

What Was Not Said and What to Do About It

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Abstract

The Woo et al. review (this issue) provides a foundation for considering the larger goals of higher education. We step back to consider the broader goals and ideals of higher education. Fundamentally, we want to admit a diverse set of students into graduate school and then produce the most accomplished scientists, artists, leaders, and innovators. In a world with inequality in preparation and finite resources, these ideals end up in tension without any easy resolution. The inability to provide opportunities and develop talent across all groups up to early adulthood is *the* fundamental problem we face. It is tempting to ignore it. We would be delighted if test and grade differences could be easily dismissed. Instead, we know that a great deal of potential is being wasted, and this waste represents a terrible loss for individuals, communities, and society. We believe that the greatest change will come from better and expanded investment in expanded gifted-and-talented programs, increasing the flow of underrepresented students into these programs, greatly improved assessment of psychosocial skills and talents at all levels, and career counseling and mentoring that begins early and continues through higher education.

Keywords

standardized testing, admissions, fairness and bias

In the target article, Woo et al. (2022; this issue, p. ◆◆◆) provide a sweeping review of the psychometric literature on traditional cognitive and noncognitive predictors of graduate-student performance, and they provide a data-driven analysis of these predictors. The use of standardized test scores, especially scores purported to measure cognitive ability, has been a controversial practice for some time in education circles. The controversy stems from the fact that some ethnic-racial and socioeconomic groups obtain lower scores on these tests, on average, than others, which results in fewer students from the groups with lower average distributions gaining access not just to graduate education but also to undergraduate education and to gifted and talented education programs in the K–12 arena. Thus, test scores are often blamed for the ethnic-racial and socioeconomic disproportionalities in education and employment contexts in which test scores are included in the selection criteria (Ford & Helms, 2012).

First, we appreciate the authors' work carefully defining language that often goes undefined in this discussion. Clear definitions help readers consider evidence

from a common perspective rather than relying on their implicit beliefs. We also appreciate and largely agree with their assessment of the literature. We agree with their conclusion that tests exhibit useful predictive power for a number of important measures of student success (Kuncel & Hezlett, 2010; Lubinski, 2016) but are less strongly correlated with some outcomes. These latter outcomes, such as degree attainment, are difficult to predict in general and are substantially driven by psychosocial characteristics (McCabe et al., 2020) in groups of individuals with similar levels of ability and training. However, the evidence for a powerful association between cognitive abilities and the long-term accomplishments we want from graduate students is undeniable (e.g., Lubinski, 2009; Wai et al., 2018).

We also share the belief that assessment of psychosocial characteristics is of critical importance (see Olszewski-Kubilius et al., 2019), but we are concerned

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that many commonly used measures have poor predictive power and can be prone to bias. Finally, we also agree that tests, which have been more heavily studied than other options by at least an order of magnitude, appear to lack psychometric bias, although we note that there may be exceptions for nonnative speakers (Shewach et al., 2017).

Because the authors have conducted an extensive review of many of the pertinent factors, our goal in this comment is to discuss what was not said and talk about what we might do to improve the situation. This approach is not a criticism of their piece. They had enough on their plate to begin with, and we are grateful to the authors for providing a sweeping and unblinking review that can act as a foundation for our thoughts.

The Goals of Higher Education

First, we must take a step back and ask, “What are the goals of higher education?” Goals should influence how admissions are conducted and what student characteristics are evaluated. Education has been an engine for economic growth, innovation, technological advancement, social reform, upward mobility, developing an informed citizenry, and the preparation of adults for the workforce, hopefully in a career of interest to them.

For graduate-school admissions, we think education goals should be based on two major ideals. One is to provide equal opportunity to everyone who is prepared for graduate training. We would like to admit a diverse set of students into graduate school. The fact that racial/ethnic, socioeconomic, geographic, and gender groups are underrepresented in higher education is distressing and is the underlying reason for the Woo et al. article and current discussions of admissions. We know that a great deal of potential is being wasted and this represents a terrible loss for individuals, communities, and society (Wai & Worrell, 2020). Addressing this concern should be a high priority.

The other ideal is to obtain the benefits of the best achievements from our higher education system. That is, we want to produce the most accomplished scientists, artists, leaders, doctors, and innovators. It is with good reason that universities brag about their Nobel Laureate numbers and create displays of the major scientific, technological, and artistic accomplishments created by students and faculty. We stand in awe of the medical miracle that is the development of not one but many highly effective COVID vaccines within a year. It was unprecedented, astonishing, amazing, and driven by the research and work from the best scientists and experts. We live in a scientific and technological renaissance that is driven by those who have attained eminence in their fields.

Talent Is Not Equally Developed

The two ideals—providing equal opportunity for all who are prepared and yielding the most accomplished producers and performers—are not inherently in conflict but become so when talent is not equally identified and developed. The inability to provide opportunities and develop academic talent across all groups is the fundamental problem we face (Carter & Welner, 2013; Hamilton et al., 2018; Ricciardi et al., 2020), and it is tempting to overlook it. We would be delighted if test and grade differences could be easily dismissed. But blaming underrepresentation on assessments does not recognize the complexity of the issue and is comparable to blaming severe weather caused by climate change on the thermometers that indicate the planet is warming.

Achievement gaps appear as early as preschool (Aud et al., 2010) and generally persist and often worsen over time (De Brey et al., 2019). Many contributing factors have been identified, ranging from differential summer slide in math and reading on the basis of socioeconomic status (Coley et al., 2020), to school resources (Zwick & Himelfarb, 2011), to parental educational qualifications (Hartas, 2011). The underrepresentation of minority students in graduate school parallels gifted-and-talented programs, in which tests are often blamed but are a reflection of the gaps in achievement (Erwin & Worrell, 2012) and opportunity (Carter & Welner, 2013). For example, most people ignore the fact that the achievement gaps manifested in standardized test scores used for admissions at the graduate and undergraduate level are also present in the most commonly used nonstandardized measure of academic achievement (i.e., GPA).

Differences in developed skill do not disappear easily in teen or adult samples. High school grades partially obscure this problem because grading is a within-schools phenomenon—but so are social-class differences (Zwick & Greif Green, 2007). Likewise, when tests are rescored within schools, much of the group differences disappear (Kostal et al., 2017). Although it is certainly the case that college can help students build skills, it is often forgotten that those with greater initial skill generally do not stand still; they continue to advance as well (Ceci & Papierno, 2005). A striking example of college graduates illustrates this point.

Recently, one of us examined the course-taking behavior of science, technology, engineering, and mathematics (STEM) bachelor's-degree graduates at 74 colleges and universities (Zhang et al., 2021). On average, Black and Latinx graduates took fewer advanced courses than White and Asian students by nearly 40%

and 20% of a standard deviation, respectively. On average, these groups also earned lower grades ($d = -0.71$ and -0.42) along their way to a college degree. Much of the effect for taking advanced STEM courses was attributable to quantitative reasoning scores at entry to college, whereas social class and student goals did not meaningfully affect the model. Across all groups, the full story is that, regardless of group membership, students with less academic preparation when they enter college do not tend to do as well or complete as much advanced material even though they earn the degree. Skill differences persist and, unfortunately, academic readiness is uneven across individuals and groups.

It is certainly unfair that many students, through no fault of their own, have not received the educational opportunities that would have left them better prepared for higher education. At the same time, it is also unfair to deny admission to a person who would have performed better than the person admitted. In a world with inequality and finite resources, these two aspects of fairness are in tension with no easy resolution. However, we think that there are ways to reduce the problem and the tension.

What to Do About It

Graduate programs understandably focus attention on the point of admissions. However, to best address both of the ideals of higher education, the point at which an individual is applying to graduate school is often too late to get the biggest effect. We need to expand the pipeline and enhance early identification of gifted students in unrepresented groups. A detailed discussion for improving K–12 education is well beyond the scope of our comment, but substantial investments both during school and over the summer are needed (Coley et al., 2020; Kim & Quinn, 2013; Peters, 2022; Worrell & Dixson, 2022).

Addressing all of the issues with K–12 education would be ideal and is critically important, but it also will require investments and changes that are not likely to occur quickly. Likewise, reducing the impacts of systemic racism, White supremacy, income inequality, and deep poverty are necessary societal goals that will require several generations of consistent effort to achieve, and will occur only if and when policymakers can agree that these are desirable goals worth pursuing. Therefore, when the goal is increasing preparation for graduate education, we would like to spotlight that an increased investment in equity-minded gifted-and-talented programs is an actionable and scalable approach.

If we think of graduate school as the ultimate gifted-and-talented program, the pipeline to graduate school

will largely comprise students achieving at a gifted level at each stage of education. We believe that this expansion would need to differ structurally from many previous programs by changing both the procedures for identifying students and the nature of the characteristics considered. Considerable expansion in these programs could be realized with a comparatively small increase in spending because gifted-and-talented programs are a woefully neglected aspect of public educational spending, constituting less than half a percent of the federal educational budget (Wai & Worrell, 2017).

Increasing the flow of underrepresented students into these programs is doable, especially as substantial numbers of students, including students from underrepresented groups, begin the school year with scores at least 1 year above grade level (Peters et al., 2017) and thus often do not learn anything new. Some structural changes would need to occur that would increase enrollment of underrepresented students and improve the quality of gifted-and-talented programs (Peters, 2022).

First, expanded and universal screening using within-school local norms instead of district or statewide norms would increase representation. This strategy allows students to be assessed within the context of their community and school and will improve representation (Carman et al., 2018; Worrell & Dixson, 2018).

Second, teacher discretion can reduce the number of unrepresented students, so avoiding the use of teacher recommendations for screening can increase the identification of minority and low-income students who benefit greatly from the programing (Grissom & Redding, 2016; Worrell & Dixson, 2018; Worrell et al., 2019).

Third, broadening the definition of gifted and talented by considering specific abilities and psychosocial skills can also contribute (Subotnik et al., 2011). Students can be talented in cognitive domains that reach beyond traditional assessments, and these talents should be nurtured. Likewise, a student's psychosocial skills can constitute an important area of talent as they have important associations with academic success and beyond (e.g., Roberts et al., 2007). Assessments of these characteristics have improved and can contribute to a comprehensive approach. Here teachers can have a role by providing teacher observations (not gatekeeping), which should evaluate specific behaviors that do not require inference but avoid rating characteristics that do (Worrell & Erwin, 2011). In total, decisions should be local and rely on a rigorous assessment of an expanded set of both cognitive and socioemotional skills (for an expanded list of best practices, see Worrell & Dixson, 2018; Worrell & Erwin, 2011).

Improving Higher Education

The same ideas hold true for higher education; some students are not well prepared for graduate study, whereas others are well prepared but may not consider applying in the first place (e.g., Hoxby & Turner, 2015). The comparatively wide open and student-choice driven higher education model in the United States is a blessing and a curse. Student agency and choice are favored, but too many students are entirely unaware of the path they need to pursue for a career or become a competitive candidate for graduate training. They lack the insider knowledge that other families have (Subotnik et al., 2021) as well as access to talent-development opportunities in out-of-school settings (Olszewski-Kubilius et al., 2020).

Because the student-choice model is unlikely to change, colleges and universities would better serve their students if they made graduate-school expectations transparent and helped students understand the path to their goals. For example, author F. C. Worrell would not have even considered graduate school were it not for effective mentoring. Evidence-based guidance on the coursework and experiences that lead to admissions and success in graduate school could be provided with the same concept also offered to high school students across broad occupational categories. It is one thing to know that colleges like AP Physics; it is another to know how to prepare for it and what percentage of Master's-level engineers scored well on the exam.

With a widened early pipeline and greater recruiting, mentoring, and research experience, graduate programs will have greater success in diversifying the entering classes. Targeted research opportunities and mentoring can be effective (e.g., Estrada et al., 2018; Pender et al., 2010) and appear to have both value and self-efficacy effects. Arguably, these programs should be begun even earlier in the pipeline, but in all cases, an expanded group of students will support the first goal of expanding opportunities. Even supplying basic information about graduate school to underrepresented groups can be productive. Each of us has seen surprise on a student's face when we explained that most Ph.D. programs pay for tuition and provide some modest income. What once seemed impossibly expensive suddenly became an affordable reality.

Finally, at each stage of the process, we want to repeat that how we evaluate students, from gifted and talented children to prospective graduate students, needs to expand. One score should never be the sole criterion for such a high-stakes decision (Worrell, 2009), and the reality is that most graduate schools have long embraced this truth. We should include expanded definitions of giftedness to include psychosocial skills and

talents in nonacademic domains at all levels (Olszewski-Kubilius et al., 2019). Considering multiple valid pieces of information will also improve our ability to identify students who may have underperformed at an earlier stage but are likely to make especially good progress in the next.

However, we see too many programs arguing for more reliance on tools such as letters of recommendation, personal statements, and research experience, apparently unaware that these tools have little predictive power. They can be greatly improved, but it will often take more than adding a rubric for rating and scoring. Holism is hollow without empirically validated tools and data combination methods, and this situation is a precise description of the present situation (Kuncel et al., 2020).

The Woo et al. article stands as a thoughtful summary of the current state of graduate-school assessment. We hope that readers will embrace the voluminous evidence they put forward and consider it in the wider context we briefly present. There is much work to do, but in the end, we can maximize the two ideals of higher education if we recognize that the process of diversifying the student body in graduate school has to begin long before students are applying to graduate school.

Transparency

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