Group Size, Communication and Challenges for the Education of Global Citizens

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Abstract: Not long ago, *multiculturalism* was considered something rather dubious. A leading German politician even coined the expression *multicriminalism*. Today some of the white sheep of the past who still believe in the values of days gone by, such as the Gospel or the German Mark, have become a minority.

According to evolutionary psychology, what we are today is the result of adaptations to the effects our ancestors experienced for tens of thousands of generations and what we are going to be in future depends on the decisions we make today. The reason for our taking the evolutionary perspective is, "through a better understanding of our evolutionary past we may set up our system of values on a sound, enduring basis" (Csikszentmihalyi, 1975, p. 13). In order to educate global citizens to live the moral values of democracy we are well advised to examine the adaptive value of moral for our "ill-behaved" Pleistocene past. Let us face it: We might not have set out as learned men and women of a high moral standing! Moral has become necessary through our life in larger groups.

This paper examines the chances and constraints of our social evolution towards multiculturalism and globalization. After an analysis of the survival advantages and challenges of living in ever-larger groups, attention will be drawn to some of the biological-cognitive limits of social cooperation among humans. The presentation will attempt to show solutions as to how these limits may be overcome.

Key words: group size; challenges of globalization; democracy; moral

Black Sheep—White Sheep. Evolution of Our Moral towards Multiculturalism and Globalization?

Every human group has patterns of behavior it considers right and others that are considered wrong. A widespread form of punishment for wrong-doers is labeling. From time to time the labels leading to exclusion from a social group change, as is demonstrated by the following examples from the last half-a-dozen or so decades: "traitor to the nation" or "nationalist," "Semite" or "anti-Semite," "queer" or "homophobic." Only a decade ago a leading German politician voiced his warnings against an uncontrolled influx of foreigners into a nation that developed its singular culture organically over centuries, describing multiculturalism as *multicriminality.* Today the white sheep of yesterday who argue for traditional values such as the Gospel or the German Mark have become a small minority. So much the better that a high ranking international conference, AUDEM[1] has come together to find valid and humane solutions.

What we are today is the result of forces affecting our ancestors tens of thousands of generations ago and what we are going to be in future depends on decisions we make today. The purpose for our dealing with evolution is that . . . "*a better understanding of our evolutionary past can help establish the basis for a functioning system of values*" (Csikszentmihályi, 1993, p. 8). In order to understand 2
the evolution of our social behavior we will have to take a look at the supposed conditions under which our ancestors had to survive (Cosmides & Tooby 1992).

United we are Strong . . . ly divided? Survival Advantages and Challenges of a Group

Ever since humans appeared on Earth they have enjoyed better protection from all kinds of danger—be it monsters or muggers—if they congregate in groups. Just imagine being confronted by a would-be mugger all by yourself or as part of a large group . . . The price to be paid for the protection of the group is that the limited resources available (the best bits, mates, sleeping places, or university chairs) have to be shared. Occasionally this could lead to argument and even aggression. Would a large, well cooperating group offer a solution?

If siemens knew, what siemens knows. Biological Limits of Social Cooperation 3

Miller (1956) clearly demonstrates the limitations of human knowledge management. As Table 1 and Figure 1 show, the size of social groups in primates is limited by the size of the neocortex of the particular species. The technique primates use to bond and keep their groups together is mutual grooming. This procedure increases the endorphin flow in the individual being groomed and this in turn will inhibit aggression toward the donor of this flow-experience. The total time used for strengthening group cohesion via social grooming depends directly on

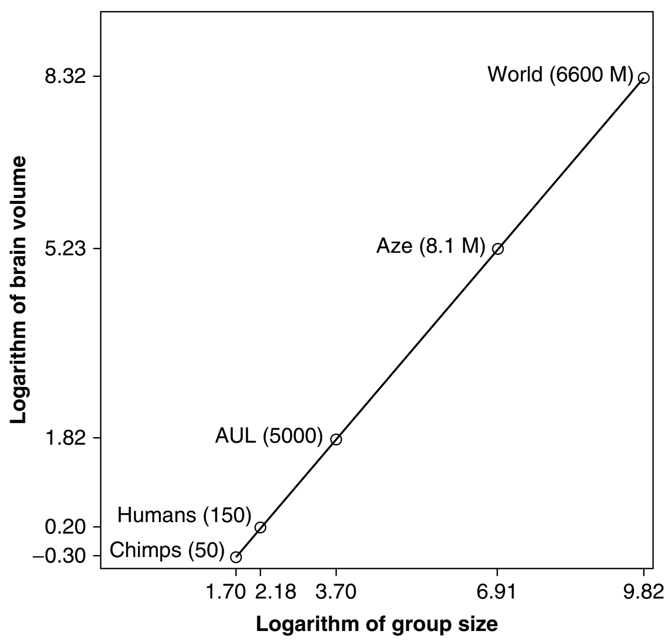
Table 1

The effect of group size on brain volume in primates

Society	Group size *n*	Logarithm of *n*	Relationships among members $n(n-1)/2$	Brain volume (liters)	Logarithm of brain volume
Chimps	50	1.70	1.23×10^{3}	0.5	−0.30
Humans	150	2.18	1.12×10^{4}	1.6	0.20
Azer. Univ. Languages	5,000	3.70	1.25×10^{7}	65.5	1.82
Azerbaijan	8.1 million	6.91	3.28×10^{13}	186,208	5.27
The world	6,600 million	9.82	2.18×10^{19}	323,593 656	8.51

group size. Dunbar (1998) points out: the maximum size of a human social group, where everyone will cooperate—and celebrate—with everyone else, is 150. This is three times the size of the largest subhuman group observed (chimpanzees). The chimp-group spends all morning grooming to limit aggression and ensure group cohesion. For the human group of 150, the time necessary for everyone to groom everyone else long enough to produce a notable flow of endorphin would be nearly 10 hours a day. This delightful indulgence would lead to a life in ecstasy but would

Figure 1 The effect of group size on brain volume in primates



leave no time for sleeping, hunting and gathering, let alone reading (or writing!) such papers. Dunbar (1998) suggests that language was developed as a surrogate for grooming, as you can only physically groom one person at a time whereas you can verbally groom three around you. This makes verbal grooming three times as effective as the hands-on version.

Verbal grooming might be three times as effective as the technique used to keep a group of 50 chimps together, but to secure cohesion for a group of 5,000 (e.g., a university faculty) we require something 100 times as effective. (For globalization to succeed, we would actually need something 130 million times as effective!)

Is our VCD (virtual contact device, e.g., internet/e-mail) *the* solution? At first sight this may appear technically possible—you can easily reach a huge number via the internet, but: let us see who is part of the net. Certain states, like Bhutan, were able to avoid getting caught in the net for a long time. The age, the socio-economic and educational level of potential users will also keep them out of the global spider's web (Döring 1999). If the elderly are less likely to immerse themselves in the virtual world, it is often claimed that young people frequently abuse it for pornography and cyber-sex. However, seen under the evolutionary perspective individuals engaged in virtual sex will promulgate these behavioural programs far less than those whose genetic architecture will not accept being tricked into virtual rather than physical love. Also, receiving an e-mail is far less stimulating in terms of endorphin than having a good face-to-face chat with your buddy (Hejj 2000). By definition, spending more than 8 hours a day in the virtual world is characteristic of a weak ego with the typical loneliness and contact avoidance of a schizoid personality (it is well known that these prefer contacts to machines as opposed to human relationships) (Riemann 2008).

Head Footer and the Destruction of the Soul. The Schizophrenia of Globalization

This brings us to the art of schizophrenics. As in children's drawings their depiction of the human is the head footer. The art historian Pap (2003) explains that the head symbolizes the spiritual-intellectual part, between the neck and the waist represents the soul, and below the waist stands for the body. The head-footer shows but one example of this schizophrenic view of the human, rather intellectual and depraved of the belly-feelings of the soul (Hejj 1998).

The question appears justified: Why does the head have to be so big? Table 1 (graphically represented in Figure 1) has the answer. In any group, in addition to his/her own relationship to all the other members, each member has to consider the relationship among all the other individuals as well. With growing group size [*n*] this leads to an exponential increase of relationships among the members [$n(n-1)/2$]. For the largest observed subhuman group of 50 the number of relationships each of the members has to take into account is 1225. These are handled by a brain volume of 0.5 liters.

In the typical group of a traditional tribal society (or a western style wedding) of 150 humans, the number of relationships to be considered increases to 11,175, calling for 1.6 liters of brain volume. These are the first two data shown in Figure 1, which depicts both group size (x-axis) and brain volume (y-axis) on a logarithmic scale in order to represent an exponential function as a linear one. The extrapolation of this function enables a rough estimate of the brain volumes necessary to handle the number of relationships for the last three "groups."

For a faculty of 5,000 the number of relationships to work through goes up to 12.5 million. The regression in Figure 1 shows the amount of brain necessary for working this group to be 65.5 liters. The term "Head of Faculty" gains quite a new sense!

But what if someone wanted to have an entire country like Azerbaijan (population 8.1 million) form a functioning group? Well, the number of relationships to be permanently taken into account would be 10^{13} requiring roughly 186 thousand liters of brain for each citizen. For globalization to succeed at a human level the 6,600 million people inhabiting our planet at the time of writing would have to be able to work with 10^{19} relationships in order for everyone to be equally important to everybody else. According to the estimate of Figure 1, this needs approximately 323 million liters of brain.

Those 323,593,656 liters are roughly equivalent to 323,000 metric tons. But bear in mind that although the brain consumes more than 20% of the energy of the body, it weighs only 2%. Thus, our global giants would weigh just over 16 million metric tons, or more plausibly expressed: about 33 times the weight of the World Trade Center towers. Supposing a terror-mutation would make these global giants possible, they would smash each other's heads in their competition for edible energy. Surely there has to be a more humane solution!

Brave New World. From Humanism Towards Transhumanism[2]

Humanism aims at enabling the largest possible number of individuals to live their full potential. We thereby often use technical assistants such as the computer. But: Will computers remain our friends & helpers? The first doubt arose when the world champion in chess was defeated by a computer. But of course the triumph of human intelligence is not just manifested in a game of chess. Humans write romantic poems and scientific papers and even intelligently intrigue for or against their publication. Since intelligent assistants are extremely useful for us, we are likely to promote development of ever-increasing technical intelligence. Equipped with significantly higher intelligence, any sufficiently sizable group will be superior to possible competitors economically, politically, and militarily. What does the human have to offer? 100,000 million (10^{11}) neurons in our brains, forming a strong network. If we postulate these neurons as extremely efficient micro-processors rather than simple on-off switches, our brain could carry out 10^{17} operations per second. The founder of Intel Inc., Gordon Moore, set up the following formula: Moore's Law states that the number of chips on a motherboard doubles each year. The evidence of the years past is good proof for the validity of this law. The performance of computers will surpass that of our brains long before the author reaches the age of professor emeritus.

But what indeed is the meaning of intelligence? Eysenck (1971) demonstrates that the "hardware" (crystalline) component of intelligence is reaction-time. Three experimental subjects of high (IQ = 137), average (IQ = 100) and low (IQ = 73) intelligence are given an acoustic stimulus. The E_4 repolarization points show the time (in milliseconds) elapsed until the stimulus is processed by their brains. Eysenck's (1971) study of evoked potentials illustrates that the first person is able to process four times as many stimuli in the same amount of time as his less intelligent counterpart nr. 3.

In problems that are more complex, this very difference gets even more drastic: some are able to solve problems easily that others cannot tackle at all (you still find entire continents where the wheel has yet to be invented). 5

On the other hand, transhumane helpers also pose certain dangers. With their quick promulgation they could occupy huge territories. During the search for their raw materials they could advance the destruction of the environment. They could even provoke wars. It is contradictory to experience to suppose that they will bring us paradise. We are blessed with IQs much higher than mammoths or mountain gorillas. Their extinction by humans should give us some idea of the danger such a superior transhumane intelligence could pose to us.

"I'd Like to Teach the World to Sing in Perfect Harmony." Concrete Contacts Instead of Virtual Wishes

If futuristic concepts such as computers are not suitable for promoting global cohesion, neither as transhumane intelligence, nor as a media of communication (e-mail), it may be high time to make plans more in accordance with the stone-age psychology of the human. Are we damned to be blood and territorial hordes? The author doesn't think so. It is true that our biological processing capacity poses obvious limitations to the number of individuals whose fate really affects us. Like in a game of lottery only a few will be drawn. One of the main features that keeps that game interesting is that the numbers drawn do not, by any means, have to be *closely related*. The fairness of the rules of the game makes sure that every individual has *the same chance* to be "drawn." These fair rules of the game have to be the aim of any education toward modern citizenship in our interconnected world. Even this could not make each and every one of the thousands of millions of individuals in the world all equally important to us. But it can prevent entire groups being systematically banned (discriminated) from the circle of our friends and acquaintances. The old wish for global harmony is within reach: *I'd like to teach the world to sing in perfect harmony* does not mean that the entire world has to actually sing along in this choir. The choir will remain small enough for everyone to be able to physically get in touch with everyone else. In the eyes of this author, an education for modern citizens is the qualification to these heterogeneously harmonic choirs, as phrased by the apostle of positive psychology, Csikszentmihályi: "The most urgent task we have to accomplish today is to set up a new educational program, which will make it perfectly clear for every child from the first grade on that his life is interdependent on each of the other creatures in the entire Universe" (Csikszentmihalyi 1993, p. 355), and ". . . an active, conscious participation in the process of evolution is the best method to give meaning to one's life and to enjoy every moment on our way" (Csikszentmihalyi 1993, p. 29).

Notes

1. This paper was originally presented at the annual meeting of the Association of Universities for Democracy in November, 2008 in Baku, Azerbaijan.
2. Website of the World-Transhumanist-Association (WTA): www.transhumanism.org

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