case with collecting gender and race information in such surveys, SO/GI data could aid in developing accountability systems to protect against LGBTQ bias and discrimination and identifying LGBTQ pipeline issues in these institutions. Informed by such data, these STEM institutions could create programs to foster more supportive and inclusive STEM environments for LGBTQ people—ranging from LGBTQ inclusion in diversity initiatives, to bias training, LGBTQ networking events, or mentorship programs.

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Note

1. As the ACS and U.S. Census do not contain SO/GI measures, sexual orientation had to be inferred via those who indicated they were in a same-sex vs. other-sex couple.

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