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Perspective: Adopting an Asset Bundle Model to Support and Advance Minority Students' Careers in Academic Medicine and the Scientific Pipeline

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Abstract

The authors contend that increasing diversity in the scientific pipeline (e.g., academic medicine, science, technology, engineering and mathematics) requires a systematic approach to retain minority high school and college students. Such an approach should focus on the interrelated and multilayered challenges that these students face. The authors fuse an alternative conceptualization of the scientific and technical human capital theoretical framework and the theory of social identity contingencies to offer a conceptual model for targeting the critical areas in which minority students may need additional support in order to continue toward a career in science. Their proposed asset bundles model is grounded in the central premise that making greater progress in recruiting and retaining minorities likely requires institutions to respond simultaneously to various social cues that signal devaluation of certain identities (e.g., gender, race, or socioeconomic status). The authors define "asset bundles" as the specific sets of abilities and resources individuals develop that help them succeed in educational and professional tasks, including but not limited to science and research. The model consists of five asset bundles, each of which is supported in the research literature as a factor relevant to educational achievement and, the authors contend, may lead to improved and sustained diversity: educational endowments, science socialization, network development, family expectations, and material resources. Using this framework, they suggest possible ways of thinking about the task of achieving diversity as well as guideposts for next steps. Finally, they discuss the feasibility of implementing such an approach.

As the U.S. health care system undergoes systemic change, special attention is being paid to improving cultural competence and increasing the diversity of health care providers as a mean of reducing health disparities among racial/ethnic minorities.[1] Research indicates that cultural barriers between minority patients and their health care providers may lead to

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disparities in care and possibly poorer health outcomes for these patients.[2–4] *Cultural competence*, as defined by Betancourt and colleagues,

> entails: understanding the importance of social and cultural influences on patients' health beliefs and behaviors; considering how these factors interact at multiple levels of the health care delivery system (e.g., at the level of structural processes of care or clinical decision-making); and, finally, devising interventions that take these issues into account to assure quality health care delivery to diverse patient populations.[5 (p297)]

Accordingly it is expected that cultural competence is a strategy to improve health care quality, particularly for racial and ethnic minorities.[6,7] If cultural competence is to emerge as a key aspect of academic medicine's commitment to improve health outcomes and reduce disparities, it is important to explore creative ways to develop it in the workforce.

Increasing the diversity of health care practitioners and researchers in the academic medicine and science, technology, engineering, and mathematics (STEM) research workforce is also critical. The benefits of diversity have been shown to be far reaching and include increased cultural sensitivity, creativity, innovative thinking, and the development of unique solutions for problems.[8] Achieving this workforce diversity, however, will require us to look for future minority physicians and scientists outside the pool of minority students from the highly educated middle-class and upper-middle-class families that have historically benefitted most from social change.[9] As important as their experiences are, these students represent a minority of a minority.[10] Further, upward social mobility into the middle class occurs more slowly among minority than majority populations,[11,12] and it seems likely that it will occur at an even slower pace given the differential adverse effects of the recession on low-income and less-educated minorities.[13] We believe these points lead to an inescapable conclusion: Increasing diversity among health care practitioners and scientists requires a targeted approach to improve the social mobility of low-income minority high school and college students who have the ability to succeed in higher education but do not have the social or economic resources or the encouragement to do so. In sum, we suggest that it is imperative to provide greater advanced educational opportunities to the higher percentage of minority students who are *not* from middle-class or affluent families and to recruit them into academic medicine and STEM professions.

Preparing low-income minority students for and recruiting them into academic medicine and STEM fields requires us to pay close attention to the heterogeneity and complexity of their backgrounds and experiences. Toward that end, we acknowledge that a panacea for increasing diversity is impractical. Further, we acknowledge that there are many dedicated professionals working toward increasing diversity at the national, local, and institutional levels. However, we believe that a synthesis of the many knowledge bases regarding diversity initiatives is lacking in the literature. Thus, in this Perspective, we propose the asset bundles model as a usable and useful conceptual framework that draws from various disciplines and literatures and can be shared with broader and diverse audiences, beyond those well versed in this subject matter.

We developed the asset bundles model using the insights offered by the scientific and technical human capital (STHC) model and social identity contingencies (SIC) theory. The STHC model, developed by Bozeman and colleagues,[14,15] has been applied in a variety of contexts related to scientists' and other researchers' careers.[16–20] In capsule form, the STHC model assumes that individuals' capacity to engage in research and knowledge production can be expressed as the sum of their accumulated technical ability (their human capital) and their ability to express these capabilities through their network ties and understanding of social institutions (their social capital).[14] Here, we present a new conceptualization of the

STHC model, using the concept of *asset bundles*, which we define as the specific sets of abilities and resources that individuals develop that help them succeed in educational and professional tasks, including but not limited to scientific research and clinical practice. As we developed our asset bundle model to respond to the needs of minority students with varying social identities (such as race, ethnicity, gender, or economic status), we considered how the theory of SIC, or the range of judgments, stereotypes, restrictions, opportunities, or treatment a person expects to face on the basis of the institutional setting's response to one or more of the person's social identities,[21–23] are important to minority students' educational outcomes. The SIC theory purports that institutional settings can trigger "people's expectations about the kinds of social identity contingencies they may face, and these expectations affect whether people can trust and feel comfortable in a given setting."[21(p.616)] Thus, the asset bundles model is grounded in the central premise that recruiting and retaining minorities in academic medicine and STEM professions likely requires institutions to respond simultaneously to various social cues that signal devaluation of certain identities (e.g. gender, race/ethnicity, or socioeconomic status).

In the ensuing sections of this Perspective, we first provide an in-depth rationale for addressing the various social identities of minority high school and college students in the scientific pipeline as a means of enhancing diversity among academic medicine and STEM professionals. In doing so, we also consider issues related to gender and economic status. Using the asset bundles framework, we then suggest possible ways of thinking about the task of achieving diversity, as well as guideposts for next steps. We conclude with a brief discussion of the challenges of applying asset bundles thinking to develop, recruit, and advance low-income minorities in preparation for careers in academic medicine and STEM fields.

Minorities in the Scientific Pipeline

In *Expanding Underrepresented Minority Participation: America's Science and Technology Talent at the Crossroads*,[8] the National Academy of Science's Committee on Underrepresented Groups and the Expansion of the Science and Engineering Workforce Pipeline (COSEPUP) contends that the United States is at a "transformational moment" and has a critical duty to diversify its science and engineering (S&E) workforce to "sustain America's research and innovation capacity." The changing demographic composition of the United States supports the committee's assertion: U.S. Census Bureau projections indicate that the white population will decline over the next decades and the minority populations will expand.[24] This transformational moment requires the United States as a nation to be sensitive and responsive to educating future generations, without regard to race, creed, ethnicity, gender, or socioeconomic status. COSEPUP[8] suggests, as have others,[25,26] that students trained in diverse academic settings acquire important skills and perspectives enabling them to identify and solve problems of societal importance. Moreover, consistent with others,[27,28] COSEPUP[8] argues that diverse groups are more innovative, smarter, and stronger than homogenous groups, a contention supported by extensive empirical research (for overviews, see Williams and O'Reilly[29] and Roberge and van Dick[30]).

While there has been some progress in the diversification of the U.S. S&E labor force,[8] greater diversity in S&E and other fields, including academic medicine, can be achieved by recognizing and addressing the complexities and challenges faced by prospective and current underrepresented minority students. As the SIC theory suggests, a student's minority status tells us only part of that individual's story[23] such a student has many social identities that shape personal experiences in the scientific pipeline, such as being from a low-income family or being female. Thus, adopting a deep pool strategy toward increasing diversity entails developing ways to mitigate the various contingencies that members of socially

marginalized groups may expect. We suggest that minority status, economic disadvantage, and gender interact in complex and potentially pernicious ways which undermine attempts to increase the number of underrepresented minorities succeeding in academic medicine and STEM careers.

As students with multiple social identities navigate the scientific pipeline, they are more vulnerable to social identity contingencies that increase attrition. While minority, female, and economically disadvantaged students face numerous challenges in academe, they share at least five common experiences: (1) others' low expectations about their academic ability; (2) fear of antagonism from dominant groups; (3) low visibility of others with backgrounds similar to theirs; (4) less developed networks; and (5) poorer long-term career outcomes. As a consequence, having one or more of these social identities may lead the student to have lower academic aspirations and achievement, primarily because these identities affect the student's ability to envision himself or herself as a scientist.[22,23] In other words, as students' social identities increase, their vulnerabilities to attrition are compounded. Below, we provide an overview of evidence supporting this claim.

Research has shown that underrepresented low-income whites and minorities have interest in scientific careers, yet they often fail to fulfill their aspirations due to a variety of interrelated individual, social, and institutional factors.[31] Disadvantaged students' challenges with respect to educational attainment in S&E continues to command attention in the research literature.[32,33] In particular, Alon[33] found that disadvantaged minority college students were less likely than their white counterparts to graduate from elite institutions (or from those with strong math and science programs) and attributed about a third of this race gap to the compounding effects of being disadvantaged *and* a minority. Alternatively, highly capable minority college students may forgo doctoral programs in S&E in lieu of other fields of study, not only because they sometimes cannot afford the associated prolonged educational process, but also because they lack early socialization in the world of science careers.[34] Both high school curriculum choices and parental factors have been shown to predict African Americans' persistence in math and science degree programs in college.[35] Another factor, which appears to be little researched, is that African Americans often find careers in business and other professions to be more lucrative, especially when they are actively recruited to such jobs.[36]

With respect to math and science educational attainment, Latino students face unique challenges. Rochin and Mello[37] considered gaps in Latinos' educational attainment characterized by challenges of English-language learning, underpreparation of young students for math and science courses, failure to complete advanced placement courses, little home and family support, poverty, lack of role models in the family, and lack of Latino students in science programs to offer networking opportunities and help pave others' way to science careers. Chang and colleagues[38] report that just over 20% of Latino students who begin biomedical educational programs drop out before completing their terminal degree. This dropout rate is higher than that of any other sizable racial or ethnic group.[37]

Some research has shown that trends are similar for female and underrepresented minority S&E faculty.[39] As with many minority groups, women face unique challenges that make persistence in S&E difficult. For example, Gerson[40] indicates that women are disproportionately responsible for balancing their educational and career decisions with familial responsibility and expectations. Female high school students may be required to care for their younger siblings after school or otherwise assist within the home; as a result, they may be unable to participate in extracurricular activities or attend after-school science and math tutoring sessions. Balancing such responsibilities may put young women at a disadvantage, as participation in meaningful extra curricular activities in high school is a

positive predictor of educational persistence and performance.[41] Further, Catsambis[42] reports that female students have less positive attitudes than male students toward science and science-related careers. This may be partly because women frequently experience exclusion and isolation at some point during their academic careers.[43]

In sum, we suggest that the above research provides evidence that lessening the impact of obstacles that prevent minorities from attaining careers in academic medicine and STEM professions is more complicated than addressing sources of specific vulnerabilities for individual social identities. We propose, therefore, that barriers to educational attainment, as produced by SIC, can be mitigated by identifying and addressing deficits in the asset bundles that individuals bring to their education efforts. The deficits provide meaningful indicators for the support minority students would need to persist in the scientific pipeline. We contend that students' asset bundles produce critical capital that can be transformed into better educational outcomes, particularly in science. Below, we disaggregate the components of the STHC model to focus separately on the three groups of asset bundles that are essential for success in careers in academic medicine and STEM: scientific human capital, social capital, and financial capital.

The Asset Bundle Model: A Conceptual Framework for Decreasing Scientific Pipeline Attrition

Overview

Our proposed model uses an expanded STHC theoretical framework tailored to examine the asset bundles of high school students entering college. It should be noted that the greatest opportunity to promote and sustain diversity in the scientific workforce is to avoid the "exodus [that] occurs when students abandon their intention to major in a [STEM] discipline at or before enrolling in college."[44 (p.200)] In *Rising Above the Gathering Storm*, COSEPUP[44] points out that many students who leave the STEM pipeline at this critical junction are academically quite able to succeed. This suggests that academic preparation during high school alone is insufficient to address issues of diversity in later stages of the academic medicine and STEM pipelines. While our asset bundle model is constructed surrounding issues at the critical bridge between high school and undergraduate studies, the concept is applicable both to undergraduate and graduate students. With respect to the potential for positive educational outcomes for minority students, we suggest that there are five asset bundles, each of which is supported in the research literature as a factor relevant to educational retention and achievement:

- educational endowments,
- science socialization,
- network development,
- family expectations, and
- material resources.

While these factors may affect the educational achievement of any group, we believe understanding the interaction of these variables for minorities belonging to multiple marginalized social groups is vital for efforts to increase diversity. As supported by the SIC theory, we argue that minority students may expect to face overlapping and multilayered challenges as they progress through academic institutions—institutions that potentially send negative social cues to these students. Thus, attrition may be more likely for these students, who own multiple social identities. Below, we consider each asset bundle as it relates to scientific human capital, social capital, or financial capital.

Scientific human capital: Educational endowments and science socialization

We address scientific human capital first, because it is the foundation for achievement and involves the development of the scientific talent pool. Scientific human capital encompasses two types of knowledge, *explicit* and *tactic*. To increase explicit knowledge, we propose developing minority students' educational endowments, while we recommend science socialization to improve their tactic knowledge.

Educational endowments—An individual's educational endowments chiefly depend on the caliber of his or her high school's math and science curriculum and teacher quality. COSEPUP[44] contends that, among other things, rigorous college preparatory, advanced placement, or International Baccalaureate courses completed in high school have far reaching implications for disadvantaged students' performance, preparedness, and persistence in higher education science curricula. Additionally, Burkam and colleagues[45] report that hands-on laboratory experience in high school promotes gender equity and improves academic performance for all students. Further, it is well documented that teacher quality is inextricably linked to academic success,[46] particularly for disadvantaged populations. We acknowledge that, in part, fully developing this asset bundle among low-income minority students would involve systemic reform of primary and secondary education in the United States. While such reform is needed, we recognize that there are barriers and challenges to overhauling the entire educational system. Moreover, our asset bundle model targets students who are already within the scientific pipeline and in pursuit of careers in academic medicine and STEM professions. Therefore, we suggest that offering high school and college students additional resources and educational support (including additional study material, innovative lectures that emphasize the societal relevance of S&E, and access to study groups and tutors) may mitigate potential deficits in this bundle and can strengthen students' math and science skill sets.

Science socialization—To decrease attrition, our model encourages strong science socialization of minority students, enabling them to form a personal identity compatible with a possible career in academic medicine or STEM professions. If students cannot envision themselves as scientists or health care providers, they will self-select into other paths that seem more viable to them, especially paths that are more consistent with their peers' and family members' choices.[47] Minority students may need additional encouragement and resources to adopt the norms, values, behaviors, and social skills applicable to careers in science and medicine. We suggest that by developing a scientific identity, students will become more aware of their potential and their aspirations to careers in science will become more tangible.

The science socialization process is especially critical for students with more than one marginalized social identity because it is probable that they do not have immediate role models of science or health care professionals in their homes and/or proximate communities. To foster science socialization, we recommend that high school science curricula incorporate societal relevance. In many cases, students see no obvious connection between scientific careers and the ability to serve social goals.[48] By focusing on science's relevance to problems within specific communities, schools send a positive social cue to marginalized students. In short, they signal that the scientific community is willing to be attentive and responsive to the needs of minority communities. When presented with concrete evidence showing how science and new technologies can combat and mitigate problems within their communities, students may be more likely to become engaged, motivated, and inspired to be agents of scientific change.

Budding scientists and health care professionals must also be exposed to successful academicians and practitioners from backgrounds similar to their own; this has the potential to directly mitigate a student's formation of negative expectations of discrimination or marginalization in academic settings.[22,23] For example, Pearson[49] indicates that African American PhD chemists who read about the lives and contributions of eminent African American chemistry scholars had been positively influenced to pursue science as a career. Again, this supports the need for students to be able to envision themselves as scientists. If, for example, an African American female student only sees white male scholars in the field she aspires to, she might be dissuaded from pursuing a career in science because it is a community with which she does not identify or one that she perceives as discriminatory. In short, science socialization is necessary for meaningful inclusion in the greater scientific community.

To maintain motivation and interest in academics, low-income minority students, possibly more than any other group, need clear and feasible individual development plans (IDPs).[50,51] IDPs, while not explicitly a form of science socialization, help students identify benchmarks to check their progress toward the goal of becoming a scientist, professional researcher, or health care professional.[52] Typically, IDPs are developed for graduate students and postdoctoral fellows to help them organize their educational and career goals. We do not expect that high school students will have specific career goals in mind, but they may have a general area of interest. Developing IDPs for young minority students, who are vulnerable to attrition, may help them begin to think about their goals and solidify their ability to picture themselves in careers in science or medicine.

Social capital: Network expansion and family expectations

Lin[53] offers an influential and useful operational definition of *social capital* as

> resources that are embedded in social networks and accessed and used by actors for actions. Thus, the concept has two important components: (1) it represents resources embedded in social relations rather than individuals, and (2) access and use of such resources reside with actors.[53] (pp24–25)

There is ample evidence that social capital can be of great benefit in educational attainment and career development, for both majority and minority students.[54–59] Israel and colleagues[60] used data from the National Educational Longitudinal Survey to provide compelling evidence of the compensatory effects of family and individual social capital for public school students; these effects were especially pronounced for lower-income students. Other researchers have identified social capital factors that discourage underrepresented minority students from persisting in academic science careers, including academic and cultural isolation, low expectations from their peers[61,62] and teachers,[63,64] lack of academic support structures,[37] and discrimination,[22,23] whether perceived or real. We contend that the social capital asset bundles are paramount to mitigating negative social identity contingencies for minority students. When developed in concert with the scientific human capital bundles, minority students' perceptions of belonging can be fundamentally shifted.

It is worth noting that we cannot assume that social capital is invariably an asset with respect to educational and career achievement. Social capital can have deleterious effects on education as well.[65,66] Indeed, in some cases, especially in poor neighborhoods, social capital may be employed for entry into gangs or criminal networks.[67,68] Nevertheless, social capital of sufficient quality is not only useful for but is nearly always a major contributor to achievement.[69]

Network expansion—Students build positive social capital through mentoring relationships, involvement in extracurricular activities, and peer influence. Research[70,71] shows that cross race mentoring, in which the mentor is of the dominant group (i.e., a white man) has a positive influence on career outcomes for underrepresented minorities. Implicit in that result is the fact that that expansive networks yield more opportunity.[69,72] While there are arguments against cross race mentoring,[73] we contend that until minority students can develop their own networks, gaining access to established networks through mentors is their best networking option. Further, as white men have typically been the majority in academic medicine and in most STEM fields, they tend to have expansive and well-connected networks. Toward that end, minority students should be encouraged both to build relationships with scientists within their cultural community and to form bonds with well-connected scientists regardless of race, gender, or cultural identity.

In addition to accessing mentors' networks, minority students must develop peer networks that can promote their educational aspirations. Treisman and Surles[74] compared success rates of African Americans and Chinese Americans in undergraduate calculus classes and attributed Chinese Americans' greater success to their tendency to study in groups and to use teaching assistant resources. Equally able African American students were more likely to study alone and not to use teaching assistant resources. To a considerable extent, cultural factors influence the resources available in students' social capital asset bundles, and these in turn affect students' ability to overcome educational barriers. Further, in the absence of strong inclusion initiatives, underrepresented groups tend toward self-segregation for social reasons.[75] While this allows them to draw emotional and cultural support[76] from one another, the unintended consequence is that it puts already vulnerable groups at an informational disadvantage. Beasley[77] contends that racially integrated networks offer "access to information otherwise unavailable to these students, including the existence of occupations they had never considered, the awareness of how to obtain training for them, and connections to professionals (white and nonwhite) who possess them."

Family expectations—It is also critical to understand how interpersonal dynamics within families operate to encourage or discourage children from pursuing higher education and careers in academic medicine and STEM fields. For example, racial/ethnic differences in role expectations for boys and girls may result in differing support for higher education. Historically, African American families have tended to be more supportive of educational achievement in daughters (relative to sons);[78] by contrast, in Latino families, educational achievement by daughters may be perceived to be at odds with marriage and motherhood, leading to less support of daughters relative to sons.[79] Further, Hanson[80] reports that although African American women feel less welcome than white women in science, their interests persist when they have positive familial influence.

The family expectations asset bundle cannot be easily influenced by those outside the family. However, it may be possible to mitigate deficits in this bundle by enhancing another bundle. For example, students with low family expectations might benefit from intensified science socialization to develop their sense of belonging.

Financial capital: Material resources via scholarships and grants

In 1967, Blau and Duncan[81] documented the positive impact of family socioeconomic status on educational and occupational status attainment, and their finding has yet to be contradicted empirically. When used in conjunction with academic support, meaningful financial support is highly effective in reducing attrition among economically disadvantaged and minority students.[8] The lack of grants and scholarships serves as a deterrent to academic attainment for all students but in particular minority and low-income students.[82]

Churaman[83] found that parents in underrepresented minority groups were less likely than white parents to have made sufficient financial preparations for their children's college education. In such cases, the burden to fund college falls on the student. High school students with poor financial arrangements often take part-time jobs, which in many cases severely limits the time they have to study and to be active in the extra curricular activities vital to developing social capital.[84] We contend that these students may be overlooked by scholarship search committees, as they may seem less engaged in their academic pursuits.

Facing the arduous financial responsibility of financing higher education can play a major role in academic attrition. For example, students who work over the summer may miss the opportunity to attend summer bridge programs that are offered to help them transition between high school and college and make success in college more feasible. These programs offer a range of activities, including intensified improvement of students' reading, writing, math and science skills, socialization activities to familiarize students with collegiate life, and improvement of students' study skills.[85] Interestingly, Luna De La Rosa[86] found that low-income and predominately first-generation minority students who attended a six-week summer bridge program, during which four hours were dedicated to financial literacy and the institution's financial aid process, indicated less willingness to borrow student loans and had lower expectations of the financial difficulties they would face in the subsequent academic year than they had prior to the program.[86] These findings suggest that summer bridge programs potentially play a critical role in shaping attitudes about finances and employment during college. However, in light of the many[87–89] concerns about the immediate and long-term effects of student loan debt on minority college graduates—and in particular, on those students seeking professional and graduate degrees[90]—we contend that deficits in this bundle should be filled by targeted interventions, such as scholarships and grants, to provide funding for minority students' higher education.

Bundling the asset bundles

It is not enough to understand how individual asset bundles are important to the recruitment, advancement, and retention of minorities in academic medicine and STEM fields. We expect that each asset bundle will be related to other asset bundles and social identities. For example, the development of networks and access to science socialization, early educational endowments, scholarships, and grants are directly related to students' social identities, such as economic status.[91] Alternatively, social identities such as ethnicity[92] or gender[93] influence students' educational plans and may be directly related to the development of their scientific human capital bundles. Curiel[94 (p90)] describes the interaction among sets of variables pertaining to family, culture, language, and schools, noting that "the limited parental involvement of Hispanic parents in education [is] in part due to language barriers, lack of familiarity with structural arrangements of schools, and negative attitudes that are shared by both school authorities and parents."

Even if asset bundles are related, we assume that there is a degree of distinctiveness among them as well as a degree of substitutability of assets such that strength in one may offset weakness in another. We expect that as the students' asset bundles develop, their insecurities and disadvantages stemming from their various social identities will diminish. Thus, by acknowledging the ways in which social identities shape students' experiences and development of assets that we contend are directly related to educational outcomes, the asset bundle model has the potential to help advance minority students through the scientific pipeline.

Implementing an Asset Bundles Approach to Advancing Minority Students in the Scientific Pipeline

To combat minority student attrition at all critical segments of the scientific pipeline, we must adopt an approach that focuses on the interrelated and multilayered challenges that these students face from the earliest points in their science careers. Thus, in addition to the effective programs already in place and aimed at minority retention and advancement, additional resources and somewhat different programs may be required for a group likely to face obstacles heaped upon obstacles. There are numerous initiatives and programs that target aspects of the model we propose (e.g., Institute for Broadening Participation, the Louis Stokes Alliances for Minority Participation), but few that comprehensively address potential deficits in all five asset bundles. The Meyerhoff Scholars Program of the University of Maryland, Baltimore County, however, is an exemplar of an asset bundles approach to diversity. As of early 2011, through intensive and sustained attention to the diverse needs of its scholars, the program has more than 700 alumni, among whom 81 had earned PhDs, 25 had earned MD/PhDs, and 92 had earned MDs.[95] We argue that this program's success at the collegiate level provides evidence that asset bundle thinking is practical and feasible. Moreover, we expect that when asset bundle thinking is implemented along all segments of the scientific pipeline, it can help academic medicine and the S&E fields achieve the sustained diversity they require.

Applying asset bundle thinking to the challenge of increasing the diversity of the academic medicine and STEM workforces requires more than a piecemeal approach. In our judgment, many inter-related strategies are required. For example, the SIC theory illustrates that students form perceptions about how academic institutions will respond to them because of their varying social identities.[23] We argue that these expectations are critical to minority students' experiences and, in particular, their ability to envision themselves as scientists and health care providers. Toward that end, to develop students' full capacities, asset bundle thinking requires that institutions first acknowledge the capabilities of all talented minority students, regardless of the various social groups to which they belong. Subsequently, institutions should concentrate on developing students' capabilities, rather than problematizing their deficiencies. In sum, academic institutions have the duty to be conscious and careful about the messages they send about the values, capabilities, achievements, and expectations of minority students.

Alternatively, we recognize that, even when encouraged and provided resources, not all students are capable of pursuing careers in academic medicine and STEM research. Accordingly, we acknowledge the need to identify the most qualified students for whom this intervention will be the most beneficial. A possible starting strategy could be to rely on systems already in place to ensure that low-income minority high school students who perform exceedingly well on standardized tests and/or classroom examinations are identified and encouraged, either by teachers or other educational professionals. Once especially able students have been identified, it is important to then offer them the array of social and educational supports embedded in the asset bundle model to help them establish identities consonant with higher education in the sciences. This cannot be done entirely with existing resources, but compared with the level of resources needed to make fundamental improvements in primary and secondary education, we believe the required investment is modest. Although the asset bundles framework requires much front-loaded effort, the return on this investment will likely yield not only an increase in diversity among scientists and health care providers but also an improvement in these professionals' ability to understand and respond to the health care needs of the populations at greatest risk.

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