High IQ Society

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A high IQ society is an organization that limits its membership to people who are within a certain high percentile of Intelligence quotient (IQ) test results. The oldest, largest and best-known such society is Mensa International, which was founded by Roland Berrill and Dr. Lancelot Ware in 1946. Other early societies are Intertel, founded by Ralph Haines in 1966; the International Society for Philosophical Enquiry, founded by Dr. Christopher Harding in 1974; Prometheus Society, Mega Society, Top One Percent Society, One-in-a-Thousand Society, Epimetheus Society, and Omega Society, founded by Dr. Ronald K. Hoeflin.

Entry requirements

High IQ societies typically accept a variety of standardized intelligence tests. The ceiling of most standardized (validated and normed) intelligence tests is at around the 99.9th percentile. Measurements above this level need--for a credible result--a calculation, extrapolation and interpretation (including observations during the tests and sub-tests) by psychometricians experienced in high IQ testing, and at least two differently designed standardized tests (among these at least one supervised) should be performed. Measurements above 99.9th percentile are dubious as there are insufficient normative cases upon which to base a statistically justified rank-ordering. In 2010, the U.S. population's normal expectation for the number of persons with IQ over 175 (sd15) is about 90 persons. There is a deal of speculation on whether the entry criteria to some high iq societies are reliable and not depended on their financial contribution by their potential members.

Some societies

The entrance criteria for IQ societies varies considerably across both the kinds of tests accepted (i.e., whether the tests are either numerically, spatially, verbally, etc. slanted and are proctored or not) and how high one must score in order to acquire membership.

Neuroscience and intelligence

Neuroscience and intelligence concerns the various neurological factors that may be responsible for the variation of intelligence within a species or between different species. Much of the work in this field is concerned with the variation in human intelligence, but other intelligent species such as the non-human primates and cetaceans are also of interest. There is clear agreement within the scientific community about the measurement of intelligence, but not, yet, its bio-social basis. The basic mechanisms by which the brain produces complex phenomena such as consciousness and intelligence are still poorly understood.

Much of the research into the neuroscience of intelligence has involved indirect approaches, such as searching for correlations between psychometric test scores and variables associated with the anatomy and physiology of the brain. Historically, research was conducted on non-human animals or on postmortem brains as well as on skulls (Craniometry). More recent studies have involved non-invasive techniques such as MRI scans as they can be conducted on living subjects. MRI scans can be used to measure the size of various structures within the brain, or they can be used to detect areas of the brain that are active when subjects perform certain mental tasks.

Anatomy

Some of the anatomical variables that have been studied in association with psychometric test scores include total brain volume, the size and shape of the frontal lobes, the amount of grey and white matter, and the overall thickness of the cortex.

Brain size

Rushton and Jensen (2010) argue that the brain is metabolically demanding. In rats, cats, and dogs it uses about 5% of the body's energy; in non-human primates, 10%, in humans, 20%. Larger brain are also expensive evolutionarily since they take time to grow and requires larger bodies to produce and sustain them. So an increased brain size would not have evolved unless it gives great evolutionary advantages. They argue that brain size and brain-to-body mass ratio has been increasing for the last 575 million years. Mammals living 65 million years ago had substantially lower brain size than today. The hominid brain has tripled in size over the last 3 million years from Australopithecus to Homo erectus to modern humans. The claim that Neanderthals had average larger crania than anatomically modern humans has been falsified. Looking at brain to body size it was slightly smaller. They further argue that any decrease in average brain size over the past 35,000 years has been paralleled by a corresponding decrease in average body size suggesting no change in the ratio of brain to body size.

Brain size is an import variable in Rushton's r-K theory which he described in his book Race, Evolution, and Behavior (1995). Rushton (2004) argued that the theory was supported by relationships between brain weight and several other variables among 234 mammalian species: longevity (r = .70), gestation time (.72), birth weight (.44), litter size (-.43), age at first mating (.63), duration of lactation (.62), body weight (.44), and body length (.54). The relationship remained after controlling for body weight and body length. Looking 21 primate species, brain size still correlated .80 to .90 with life span, length of gestation, age of weaning, age of eruption of first molar, age at complete dentition, age at sexual maturity, inter-birth interval, and body weight.

Another theory of brain size in vertebrates is that it may relate to social rather than mechanical skill. Cortical size relates directly to a pairbonding life style and among primates cerebral cortex size varies directly with the demands of living in a large complex social network.

Within human population, studies have been conducted to determine whether there is a relationship between brain size and a number of cognitive measures. Studies have reported correlations that range from 0 to 0.6, with most correlations 0.3 or 0.4 Some scientists prefer to look at more qualitative variables to relate to the size of measurable regions of known function, for example relating the size of the primary visual cortex to its corresponding functions, that of visual performance.

Rushton and Ankney (2009) in a literature review write that in 28 samples using brain imaging techniques the mean brain size/g correlation was 0.40 (N = 1,389). In 59 samples using external head size measures it was 0.20 (N = 63,405). In 6 studies that corrected for that different IQ subtests measure g unequally well, the mean correlation was 0.63. Some studies have found the whole brain to be important for g while others have found the frontal lobes to be particularly important. Two studies found correlations of 0.48 and 0.56 between brain size and the number of neurons in the cerebral cortex (based on counting in representative areas.

In a study of the head growth of 633 term-born children from the Avon Longitudinal Study of Parents and Children cohort, it was shown that prenatal growth and growth during infancy were associated with subsequent IQ. The study's conclusion was that the brain volume a child achieves by the age of 1 year helps determine later intelligence. Growth in brain volume after infancy may not compensate for poorer earlier growth.

There is an association between IQ and myopia. One suggested explanation or several is that pleiotropic gene(s) affect the size of both brain and eyes simultaneously.

Specific regions

Luders and colleagues in a literature review (2009) write that the majority of data shows that both gray matter and white matter volume correlate with IQ but the correlation is stronger for gray matter. Increased number of neurons in the gray matter may explain the higher correlation but not necessarily so since glucose consumption and intelligence measures correlate negatively which may mean intelligent individuals use their neurons more efficiently, such as being more efficient in their formation of synapses between neurons which help to create more efficient neural circuitry. The white matter correlation may be due to more myelination or better control of pH and thus enhanced neural transmission. For more specific regions, the most frequently replicated positive correlations appear localized in the lateral and medial frontal lobe cortex. Positive correlations are also found with volume in many other areas. Cortical thickness may be a better measure than gray matter volume although this may vary with age with an initially negative correlation in early childhood becoming positive later. The explanation may again be that more intelligent individuals manage their synapses better. During evolution not only brain size but also brain folding has increased which has increased the surface area. Convolution data may support the "The Parieto-

Frontal Integration Theory" which see medial cortex structures as particularly important. Volume of the corpus callosum or subareas were found to be important in several studies which may be due to more efficient inter-hemispheric information transfer.

In 2007, Behavioral and Brain Sciences published a target article that put forth a biological model of intelligence based on 37 peer-reviewed neuroimaging studies (Jung & Haier, 2007). Their review of a wealth of data from functional imaging (functional magnetic resonance imaging and positron emission tomography) and structural imaging (diffusion MRI, voxel-based morphometry, in vivo magnetic resonance spectroscopy) argues that that human intelligence arises from a distributed and integrated neural network comprising brain regions in the frontal and parietal lobes. Brain injuries at an early age isolated to one side of the brain typically results in relatively spared intellectual function and with IQ in the normal range.

Glucose metabolic rate

Other neurological parameters have been associated with IQ. Haier et al. (1995) found a correlation of -0.58 between glucose metabolic rate "GMR" (an indicator of energy use) and IQ. This suggested that intelligence is associated with more efficient brains. Others found a positive correlation between IQ and GMR (DeLeon et al. 1983; Chase et al. 1984). It seems like difference in results comes from different cognitive tasks (complicated vs. simple) that were performed by examinees (Fidelman, 1993).

Height

Epidemiological studies have shown that intelligence is positively correlated with body height in human populations. One possible explanation is that it may be explained by differences in brain size, which is correlated with height.

It has been suggested that the large increases in average height, assumed to be due to improved nutrition, have been accompanied by an increase in brain size which may be one explanation for the Flynn effect.

Health

Several environmental factors related to health can lead to significant cognitive impairment, particularly if they occur during pregnancy and childhood when the brain is growing and the blood-brain barrier is less effective. Developed nations have implemented several health policies regarding nutrients and toxins known to influence cognitive function. These include laws requiring fortification of certain food products and laws establishing safe levels of pollutants (e.g. lead, mercury, and organochlorides). Comprehensive policy recommendations targeting reduction of cognitive impairment in children have been proposed.