

# How and Why Wai and His Colleagues Reach Conclusions That Do Not Necessarily Follow from Their Data: Reflections on “The Role of Elite Education and Inferred Cognitive Ability in Eminent Creative Expertise: An Historical Analysis of the Time 100”

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## Abstract

I argue that Wai and his colleagues (2019) argue for a causal relationship between general cognitive ability and creativity that goes beyond their data. Although there certainly is a correlational relationship, the data they present do not clearly allow for causal conclusions of any kind. I discuss three issues with their article: the usefulness of a measure of admission to elite universities as a proxy for a measure of general cognitive ability; the desirability of limiting causal conclusions based on correlational data; and the desirability of having a comparison or control group when drawing scientific conclusions.

## Keywords

elite education, cognitive ability, eminent creative expertise

## Introduction

Wai, Makel, and Gambrell (2019) have performed an analysis of the Time 100, which is, according to Wai et al., a list of people “who arguably have created a perceptible product that is both novel and useful as defined within the current social context” (p. 78). Their analysis has led them to several conclusions, among which are that “Top 1% in general cognitive ability people being overrepresented among the TIME 100 by a factor of about 42 times base rate expectations (or a relative risk of 42, a very large effect size) suggests that cognitive abilities certainly are important for the development of creative expertise across the domains covered by the TIME 100” (p. 87).

First off, let me commend the authors for

their creative analysis of the Time 100. They recognize, rightfully, the need to go beyond often trivial tests of divergent thinking to look at creativity in a large sense. It is hard to do such an analysis in a quantitative way, and they have used an ingenious methodology to look at relations between admission to elite universities and later creative achievement. The authors truly deserve to be congratulated for an innovative and useful assessment of how general cognitive ability and elite university education are associated. Personally, I wish more investigators would do such innovative analyses, rather than relying largely or exclusively on measures of creativity that are dubious at best.

All that said, I question whether their conclusion follows from their data. There are

three issues, one of which the authors seem clearly to recognize and the others of which they perhaps do not recognize as clearly. The three issues pertain to admission to an elite university as a proxy for general cognitive ability, drawing causal inferences from correlational data, and lacking a comparison group.

### **Admission to an Elite University Is Not a Good Proxy for Measuring Extremely High Levels of General Cognitive Ability**

The first issue, which the authors recognize, is that inferring that education at a prestigious university implies one is in the top 1% in general cognitive ability is quite a bit of a stretch. Without doubt, students in prestigious institutions, at least in the United States, are, on average, higher in various cognitive abilities than are people in institutions of little or no prestige. But anyone who has read about recent admissions scandals, or who has worked with college admissions at prestigious institutions (as I have at Yale and Tufts universities), knows that there are many different ways in which students can be admitted to prestigious colleges and universities. Certainly, most of the admitted students are above the average of the general population in cognitive abilities. But the top 1%? Students are admitted to many prestigious institutions for a combination of reasons: general cognitive ability, of course, but also (a) athletic prowess, (b) alumni connections, (c) wealthy parents who have contributed or are expected to contribute financially to the institution's success, (d) contribution to geographic distribution, (e) contribution to racial/ethnic or gender diversity, (f) political or other connections, (g) simple ability to pay full or almost full tuition, (h) special musical, artistic, literary, or other talents, (i) perceived leadership qualities as shown in extracurricular activities, and (j) personal charisma, as shown in an admissions interview or by a quirky college-application essay; among other reasons. Simply having high cognitive abilities does not "cut it" for admission to most elite institutions, and never has, as many students discover who are rejected despite their sky-high high school GPAs and/or standardized test scores. Students may be admitted whose standardized-test scores are far below those of other students, simply because they have other

qualities that universities are looking for in students. Discussions of some of these issues can be found in a large number of sources (e.g., Bedor, 2015; Mac Donald, 2018; Springer, Reider, & Morgan, 2017; Steinberg, 2003; Sternberg, 2010, 2016). Students of less than top-1% general cognitive ability do not even necessarily have to fake their way into admission to a prestigious college (*New York Times*, 2019). There are so many other ways to achieve admission to prestigious universities, especially for students who have parents of means.

In making the first point above, I do not wish to denigrate students admitted to elite universities who are not in the top 1% for cognitive ability. On the contrary, I have argued for diverse criteria other than traditional cognitive abilities for such admissions (Sternberg, 2011, 2016). Rather, my argument is that admission to an elite college is not a particularly good proxy for high general cognitive abilities—nor, necessarily, should it be. A reasonable question to ask is just what so-called "elite" universities *should be* looking for when they admit students. Many such universities have decided that general cognitive ability should only be one factor among many in making admissions decisions. That is, they do not look at holistic admissions—admissions by a diversity of characteristics—as a departure from getting the best students; rather, they look at such admissions as the means to get the best students, or as I have put it, of getting students who will make a positive, meaningful, and potentially enduring difference to the world—who will contribute toward making the world a better place (Sternberg, 2016). So elite universities do not even intend, and never have intended, for admission to be a proxy for top-1%-level general cognitive ability.

### **Lack of a Comparison Group**

Wai and his colleagues do not include a comparison group in their study. But such a comparison group would have been useful. *US News* conducted a survey of "The Top 10 Colleges for Members of Congress: What schools can claim the greatest number of congressional alums from among today's lawmakers" (Morella, 2010). The colleges? First (#1) is Harvard, then Stanford, then Yale, then UCLA—well, you get the idea. How is Congress

doing? Well, there is perhaps no objective way of assessing what it is doing or, as some believe, not doing, but as of the day I am writing this article, public approval of Congress in the United States is at 17% (<https://news.gallup.com/poll/1600/congress-public.aspx>), barely a number that would lead one to list its members as making distinguished creative contributions. Creative contributions, as the authors recognize, always need to have an audience, and the US audience, at least does not see Congress acting in the kinds of creative ways that lead to their approval.

To put it another way, how many people go to top universities, or, for that matter, have extremely high IQs, who distinguish themselves in their careers not by their creativity, but rather by their lack of creativity, impotence in the face of an overbearing CEO or president, or just general ineffectiveness? By looking only at those with elite educations who succeed brilliantly, and not at those who fail to make any meaningful difference or who make a negative difference, one is lacking a meaningful comparison group. Indeed, a number of authors have pointed out how abilities, including creativity, can be used not just in constructive ways, but also in toxic ways (e.g., Cropley, Cropley, Kaufman, & Runco, 2010; Sternberg, 2010).

One could conclude from the *Time 100* that many people who are eminently successful have gone to great universities. But do we know that spectacular failures are not also over-represented among those who got top educations and then proceeded to mess up in spectacular fashion? Among U. S. Presidents, William Howard Taft, Gerald Ford, George H. W. Bush, George W. Bush, and Bill Clinton (law school) all were graduated from Yale, and Donald Trump from the University of Pennsylvania (Wharton School). Make your own decision about their intellectual, creative, or other merits.

### The Matter of Causality

We all know that correlation does not imply causation—we learn it in our first statistics course. Yet, we are not all as adept at applying the rule as we are at knowing of its validity. Consider the present case.

Suppose, in an alternate universe, prestigious universities want to be objective and so they decide to admit students solely on the basis of height. Cognitive ability and everything else no longer matter. Only height, which can be objectively, reliably, and validly measured, counts. So, for example, perhaps Harvard, in that alternate universe, accepts only people over 7 feet tall, Yale, over 6' 11", etc., down to Podunk U., which takes only people over 4 feet tall. When the students graduate from the elite schools—these days, virtually all of them do—the prestigious law schools, medical schools, and graduate schools are eager to get them, because those schools look especially for two things: a prestigious undergraduate degree and, of course, tall people. After all, they think they know that it is height that matters for success (and, in fact, it does matter to some extent in many occupations!). Employers want to hire these people—they don't even bother going to Podunk-like schools to recruit. Venture capitalists want to fund the graduates of prestigious schools—even the people who voluntarily drop out of them are looked at with glee—and society welcomes the graduates of its elite schools into its top echelons. Over the years, these highly valued young people work their way into the top positions in society. And they *do* have the ability to succeed, as do untold numbers of others with similar cognitive abilities who are stuck in dead-end positions and who are given no opportunities at all and will never show what they could have done if they had had the opportunity for an elite education.

Then, authors from the alternate universe write an article on how important elite education and height are to success. And of course, they are right. Height was what enabled people to get through a narrowing funnel that would only let the tallest through. Whether height mattered to their success was beside the point. The tall people were given opportunities, many succeeded, and some even made it into the *Time 100* of the alternate universe, seemingly showing that height actually is a good predictor of success in that universe. And it is!

Unfortunately, *we* all are living in the alternate universe, except that we use sometimes

largely irrelevant criteria beyond height to make our decisions. At one time, for example, socioeconomic status (SES) and related measures were what gave people opportunities to attend elite universities (e.g., see Karabel, 2006). Standardized tests were designed to be a meritocratic replacement (Markovits, 2019)—except that, as we know, the correlation between tests and SES is very high, partly because you, the reader, are perhaps helping your children educationally in ways that low-SES people don't even know how to do or know they should do.

To a large extent, universities in the United States (and probably other countries) are magnifiers of already existing privilege. For example, the median parental income of students at Yale is \$192,600; almost one-quarter of the students are from families in the top 1% of family income, and almost half from the top 5% of family income (The Upshot, 2019). The figures at Princeton are similar (The Upshot, 2019). Is it any wonder that so many great successes of any kind attend prestigious universities, given the enormous head start in life so many of these children have? Indeed, the head start, with little regard to their abilities, may have helped many of them, directly or indirectly, be admitted to elite colleges and universities in the first place (Golden, 2007). Having a head start—better schools, quality summer camps, tutoring, parental interventions, quality toys, books, and technological innovations at home—does not get one into the *Time 100*. But such a head start certainly gives one an enormous advantage over those who have to worry about parents addicted to opioids or about getting mugged on the way to school. And how many children in the top 1% in any ability or talent—general-cognitive, artistic, musical, scientific, athletic, or whatever—will not have the resources to engage in the preparation it takes to enter the *Time 100*? These are the individuals who might have gotten there except for the struggles they face in their daily lives. Many of them, regardless of ability or talent, would never even consider applying to an elite college or university.

Moreover, other cultures—what we might refer to as “less modernized” ones—value skills

other than the general cognitive ability that so many of our standardized tests measure, directly or indirectly (Greenfield, in press; Sternberg, in press). They may value creative skills, practical skills, or even wisdom-based skills that general-cognitive abilities tests fail to measure (Sternberg, 2003). Hunting skills, fishing skills, gathering skills, negotiation skills are just a few of the practical skills various societies might value; and other relevant skills might include emotional or social intelligence (Kihlstrom & Cantor, in press; Rivers, Handley-Miner, Mayer, & Caruso, in press). Even our own culture values skills way beyond general cognitive ability; athletic skills are an obvious example. So, although general cognitive ability may correlate with success, so, in our own culture, may a host of other abilities, such as emotional and social intelligence.

## Conclusion

My disagreement with the authors of the target article is not in the association between elite education or even general cognitive ability and creative success. Certainly, elite education is associated with success, including creative success. General cognitive ability, as well, is associated with creative and other forms of success (Deary & Whalley, 2008). The authors' analysis shows it, and my own theory of intelligence suggests that part of creativity is analysis—or discerning which ideas are good and which are not (Sternberg, 2003). It is truly difficult to be highly creative without a reasonably high level of intelligence, although not necessarily at a level in the top 1% (Sternberg, Kaufman, & Roberts, 2019). But often we see causation where there is merely correlation, and we draw conclusions lacking a control or comparison group (another highly desirable feature to have when drawing conclusions). I believe we need to be cautious in drawing conclusions that go beyond the data concerning the relation of general cognitive ability or elite university education to creativity. They may matter, but not always in a direct way.

Correlations are not merely a product of the forces of nature. Society *creates* correlations between ability measures and success by

allowing only those who do reasonably well on the measures to proceed to the kind of education, elite or otherwise, that will enable them to have success. I agree with Wai and his colleagues that there is a correlation; but I suggest that it is at least, in part, a societally-created one. There may be many other individuals who could have succeeded, creatively, or otherwise, but who never got the chance because of the circumstances of their birth or upbringing. And some of those who did succeed may have succeeded because, metaphorically, they had a huge head start.

### Authors' Declarations

The author declares that there are no personal or financial conflicts of interest regarding the research in this article.

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