

A Conversation with Gwern Branwen on March 14 2014

Participants

- Katja Grace – MIRI Researcher
- Gwern Branwen – Independent intelligence enhancement researcher
- Ryan Carey – MBBS, Collaborator with Leverage Research

Note: This set of notes was compiled by Ryan Carey and gives an overview of the major points made by Gwern Branwen.

Summary

Katja and Ryan spoke with Gwern Branwen on IRC as part of investigating intelligence enhancement. Conversation topics included nootropics, brain training, transcranial direct current stimulation and embryo selection.

Intelligence Enhancement

Gwern thinks that society should keep implementing the few well-known population-wide interventions like iodized water and correcting micronutrient deficiencies but is not aware of any new intelligence amplification technologies that merit being distributed across the population. He thinks some more substances suit personal use, like creatine, modafinil and melatonin. He recommends further research of creatine and transcranial DC stimulation. He believes that embryo selection using cognitive genomics research may significantly increase intelligence.

Nootropics

Gwern is shifting toward the view that currently useful nootropics either restore a deficit or improve average performance but do not improve peak performance. For example, melatonin can restore harm from artificial lighting and modafinil can help you to do more work without altering your peak performance.

He doubts the ability of nootropics to improve peak performance because the field of nootropics has hardly developed over the last hundred years despite widespread interest including the military. He reports that many studies have been falsely positive because of reasons like regression to the mean and methodological issues like poor control groups and poor analysis of subtests. In his experience, the judicious use of stimulants and nootropics has altered the proportion of his good and bad days without changing the nature of the good and bad days themselves. And the difference between his good and bad days seemed to relate more to motivation than intelligence.

Gwern reports that stimulants may work better on people with lower IQs because they exert their effect by increasing motivation rather than intelligence. Gwern explains that cash incentives can improve the IQ scores of people who score low – when someone scores low, that's going to be for a composite of reasons including motivation because IQ tests are not perfect measures of intelligence, and so with stimulants we can expect a similar effect.

Brain-training

When asked about brain-training, Gwern points out that his meta-analysis of dual-n-back shows that it does not enhance intelligence – the purported intelligence gains were in groups with passive control groups – and is pessimistic about any existing brain-training increasing intelligence.

Implementing Existing Interventions

For population-wide distribution, Gwern says iodization of water and correcting micronutrient deficiencies are effective. Gwern thinks that it could be useful to improve education for the gifted and talented given the outsized impact of high IQ individuals studied in the Study of Mathematically Precocious Youth. He does not think there are other intelligence enhancement that currently merit population-wide distribution.

For individuals Gwern advocates using creatine. He also reports that melatonin and modafinil can be useful. Creatine, because it is safe and unusually cheap. In his meta-analysis of three RCTs, he found that creatine gives an IQ gain of 0.76 standard deviations (11 points). However, he notes that the true effect size may be smaller as:

- 1) Many of these participants were vegetarians, who have stronger evidence of benefit
- 2) On further study many substances are less impactful than they first appear.

Adjusting for these factors, Gwern says he would be surprised if the true effect was bigger than 0.3 standard deviations for vegetarians, and 0.2 standard deviations for carnivores.

Gwern recommends that on an individual basis, micronutrients will probably not be useful, because they need to be given developmentally on a population-wide basis. He reports that TMS would need to become much cheaper and smaller to be useful for use by a research team. He reports that transcranial direct current stimulation could be good because it is cheap and appears safe but is not up-to-date with the literature.

Research Opportunities

Gwern thinks that the best prospect for intelligence enhancement research is creatine, followed by transcranial DC stimulation.

Creatine could be tested with a large-scale RCT. A positive result would convince a lot of people to take creatine. Gwern says that creatine and placebo pills are cheap, the total cost of commissioning this research is uncertain. When asked whether it would be helpful to get a handful of volunteers to perform such an experiment informally, Gwern said it would probably not be useful because such collaborators often drop out, biasing the study.

Genomics research

Gwern thinks in the future, embryo selection may cause substantial intelligence enhancement. In his view the potential for embryo selection to improve intelligence is a straight-line extrapolation of what existing intelligence and genetic research is saying. He says that the

uncertainty seems to be when we accumulate enough variants, not if. He would be surprised if accumulating a million SNPs with an IQ score or proxy was insufficient for embryo selection. However, its effect could be reduced if it is not widely used. This could be limited by the cost, the unpleasantness of egg-donation procedure and the required planning ahead.

Other People to Talk To

- Hsu on genomics
- Redick on brain training