Outliers and Outsiders

(Part Two)

The Dr. Jonathan Wai Interview

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DR. JONATHAN WAI (PART ONE)[23]

[2] Research Scientist, Talent Identification Program, Duke University & Case Western Reserve University.
[3] First published on September 1, 2014 at www.in-sightjournal.com.

ABSTRACT

Part one of a three-part in-depth, broad interview with Research Scientist, Dr. Jonathan Wai, of the *Talent Identification Program*, Duke University, and Case Western Reserve University. He discusses the following subject-matter: family background regarding culture, geography, and language; development; universalizing intelligence testing with non-verbal tests; commentary on new global increases in flourishing with a focus on India and Mainland China, and an example of Mathematician, Srinivasa Ramanujan; *Finding The Next Einstein*; *Who's Smarter? Republicans and Democrats in Congress* (2013), and the top 1% of the ability spectrum based on extremely high standardized test scores for admissions to highly selective undergraduate and graduate institutions; *Why the SAT Needs to Be Harder (2014)*'; *Could We Create Another Einstein?* (2012), and serving those with intellectual and creative talent; *Even Nerds Need to be Appropriately Challenged* (2014), and focus on average and below-average students with consequential neglect on the talented sector of the young; interview with Dr. James Flynn called *Can The Magic of Great Literature Take You Around The* World? (2011), and problem with a-historicity of incoming students.

Key Words: 'g', Arthur Jensen, Bellingham, Case Western Reserve University, communists, Dr. James Flynn, Dr. Jonathan Wai, Duke University, engineering, G. H. Hardy, Hong Kong, IQ Tests, Mathematician, Mega Test, physics, Robert Kanigel, Shanghai, Srinivasa Ramanujan, Talent Identification Program, Titan Test, Washington.

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1. **In terms of geography, culture, and language, where does your family background reside? How do you find this influencing your development?**

   My father was born in Hong Kong. My mother was born in Shanghai. They met as graduate students in the U.S. They were educated in engineering and physics, respectively, so they valued these disciplines, and education, quite highly. My mother would often tell me the story of her father, who was wealthy before the communists came, took away everything, and sent him to jail for being a capitalist. My grandfather, at age 50, would start over again in Hong Kong with next to nothing, and become a successful entrepreneur all over again. The idea that someone with brains and hard work can rise from anywhere is something I heard of often when growing up, because it was my grandfather's story. It was also my parent's story.

2. **How did you find developing from childhood through adolescence into young adulthood?**

   I was born and raised in Bellingham, Washington and enjoyed both academics as well as sports. I played just about every sport growing up, focusing on soccer and tennis at a competitive level. Probably one academic activity I have always enjoyed is reading. I remember going every week to the public library to check out piles of books as a kid. Today, I am fortunate that as a researcher and writer reading is a part of my job. I get up every day and have the opportunity to read, think, and create. I have never stopped reading.

3. **In terms of universalizing the testing of intelligence, what do you see in the future for high-range non-verbal tests? How will this change general intelligence testing and the identification of gifted individuals?**

   In college, I spent some time solving puzzles, which I have always enjoyed. Exploring puzzles online led me to what one might call "high-range tests" or basically extremely difficult puzzles that you could take as much time as you wanted to solve. I spent some time solving these puzzles, which were designed to be IQ tests with greater headroom, and met a lot of interesting people from around the world who also enjoyed creating and solving such puzzles. I don't know if this will ever be standard practice for intelligence testing, because most people don't have the free time to take an extremely difficult untimed puzzle solving challenge than can span weeks, months, or even longer. I don't know what the future of intelligence testing will hold, but see Arthur Jensen's *Clocking The Mind* for a vision of intelligence testing that is based on reaction time, nearly the opposite of an untimed puzzle test.

4. **For those having the talent, but lacking the opportunity – especially in India and Mainland China, what of those hundreds of millions of people having increasing standards of living and the educational opportunities to take advantage of natural talent for further flourishing? On the one hand, the increased access for personal and global gain of utilizing the best human talent in international contexts. On the other hand, the allowance – based on technological innovations and increased standards of living – of presenting the real possibility for human flourishing at all levels, i.e. the potential for a global renaissance of the human spirit in, at a minimum, intellectual terms. How do you see identification in the long-term for the high-end (4/5/6 standard deviations, or SD, above the norm)? What of 'g' tests for those ranges above the relatively high ceiling of the *Ravens Advanced Progressive Matrices* (RAPM)?**

   One of the greatest stories of talent from a poor background was that of the Indian Mathematician Srinivasa Ramanujan, which I first read about in the great science writer Robert Kanigel's *The Man Who Knew Infinity*. However, in Ramanujan's case, he was still "discovered" by G. H. Hardy, yet

there are likely a number of people with similar potential who did not end up flourishing. One of the most systematic and cost effective ways to identify talent is to make sure that all students are first given an opportunity for a good education, but also that they are tested. Although testing is viewed as favoring wealthy students, in fact testing is entirely objective in the sense that the test does not know or care what you look like, how much money you or your parents have, and will measure with high reliability and validity your degree of competence and what you are ready for educationally.

5. **While reading through all of your *Finding The Next Einstein* and academic work to date, I noticed the common themes of creativity, intelligence – naturally, and critiques of the gifted world – especially regarding assistance to the gifted. Why did you begin writing this series of articles? Where did your interest in the topic originate?**

   I am a nerd. I have a soft spot for nerds. I have also always recognized that there is wide variation in brainpower, creativity, and problem solving ability. I always enjoyed reading biographies of great people because I tried to learn how they solved problems and overcame difficulties, both personal and professional. How did these people become successful? Although there are many factors at work, including many years of hard work, the role of creative brainpower intrigued me. I also enjoy the craft of writing, and decided I would start trying to educate the public about my areas of expertise and maybe even help some talented kids.

6. **Of particular note in your article *Who's Smarter? Republicans and Democrats in Congress*[4] (2013), though a small point from a relatively short piece, you provide a bar graph of those in various fields sufficing to qualify for the top 1% of the ability spectrum based on requiring extremely high standardized test scores for admissions to highly selective, and 'elite', undergraduate and graduate institutions. What did you find?**

   This bar graph was taken from my research article *Investigating America's Elite*[5]. Basically I found that among Fortune 500 CEOs, billionaires, federal judges, Senators, and House members, a larger portion of each of these groups were in the top 1% of cognitive ability. This shows that the U.S. elite are largely drawn from the cognitive elite. Also, a lot of really smart and motivated people end up attending the very top schools in the U.S.

7. **You wrote an article on the *Scholastic Aptitude Test* (SAT) entitled *Why the SAT Needs to Be Harder*[6] *(2014).* In short, it does not discriminate the highest levels of ability well-enough. There exist many tests with 4+ standard deviation (SD) ceilings within many societies, e.g. the Mega Society's (one-in-a-million cutoff) *Titan Test* or *Mega Test*. What about coordinating with those involved in the construction of tests at the high-range to develop SAT-style questions to probe the ultra-high range of 4 and 5 sigma? Or to the prior point, what about constructing a non-verbal/'culture fair' test with high ceiling at 4.5 or 5 SD?**

   This is an intriguing idea. Although I enjoy high range tests and puzzles, I'm not entirely sure what constructs they measure. One solution to the problem you describe is to use a test such as the SAT designed for the average 17-year-old on a talented student at a much younger age. This provides sufficient headroom for the talented student and also gives the benefit of reliability and validity in a timed setting.

[4] See Wai, J. (2013, November 4). Who's Smarter? Republicans and Democrats in Congress.
[5] See Wai, J. (2013). Investigating America's elite: Cognitive ability, education, and sex differences.
[6] See Wai, J. (2014, March 7). Why the SAT Needs to Be Harder.

8. You close the excellent article, *Could We Create Another Einstein?*[7] (2012), with "Overall, *Creating Innovators* is an important book because it emphasizes developing the talent of students who are essential to the future of America and profiles some extremely bright minds and their parents, teachers, and mentors to provide some insights into ways to develop intellectual and creative talent." How can we best serve those of exceptional intellectual and creative talent?

The key, really, is to make sure that all students are intellectually stimulated each day and are learning something new. Another way I think we can serve talented students is to help them become challenged early and in many areas so they might develop a sense of humility and understand what it means to fail. Many of these students end up in leadership positions in society where they make decisions that impact people of various levels of ability, including people who are very different from them. So they need to be wise and humble in addition to being smart.

9. I felt struck by a statement in *Even Nerds Need to be Appropriately Challenged*[8] (2014), "A majority of Americans believe in equity rather than excellence." It seems to argue for a pervasive cultural value of mediocrity based on disadvantaging the talented for the sake of equity with the average and below-average. What do you think? Would you change this cultural value? If so, how would you restructure the educational funding based on the changes to the cultural value?

For whatever reason, in the U.S. today the culture places a primary value on helping below average and average students. I think we should definitely help these students, but also not forget about challenging talented students.

10. You conducted an interview with Dr. James Flynn called *Can The Magic of Great Literature Take You Around The World?*[9] (2011). In it, he states, "Anyone who is a-historical lacks autonomy. They live in the bubble of the present that is defined for them by their government and the media. They have no accumulated knowledge that allows them to criticize what they are told." How would you remedy this problem with the incoming generations of students?

There is tendency in each new generation to want to create something new, to distinguish itself from past generations. And it is true that the young often will find new ways of innovating that will bring us ideas and things that we never dreamed of. However, an understanding and appreciation of the past is important especially for students who end up rising to positions of leadership in society, because there are many patterns in history that can teach new generations about what has already been done so that they don't repeat those patterns, or at least understand the patterns they see around them in society, which seem to arise often. The solution is that students should have a deep appreciation for and education in history, but also not be constrained by that history in a way that prevents them from innovating in an entirely different manner.

[7] See Wai, J. (2012, April 29). Could We Create Another Einstein?.
[8] See Wai, J. (2014, March 23). Even Nerds Need to be Appropriately Challenged.
[9] See Wai, J. (2011, June 6). Can The Magic Of Great Literature Take You Around The World?.

DR. JONATHAN WAI (PART TWO)[10][11]

[10] Research Scientist, Talent Identification Program, Duke University & Case Western Reserve University.
[11] First published on September 8, 2014 at www.in-sightjournal.com.

ABSTRACT

Part two of a three-part in-depth, broad interview with Research Scientist, Dr. Jonathan Wai, of the *Talent Identification Program*, Duke University, and Case Western Reserve University. He discusses the following subject-matter: Tom Vander Ark in *The Educational World Is Flat* (2012), an interview between Marilyn vos Savant and Harold Channer in 1986, and specialists and generalists; Salman Khan and the *Khan Academy*, Einstein's *Ideas and Opinions* (1960), and universality of English; risks of rote learning with Khan Academy, asian educational systems, and Bill Gates; flourishing of the gifted population with focus on the young; myths of the gifted population; responsibilities of the gifted population to society and culture; near and far future of the gifted population; *The SAT Is Too Easy* (2012) and a higher SAT ceiling; Karl Bates, *The Art Of Communicating Science* (2013), and C.P. Snow; and *Project Scientist: Inspiring The Next Generation Of Females* (2013), women in STEM, business, and leadership, and the example of Japan.

Keywords: Bill Gates, C.P. Snow, Canada, Einstein, English, Flynn, Gifted Population, Google, Harold Channer, Japan, Karl Bates, Khan Academy, Marilyn vos Savant, Salman Khan, STEM, Talented Youth, Tom Vander Ark, U.S.

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11. One of the items most striking to me came from an interview with Tom Vander Ark entitled *The Educational World Is Flat*[12] (2012), "In America we appear to have a strong emphasis on being well rounded. Einstein was someone who focused on subjects that he was interested in and tended to ignore subjects that he didn't care much about."[13] It reminded me of an interview by Harold Channer with Marilyn vos Savant (1986).[14] In it, she says, "…What I call a misguided effort to be well-rounded. Why not let one person go and become another Einstein in his or her field? It doesn't have to be something as impressive as physics. There are all kinds of things. But in this effort to make a well-rounded individual, we sort of turn them all off to everything, give them things too early."[15] It seems further reason to consider catering to the most talented. What do you think of specialists and generalists? How might the US alter the educational streams for the gifted to allow to more specialization in an area of sole interest?

Today there is so much knowledge that specialization is almost a necessity. I think, at least in the U.S., the value of being well rounded comes from parents who want their children to be happy in every sense. Parents want their kids to fit in and be accepted by society. Not being well rounded means you are more of an outlier, and especially if you are a social outlier, you have less chance of being accepted. But this is always an issue for people who go on to become great. Oftentimes the path to greatness is quite lonely because you are going where nobody else has gone before. I think a general education is necessary, for example being familiar with history as Flynn pointed out earlier. But if a student knows what they want to do at an early age and wishes to specialize, I think we should let them do that and not hold them back.

12. You have had interviews and articles on the use of modern technology such as computers and software to design, and upgrade, education. Even though, Salman Khan in one interview with you discusses the changes brought on through a decent online educational system called *Khan Academy*, which, of course, he founded and operates. However, I see the foundational change to much of the educational world for the 21st century arising from one area, even though mathematics counts as a universal language. The international language seems quite strongly English. Relevant, to me at any rate, I remember reading the opening piece of Einstein's *Ideas and Opinions*[16] (1960), which I found once more for this, and he says, "As late as the seventeenth century the savants and artists of all Europe were so closely united by the bond of a common ideal that cooperation between them was scarcely affected by political events. *This unity was further strengthened by the general use of the Latin language*."[17] [Italics added] The increasing universality of the English language, in my opinion, will likely improve the educational level of the world. In this sense, organizations such as *Khan Academy* appear to be 'piggybacking' on the phenomenon of increased universality of a common working-language, namely: English – partially eliminating our literal, global 'Tower of Babel'. What do you think?

This is an interesting idea, and perhaps a uniform language is helpful for learning everywhere. I think what online learning has done is provided educational access to anyone anywhere in the world who has a computer, an internet connection, and the freedom to find the information they

[12] See Wai, J. (2012, January 8). The Educational World Is Flat.
[13] Ibid.
[14] See Channer, H. & Mach vos Savant, M. [Harold Channer] (October 29, 2008).
[15] Ibid.
[16] See Einstein, A. (1960, February).
[17] Ibid.

want. Without question this should allow talented students from around the world have the opportunity to interact with one another and innovate together.

13. In the articles *How Khan Academy Can Help Find The Next Einstein*[18] (2012) and *Five Lessons From Salman Khan For Education*[19] (2012), you discuss concerns about how *Khan Academy* may be "enabling rote learning." This is a common criticism of Asian educational systems. Yet in academic international comparisons, those Asian nations are outperforming America, particularly in math and science. Bill Gates has said, as you quote in *If You Are Creative, Are You Also Intelligent?*[20] (2011), "You need to understand things in order to invent beyond them." Do you have thoughts on this criticism? How about ways to increase understanding and inventiveness?

I think Gates said it well already. You have to have something in your brain before you can innovate. Oftentimes rote learning just means you repeat it enough times until you have a concept always ready at your mind's fingertips. Today we have Google, which means every bit of information is available online. However, innovation often comes from the synthesis or reorganization of existing knowledge in a novel or creative pattern or extension, and so to have many things memorized can be quite important, depending upon the context.

14. You share a concern of mine. In particular, the sincere desire to assist the gifted population in flourishing, especially the young. Now, many organizations provide for the needs of the moderately gifted ability sectors of the general population, most often adults and sometimes children. However, few provide for the needs of children (and adults) in the high, profound, exceptional, or 'unmeasurable' ability sectors of the general population. Some organizations and societies provide forums, retreats, journals, intelligence tests, literature, or outlets for the highest ability sub-populations. What can individuals, organizations, and societies do to provide for the gifted population? What argument most convinces you of the need to provide for this sector of society?

There are two main reasons to invest in talented people. The first is that by investing in them we help them fulfill their potential and live rewarding and meaningful lives. The second is that by investing in them we are actually investing in our own future—that is, talented people invent a disproportionate share of things that benefit all of us. The first reason should be enough, but today in the U.S. it is not.

15. Of the gifted population, there exist many myths. What do you consider the greatest of these? What truths dispel them?

Actually, one of the largest myths I encounter is that talented people tend to have a lot of problems (e.g. social). However, longitudinal studies on talented students, such as the *Study of Mathematically Precocious Youth*, have shown that talented kids end up as well adjusted and quite successful adults who have families and friends just like everyone else. Perhaps the stereotype of the nerd as being socially inept is comforting to many people, for whatever reason.

16. In turn, what responsibilities do the gifted population have towards society and culture? Why do you think this?

I believe that each person should have the freedom to choose what they want in life and be responsible for themselves and their actions. They should try to be at least a net zero and preferably

[18] See Wai, J. (2012, December 31). How Khan Academy Will Help Find The Next Einstein.
[19] See Wai, J. (2012, December 9). Five Lessons From Salman Khan For Education.
[20] See Wai, J. (2011, April 12). If You Are Creative, Are You Also Intelligent?. *Psychology Today: Finding the Next Einstein*.

a net positive on society. However, talented people in general have been given a head start in life, and therefore my hope is that they would fully recognize this, be responsible with their decisions that impact many others, and be wise stewards of their talents. For their personal well-being, I would hope they would not waste the head start they have been given in life.

17. Where do you see the future of the gifted population in relation to society? What about the near and far future of the gifted population in general?

Talented people have always been and will always be important in society. In the book *Human Accomplishment*[21] *(2003)*, we see the many amazing things that have been created largely by the gifted population. I hope that society would place value on talented people, not for being talented, but for using their talent and working hard to create something that is helpful or beneficial to all of us.

18. You note one large, and mostly unstated, problem directly with the article *The SAT Is Too Easy*[22] (2012). For instance, you raise the issue of the current SAT's lack of ability to distinguish among the top candidates in the US. Why not coordinate with high-ceiling test constructors to measure 4.5 and 5 SD above the norm with the SAT?

As I mentioned earlier, the better solution is either to use the SAT as it exists at an earlier age, or actually bring out the original SAT, which had a much higher ceiling. Basically the idea would be to use an existing test with established reliability and validity.

19. Of the articles and interviews published, I consider the interview with Karl Bates, entitled *The Art Of Communicating Science*[23] (2013), the *single most important article* from your blog posts. You cut to the heart of the issue of culture and the split described by C.P. Snow with the sciences on the one side and the humanities on the other – and never the twain shall meet. We can talk about science. We can talk about intelligence and creativity. Regardless, without attention to understanding the separate streams of English language used in each major side, as set out by C.P. Snow, the other stuff seems secondary, even tertiary, to me. Most cutting about the interview, I find, is the concision and pragmatic nature of the responses by both of you at the end of the publication. Do you have any expansions on the topics discussed therein?

Thank you. I think scientists and journalists don't communicate as often as they should, probably in part because these groups have very different incentive and reward structures. However, the problem to a large extent lies with academics who don't understand that the rest of the world operates similarly to the journalistic world. It is the academic world which is very much in an ivory tower. A lot of different fields or disciplines, if they actually took the time to meaningfully interact, would come away with not only a greater appreciation for other disciplines, but also could improve upon their own craft.

20. In your article *Project Scientist: Inspiring The Next Generation Of Females*[24] (2013), I felt thrilled reading it. More have begun to discuss these issues. If we exclude one half of the talent pool, North America loses out. Provided the possibility of easier international travel, talented women with interest in STEM, business, and leadership fields in general will, in my opinion, likely travel to other areas with the opportunities. For instance, this appears in Japan, where many of the talented, wealthy, and highly-educated Japanese women have

[21] See Murray, C. (2003). Human Accomplishment: The Pursuit of Excellence in the Arts and Sciences.
[22] See Wai, J. (2012, July 29). The SAT Is Too Easy. *Psychology Today: Finding the Next Einstein*.
[23] See Wai, J. (2013, June 3). The Art Of Communicating Science.
[24] See Wai, J. (2013, June 24). Project Scientist: Inspiring The Next Generation Of Females.

begun to work against cultural and institutional structures to provide more fair opportunities for themselves. Especially the increased possibilities of self-empowerment of these women, they choose to do it. At least from my vantage, from the cost-benefit analysis of a talented and well-educated Japanese woman, travelling to a new place with better possibilities of equal opportunity compared to having to change a well-entrenched cultural and institutional foundation in Japanese society seems like a far better and more immediate solution. Looking at our own societies, how can we empower women here-and-now in the US and Canada?

I agree that we need to empower women all around the world. More importantly, I think we need to empower both women and men in various disciplines where they are typically underrepresented. I also think we need to focus on helping empower the individual regardless of their color or their gender. In the end, it is not about what people look like, but about who they are as an individual. We need to respect individual differences.

DR. JONATHAN WAI (PART THREE)[25][26]

[25] Research Scientist, Talent Identification Program, Duke University & Case Western Reserve University.
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ABSTRACT

Part three of a three-part in-depth, broad interview with Research Scientist, Dr. Jonathan Wai, of the *Talent Identification Program*, Duke University, and Case Western Reserve University. He discusses the following subject-matter: talent, productivity, *Who's Smarter? Republicans and Democrats in Congress* (2013); success and under-challenged high-talent workers at the highest levels of ability; *Is America "On The Wrong Side of History"?* (2012), America as an unsustainable superpower, and educational declines in America as measured by PISA; interview with Enrico Moretti, globally competitive world while continuing to attract talent at home; concept of 'intelligence', measure of IQ tests, Richard Feynman, *Discussions on Genius and Intelligence: Mega Foundation Interview with Arthur Jensen* (2002), and Steve Hsu's comments on Richard Feynman; societal worry decline in STEM and educational competitiveness in a globalized world, international setting of so-called 'soft power', i.e. cultural influence, and 'hard power' advocates; additional pieces for reading; future projects; influences and inspiration; and final thoughts with a quote from Wagner.

Keywords: Dirac, Dr. Arthur Jensen, Enrico Moretti, Einstein, Gifted, Hard Power, James Watson, Mark Zuckerberg, Mega Foundation Press, PISA, Richard Feynman, Society, Soft Power, STEM, Steve Case, Steve Hsu, Talented, Vivek Wahwa, Wagner.

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21. If we take the highest level of talent in a discipline, something like the top 5% of the ability spectrum tend to have the highest productivity and impact in their discipline. We could provide a concrete estimate for the amount of talent falling through the cracks of society. Did anyone provide a calculable estimate? For example, we could estimate the productivity and talent through measuring the current level of productivity and impact in a field through papers published and total citations - even per paper - for the top 5% of the ability spectrum through your estimates based on competitive undergraduate and graduate programs (*Who's Smarter? Republicans and Democrats in Congress*[27], 2013), using the statistical estimates of the occurrence for the top 5% out of the general population, subtract the two of them, and have a relative estimate of lost/under-utilized talent out of the general population. None of this seems out of the realm of possibility to me regarding the potential of creating a standardized measure for reference when measuring the improvement of utilization of the gifted and talented at the top 5% (or any other percent or that matter). What do you think? What other means could provide an accurate picture of the societal plight of underutilized talent?

This is an interesting idea. Probably some of the strongest international evidence that the U.S. is not developing its talented students is from international comparison tests such as the PISA.

22. What do you make of the great divide between the maximum level of ability required for the most cognitively complex fields such as pure mathematics, medicine, and science, and the under-challenged gifted population with ability in excess of the mean level of ability requisite for those disciplines? In other words, for example, their field requires 1.5 or 2 SD, but they feel unchallenged because of having ability at 3 SD.

When someone has an ability level well beyond their peers they are likely to be quite successful. Yet they also may not be as challenged as they could have been had they chosen a discipline with people as smart as, or much smarter than them.

23. You note the immigration of more talent in *Is America "On The Wrong Side of History"?*[28] (2012), where China sees the US as an unsustainable superpower. However, this seems unreasonable. International settings and competition, and global integration of political, economic, technological, cultural, and informational systems in the 21st century will disallow the viability of long-term immigration of the most talented, gifted, and appropriately skilled and motivated. It seems to me nations will continue to compete for the talent worldwide at an increasing rate. Of course, the US will stay attractive to the talented. Even so, this will not last, especially in light of the educational declines occurring for some time now in the US as measured by such rankings as the PISA. What do you think? Why? How might the US and Canada remedy such decline?

The solution is logical, but is not so simple to implement due to political barriers: encourage talented people to live and work in the U.S. or Canada or whatever your home country is. There is always going to be a limited supply of talented people and because they can come from anywhere the competition will be worldwide.

[27] See Wai, J. (2013, November 4). Who's Smarter? Republicans and Democrats in Congress.
[28] See Wai, J. (2012, April 2). Is America "On The Wrong Side Of History"?.

24. Furthermore, the interview with Enrico Moretti tells of the desire for allowing more foreign-born talent to enter into the US by such business luminaries as Vivek Wahwa, Mark Zuckerberg, Steve Case, and others, which does assist the competitive streak of the nation. However, this seems more temporary, a short-term fix, with tremendous implications for the long-term if the investment in fields having higher economic return-of-investment (ROI), e.g. STEM disciplines, for the individuals and societies involved do not having adequate funding. At some point, you cannot immigrate talent in a globally competitive world if the world integrates to a sufficient level of transport, exchange of information, trade, and so forth. In an integrated global economy, it seems implausible for an indefinite period of time, and therefore I ask, what would you do for the long-term at the individual level? How can the US appear more attractive to talented Americans to stay in their country of birth?

The solution, as I have outlined in my writings, is to both develop homegrown talent as well as encourage foreign talent to come and stay. Probably the driving principle that has attracted talent from the around the world is the freedom to innovate.

25. Do you ever question the measure of the operational definition of the concept 'intelligence' and subsequent measure through IQ tests? For instance, Richard Feynman claimed to have an IQ of 125. However, some replies do arise from an interview with Dr. Arthur Jensen from the ebook published by *Mega Foundation Press* entitled *Discussions on Genius and Intelligence: Mega Foundation Interview with Arthur Jensen*[29] (2002). In particular, the late Dr. Jensen stated in the book-length interview:

> **I don't take anecdotal reports of the IQs of famous persons at all seriously. They are often fictitious and are used to make a point - typically a put-down of IQ test and the whole idea that individual differences in intelligence can be ranked or measured. James Watson once claimed an IQ of 115; the daughter of another very famous Nobelist claimed that her father would absolutely "flunk" any IQ test. It's all ridiculous. Furthermore, the outstanding feature of any famous and accomplished person, especially a reputed genius, such as Feynman, is never their level of g (or their IQ), but some special talent and some other traits (e.g., zeal, persistence). Outstanding achievement(s) depend on these other qualities besides high intelligence. (Langan et al, 2002)[30]**

As you have noted repeatedly in your writing with wit, "…The plural of anecdote is not data." What do you think of this topic? How might others with differing ideas than you argue?

Leaving aside the label "intelligence," I think when it comes to psychometric measurement just about every mental standardized test will measure the G factor or general mental ability to a large degree. On Feynman's IQ, I will quote the physicist Steve Hsu, whose views I share on this topic (see my interview with him on *Psychology Today*):

> **Is it true Feynman's IQ score was only 125?**
>
> "Feynman was universally regarded as one of the fastest thinking and most creative theorists in his generation. Yet it has been reported-including by Feynman himself-that he only

[29] See Langan, C. M., Losasso, G., Jensen, A., et al (2002).
[30] Ibid.

> obtained a score of 125 on a school IQ test. I suspect that this test emphasized verbal, as opposed to mathematical, ability. Feynman received the highest score in the country by a large margin on the notoriously difficult Putnam mathematics competition exam, although he joined the MIT team on short notice and did not prepare for the test. He also reportedly had the highest scores on record on the math/physics graduate admission exams at Princeton. It seems quite possible to me that Feynman's cognitive abilities might have been a bit lopsided-his vocabulary and verbal ability were well above average, but perhaps not as great as his mathematical abilities. I recall looking at excerpts from a notebook Feynman kept while an undergraduate. While the notes covered very advanced topics for an undergraduate-including general relativity and the Dirac equation-it also contained a number of misspellings and grammatical errors. I doubt Feynman cared very much about such things."

26. Oftentimes, the societal worry about the great decline in STEM and educational competitiveness in a globalized world seems too high. However, the pragmatic implementation of practice appears limited to me. Regardless, much of this misses some of the major areas of great influence from a nation, which tends to have the greatest level of dissemination within an international setting of so-called 'soft power', i.e. cultural influence. Of course, the worry about STEM arises out of global competitiveness. In other words, this seems to me to give primacy to GDP over citizenry having adequate education, but with additional benefits to citizen education. Soft power provides a foundation for similar influence in the world other than technology. Although, using the technological platforms invented or improved upon by the STEM graduates. In that, STEM graduates can assist the economic and political aims of 'hard power' advocates, but the platforms of technology emerging from the technological innovations of them allow the soft power influence to proliferate. Where do you see more importance – STEM or arts disciplines/hard or soft power? Or both?

It would be reasonable to think it would be both.

27. Of those pieces which I appreciate most for further reflection: *Lee Smolin Encourages Graduate Student to Stay in Science*[31], *Will We Ever Find the Next Einstein?*[32], *How Do You Make An Intellectual Dream Team?*[33], *If You Are Creative, Are You Also Intelligent?*[34], *Is Spatial Intelligence Essential for Innovation and Can We Increase It Through Training?*[35], *Could We Create Another Einstein?*[36], *Is America "on the Wrong Side of History"?*[37], *How Do We Get Kids to Want to Be Einstein?*[38], *Intelligence: New Finds And Theoretical Insights*[39] (a very good interview with Dr. Diane F. Halpern), *The Educational World Is Flat*[40], *Studying Too Much? This Government Will Stop You*[41], *Steve*

[31] See Wai, J. (2013, September 11). Lee Smolin Encourages Graduate Student To Stay in Science.
[32] See Wai, J. (2011, March 1). Will We Ever Find The Next Einstein?. *Psychology Today: Finding the Next Einstein*.
[33] See Wai, J. (2013, March 29). How Do You Make An Intellectual Dream Team?.
[34] See Wai, J. (2011, April 12). If You Are Creative, Are You Also Intelligent?. *Psychology Today: Finding the Next Einstein*.
[35] See Wai, J. (2011, May 10). Is Spatial Intelligence Essential for Innovation and Can We Increase It Through Training?.
[36] See Wai, J. (2012, April 29). Could We Create Another Einstein?.
[37] See Wai, J. (2012, April 2). Is America "On The Wrong Side Of History"?.
[38] See Wai, J. (2012, February 12). How Do We Get Kids To Want To Be Einstein?.
[39] See Wai, J. (2012, January 11). Intelligence: New Finds And Theoretical Insights.
[40] See Wai, J. (2012, January 8). The Educational World Is Flat.
[41] See Wai, J. (2011, December 11). Studying Too Much? This Government Will Stop You.

Jobs Leveraged His Intelligence To More Effectively Create[42]**,** ***How Brainy Is Your Major***[43]**,** ***Are Elite Athletes Marrying Elite Athletes?***[44] **(a great read for discussion on individual differences),** ***How to Think Like a Scientist***[45] **(good tips for general curiosity and critical thinking too),** ***The Art of Communicating Science***[46]***, Do Journalists And Academics Live In The "Real World"?***[47]**,** ***Teaching Without Words***[48]**,** ***Finding The Next Carl Sagan***[49]**,** ***Do Smart People Rule The*** **World?**[50]**, and** ***How Science Writing Can Save*** **Lives**[51]**. Do you have any recommended reading?**

Thank you! I recommend that everyone should read what they are most interested in.

28. What projects do you have in the coming years?

I am currently involved in many different research and writing projects which surround the role of talent and its impact on society.

29. Who most influenced you? Who inspires you?

The list of people who have influenced me are written on the numerous books and articles I have read so far in my lifetime.

30. To close with a quote of Wagner from your article ***Could We Create Another Einstein?***[52]**, "Parents, teachers, mentors, and employers—we all have urgent work to do." Do you have any final thoughts?**

I don't. Thank you for these very thoughtful questions.

[42] See Wai, J. (2011, October 22). Steve Jobs Leveraged His Intelligence To More Effectively Create.
[43] See Wai, J. (2011, August 1). How Brainy Is Your Major?.
[44] See Wai, J. (2013, September 3). Are Elite Athletes Marrying Elite Athletes?.
[45] See Wai, J. (2013, July 22). How To Think Like A Scientist.
[46] See Wai, J. (2013, June 3). The Art Of Communicating Science.
[47] See Wai, J. (2013, February 25). Do Journalists And Academics Live In The "Real World"?.
[48] See Wai, J. (2012, October 15). Teaching Without Words.
[49] See Wai, J. (2012, August 13). Finding The Next Carl Sagan.
[50] See Wai, J. (2011, August 16). Do Smart People Rule The World?.
[51] See Wai, J. (2012, June 25). How Science Writing Can Save Lives.
[52] See Wai, J. (2012, April 29). Could We Create Another Einstein?.

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