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Beyond Extended Phenotype

Evolution of extended identity in order to reconcile study of humanity with biological evolution

Research paper

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Abstract

The question: “How much of biological evolution based theories, as they are understood presently, apply to human behaviour?” is highly controversial and perhaps highly politicized as well. The inference that human beings are evolutionarily programmed to have urges toward aggression, rape, murder, adultery, genocide and so on is a politically rejected idea within the social sciences. To be politically correct those who use evolutionary framework do claim that people can learn or have capacity for self restraint. However it is not clearly understood, how such restraint can possibly evolve within the evolutionary framework. This paper argues that the missing link that explains such behaviour is the concept of extended identity. How extended identity can evolve, following the framework of selfish gene, is explained by integrating theories related to selfish gene, institutional analysis, information economics and social capital literature. Archaeological evidence from evolutionary cognition is also used to show that such evolution could happen 4 million years ago (MYA).

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Introduction

Following the path breaking systematic introduction of the concept of evolution by Darwin (1872) to explain the evolution complex design in the form of living things and further refinement of Darwinian ideas by Neo-Darwinians like Smith (1982 and 1988), Hamilton and Axelrod (1981) and others, the idea of biological evolution based on gene selection is a well accepted scientific theory within natural sciences. Those ideas are reviewed in detail and robustly summarized, by Dawkins's (1982, 1986, 2006), within metaphors of selfish gene and extended phenotype. The idea being that selfish genes compete for survival as they are expressed by their phenotype. Phenotype is the functional body of the genes made by complex interaction of large matrix of genes as expressed by existing environment (Dawkins 1982, 1986, 2006). Those theories are well accepted theories within biology in particular and natural sciences in general.

Nonetheless, when Sociobiology was introduced by Wilson (1980) as evolutionary analysis of social animals' behaviour, including humans, it did face highly politicized attack coming from many social scientists and some evolutionary biologist (see Wilson, 1976; Pinker, 1997; Platek and Shackelford, 2009; Alcock, 2001). The problem partially was because some evolutionary stable behaviour like rape, aggression, genocide, adultery, infanticide and so on, which are found to be naturally inherited urges, are classified as immoral 'scientific' results generated by the elite ruling class (Alcock, 2001). Partially it was also because human behaviour does not seem to be consistent with those theories in all cases. For example, Alcock (2001) stated that, first, what is natural may not necessarily be moral. Fair enough. Second, he insisted that humans have moral faculty, which can enable them to restrain their immoral biological drives. However, Alcock somehow is not able to explain how such moral restraint or capacity to show such restraint can evolve in the first place. This clearly implies there is something missing in biological evolution as is understood now. Another Example is Pinker (1997) who insisted that humans have different competing mental schemas, some leading towards short term gains and others looking from long term goals. As a result, it is possible that restraints can come from schemes which are long term goal oriented. This is better, but it will not explain the common occurrence of internalized morality within humanity. Humans do self restrain, without any cost and benefit analysis, from doing what they consider is immoral, unfair, unethical and so on. That is why Pinker's approach cannot fully explain all dominant human behaviours. The good question is: where do we stand now?

We have proven theories which are path breaking not only in terms of what they are able to explain within biological evolution and social evolution, but also in terms of our evolutionary understanding of human mind and human cognition (for detail review of literature, see Alcock, 2001; Pinker, 1997; Platek and Shackelford, 2009; Buss, 2005) following the ground breaking works of both Wilson (1985), within Sociobiology, and Tooby & Cosmides (1987), within evolutionary psychology. However, their ideas are not only mostly ignored in wider social sciences, but also their advocates may even end up being punished through negative campaign, low status and lack of promotion (Alcock, 2001). This is basically unscientific behaviour and the solution should be to follow the scientific method than trying to politicize

scientific ideas. It is like exchanging sun for candle, when scientists end up politicizing the scientific game. This paper will try to follow a scientific approach to show that both sides could be wrong and the truth could be found in the middle.

The paper introduces the idea of extended identity and explains how such extended identity can evolve following the idea of selfish gene and extended phenotype. Furthermore, it offers explanations on how such hypothesis can give a better understanding about human reality from evolutionary point of view. It is to be noted that hypotheses used in the write-up are presented with supporting evidences. The paper concludes following presentation on implications for humanity and natural sciences.

Extended identity as special case of extended phenotype

What is the problem with what we know?

The evolutionary theory of Darwin (1872), which focuses on selection based on selfish organism, was challenged by wider observation of altruistic behaviour among organisms and especially among humans (Dawkins, 2006). In order to explain those deviations, the focus of evolutionary analysis turned toward group selections. The problem is: since group selection is evolutionary unstable, evolution cannot possibly work at group selection level (ibid). To solve this problem Neo-Darwinians focused on gene selection, which is found to be highly consistent and empirically strong theory when checked against non-human living things. In this case, altruism will be a function of blood relationship. Their conclusion, the more related phenotypes are the more altruistic behaviour will be observed, is not only widely proven (see Dawkins, 2006) within non-human living things, but also even within human beings who live by forging (see Sahlins, 1972). This is well summarized by idea of selfish genes that compete for survival, as expressed by their extended phenotype (Dawkins 1982, 1986, 2006).

Moreover the game theory based analysis of Hamilton and Axelrod (1981) and Axelrod (1984) did show that cooperative behaviour in the form of tit-for-tat or other strategies can possibly invade, dominate and can be even be evolutionary stable against alien invaders, under some conditions. The conditions for evolutionary stability are: the end of the game should be unknown; the future should not be highly discounted and the overall benefit of mutual cooperation should be very high compared to any other strategy (see Axelrod, 1984). The condition for initial invasion of cooperative behaviour is either the cost of being cheated have to be very low compared to gain of cooperation or invasion has to happen at cluster level than single phenotype's gene (ibid).

Based on those findings significant behaviours of plants and animals are explained within Sociobiology (see Wilson, 1980; Alcock, 2001). Moreover assuming brain is nothing but a conditional thinker which looks for clues on environment to choose the right action, Alcock (2001) concludes that the human brain is nothing but the same brain with more complex conditional rules. The conclusion was that human beings can easily be studied like other animals, using the same approaches used within Sociobiology. Pinker (1997), based on

accumulated work within evolutionary psychology (see Buss, 2005) and evolutionary cognitive neuron science (see Platek and Shackelford, 2009), concluded that the human brain is different. The reason given is that, there are conditional rules or common sense rules which were adaptive to our hunter and gatherer ancestries as domain specific rules that are being used as built in syntax on programming human mind from childhood to adult hood. Those built in syntaxes are culturally expressed and their domains within current humanity are elastic enough to generate satisfaction from arts, science, money making and other cultural expressions (Pinker, 1997). Such argument seems plausible but may not be adequate enough to explain why such elasticity becomes adaptable, since in face of high competitive pressure, it can causes huge fitness cost by being too elastic. That is why it can only evolve after the competitive pressure is minimized. Based on Geary (2009) the relevant time period will be since 20, 000 years; which is not adequate time enough to explain its dominance within humanity. Moreover such a theory does not allow for existence of internalized morality, where people self restrain from doing what they think are wrong, unfair or immoral without any cost and benefit analysis.

The main problem of those theories is twofold- first, they failed to explain the evolution of complex morality in general and they failed to explain clearly how complex human civilization can become possible. It is clear human beings have tendency toward suicide, genocide, infanticide, aggression, rape and so on, but human beings also have high tendency to self restrain not only when the long term cost is high, say prison or social sanction (attack) that can follow, as stated by Pinker (1997) but also mainly by internalized morality. Moreover, humans do give up their biological fitness to search for some superficial human goal like scientific truth, innovation, artistic expression, national pride, success of a football team and soon, even at cost of their fitness. In fact Pinker (1997) and Alcock (2001) did clearly claim that each is less interested about their biological fitness as a person. How such mind set is able to evolve is an important question, which needs clear answer. Those facts clearly demonstrate that something is still missing from existing evolutionary theories.

The missing link we are trying to explore here is humans have a mindset which can see itself not as fixed conditional rule executer but as end by itself. This basically means our mind (the human mind) can define its own goals independent of biological fitness. This is self evident to any layman, but evolutionary explanation for its existence should be given. There is adaptive advantage to evolution of such mindset once we take imperfect information and asymmetric information into consideration in the game of selfish genes. In the evolutionary game theory of neo-Darwinians, information about defection and cooperation is assumed to be conveyed without any cost. We know mindset works with domain specific rules or schemata or models and as a result there is always the probability of making a wrong inference. Moreover in some settings, the cost of collecting the necessary clues to make inference could be very high resulting in less than optimal clues being collected. This could happen if the fitness cost of information is greater than the fitness benefit of that information.

But most importantly when two phenotypes make gene centric choice in cooperative game with incomplete information and imperfect model, it will make cooperation less possible.

This is because information is conveyed by action that will lead to self sustaining chaotic mutual defection. For instance, if a man suspects his wife cheating on him, leading him to start drinking, she will become angry at him and may even start cheating on him because of emotional starvation. As a result, the man might become aggressive towards her and she may demand for a divorce. It is possible she was not cheating in the first place but the husband may not have the information and he may lack the right schema to understand the information to make right prediction. These are concepts adapted from information economics (see Stieglitz, 2002 for review). It is clear as the mind become very complex and the number of overlapping domain specific models become large in number, such problems will get much worse. In other words, human beings, more than all other animals, are expected to be highly exposed to such problems in playing cooperative games. The million dollar question is: what is the solution?

Possible solution to our knowledge gap

The solution is trust complemented by prediction and sanction! By observing the behaviour of an agent for some time one develops trust on some agents that they will be trustworthy in the future. As result the agent does not need to collect large set of information to make cooperation with trusted agents possible. However trust will change the mind for once and for all, if avoidance of chaotic mutual defection is very important. The mind will see the trusted phenotypes and its own genes' phenotype as one social group with unified common goal, which is also the goal of the mind. This implies the mind have to suppress its own selfish motives and have to promote collective goals. Indirectly the mind must have its own extended social identity and its own goals. However in case breach happens, one will use either personal or collective sanction to minimize moral hazard problem. To minimize the problem of adversely selecting cheaters, one will use prediction. To minimize the problem of moral hazard fear of sanction will be also used. This will minimize not only the information collection cost but also will minimize the occurrence of chaotic mutual defection that can happen when every phenotype is gene centric.

Reliable information about behaviour should be hard to access without high cost before and at the cooperation time, but must be cheaply available at sanction time for this process to work. For example, a retailer may not be able to assess the quality of large quantities of grain sold to him/her by wholesale traders; but the information is easily accessible when retailing the grain. By the same token, a lender may not know if a borrower is going to pay back in advance but he/she can easily observe when default happens; or in the middle of a group fight, it may be costly trying to observe who is doing what, but it will be easy to identify who was the hero and who was the free rider after the fight is over. In essence, timing and nature of information make it costly at some point and time, but cheap at other times to collect information, which make trust and sanction possible.

If prediction is highly unreliable or if sanction is less effective, trust can be built by demanding contract specific investment too. For instance, urban gangs could demand, from new potential recruits, the killing of a target or a complete stranger before they could be

accepted to the criminal community. The idea of contract specific investment for cooperation is a well developed concept when applied to business firms by Williamson (1983). In general trust can be built by prediction or initial contract specific investment. If information to make prediction is not reliable or if the phenotype is not trustworthy or if information to make sanction is not available or if sanction is less effective, demand for initial commitment in form of fixed investment will be very effective in order to minimize both adverse selection and moral hazard problems. This theory will harmonize the cooperative theory of Williamson (1983) based on initial commitment with wider theory of trust based literature. See Mezgebo (2009) for review of the trust and social capital literature or footnote note 1, below¹.

The question we have to ask is can trust based cooperative behaviour invade an environment dominated by untrustworthy people and if so, can it be evolutionary stable? Yes and it is a well proven fact within institutional economics, under some conditions. If the benefit of cooperation is very high, if the future is very important (if the future is not highly discounted), if end of the game is unknown and if the cost of information is very high, trust based cooperation can spontaneously evolve out of free market of simple tit-for-tat based cooperation (see Fafchamps, 2002). Of course those game theories that are used to prove those facts are based on market analysis. But I don't think market based games are different from other biological games in terms of general framework. This is not to deny the need to check for evolutionary stability within evolutionary games, but still it is highly unlikely that under some conditions trust will fail to invade and to be evolutionary stable. The difference between the stability checked by Fafchamps (2002) and biological evolution used by Hamilton and Axelrod (1981) and Axelrod (1984) is that, the first one does not allow inter generational analysis. In inter generational games, strategies can inherit their success to next generation; where a number of phenotypes or genes in next generations, representing the strategy, will be proportional to relative success of the strategy in preceding generation (see Axelrod, 1984).

What is the prediction of this hypothesis to nature of human mind?

What does this tell us about the human brain, if those conditions are met? The implication is that it will pay if the human mind evolved in a way that can promote not only the fitness of its own genes' phenotype, but also fitness of other trusted phenotypes, as long as doing so is in long term interest of own genes. What does this mean in practice?

What this implies then is that, before going to collective fight people may select the best and brave fighters, but once they are in middle of the fight their selfishness has to be give up for collective success; simply meaning, they will not try to look who is doing what in order to detect moral hazard. Since this will not only split the mind between fight and information collection, making the cost of information very high, but also can create mutual suspicion that

¹ Fafchamps and Minten, 1999a, 1999b, 2002; Fafchamps et al., 1994; Durlauf and Fafchamps, 2004; Fafchamps, 1996, 1997, 2002; Gabre-Madhin, 2001a, 2001b; Gabre-Madhin et al., 2003; World Bank, 2002; Grootaert, 1998; Overa, 2006; Lyon, 2000; Greif, 1993; Coleman, 1988; Moore, 1999; Kranton, 1996; Barr, 2000; Harbord, 2006; Palaskas and Harriss-white, 1993; McMillan and Woodruff, 1998

could lead to chaotic mutual defection. After the fight is over they can easily recollect and cross check information unintentionally collected by different group members in middle of the fight; which can be used to allocate status and sanction between different group members. This will demand a mindset which is more of Freudian (1961) in nature but approached from evolutionary psychology and evolutionary cognitive neuron science point of view.

What is needed is the mind that could define itself as essence or soul or goal of life and should define its own goal of behaviour independent of other body parts. This is commonsense, which was evolutionary impossible up to now. Evidently, the argument presented here shows what made human mind what it is now. The question would then be, if the mind is nothing but complex punches of culturally expressed commonsense and specialized schemes on biologically made operating system and readymade syntaxes adapted to our forging ancestries, then how can it define itself? That should be by extending itself to the external world since consciousness is nothing but mind's structured understanding of the external world and how it works, but the mind have to understand the world in relation to itself only not in relation to the entire body. After all, it is the model of the external world which defines what is commonsense and not, what is rational and irrational, what is right and wrong, what is moral and immoral. To extend to something implies two things: *first* self definition and *second* finding goal, values and morality for your life as they are expressed by our cultural experiences and expressions.

If one is a supporter of Manchester United football team, the success of the club will be understood as one's personal success and its failure as own personal failure. If one defines self as an American, s/he will take pride and high level of satisfaction by successes happening in America. This will give us us-verse-them mentality and morality where people can kill other groups and can feel no regret but not when they kill someone belonging to their own group. Moreover, extended identity defines what is fair, what is moral, what is just and so on. This will make complex cooperative systems highly possible and can explain why the mind can be very elastic enough to generate human organizational diversity, civilization and technology advancements.

However the extension cannot be random because in the long run, it must be evolutionary stable at least when competitive pressure was very strict. Biological evolution will limit the variations of identity which are feasible in the first place. Second it will also demand status associated with high fitness should be allocated to those which sacrifice more fitness to attain the identity's goal. For the first case, it is clear unless an identity can lead to stable fitness in the long run, it will end up being corrected by natural selection. Moreover since our operating system and different syntaxes used by different schema of the mind are adapted to reality of our forging ancestries who operate in highly competitive environment, the human mind will reject extended identity if it does not lead to higher fitness as is socially expressed taking all relevant cultures in prospective. Let us use human history to contextualize and put a meaning to the above hypotheses.

Hitler's racist and collectivist idea was popular when he was winning some battles, when unemployment was reduced and when national dignity was on upward trend, but it died fast when the trend nosedived. People run away from Cuba but not from China. This is so because China is more successful than Cuba in generating better life to its population, *given its environment and dominance of global materialistic expression of status*. Moreover, if one allows the definition of the self as an extended identity, say if people overemphasize their human identity, they may sacrifice fitness and resources to promote human welfare. If people define themselves as naturalistic, i.e., see themselves as part of the natural world, they may fight for animal rights and so on.

As stated above in early times since the competitive pressure was very strong and our operating system and mental syntaxes were developed at that time, the expression of identity will be limited by nature of our mind adapted to that period of time. Moreover at that time it was necessary for check and balances to be created between biological instincts and extended identity based mental models. This will give us Freudian (1961) ideas of id, ego and super ego, which is familiar enough not to demand discussion. If one reinterpret analysis of brain chemistry (Wagner, 2009), evolutionary psychology and evolutionary cognitive neuron science, from Freudian (1961) id, ego and super ego point of view, ignoring some logic of the original author, they are actually highly consistent to each other, but I will not be discussing the issue here for sake of brevity.

As competitive pressure is reduced and as organizations (institutions) and technologies are able to create excess fitness, behind what is needed for biological fitness, there will be high potential for cultural diversity. Those cultural diversities will be reflected not only in diversified cultural expression of functional biological fit behaviours but also in the form of biological unfit behaviours, like overweight body size which is becoming dominant over time. But this will not make culture random even if biological evolution stopped around 10 000 to 20 000 years ago. This is because every cultural expression will be biologically determined behaviour with high random noise added by culture. Biology can be viewed as determining the skeleton of culture, while the rest of the flesh is randomly built (if it is random at all, which in fact may not be) following the pattern of biology to achieve functionality of different degree.

Since the instinct based checks over extended identity, needed to ensure biological fitness in long run, are defined under highly competitive environment, they will become less effective as civilization progress to make competitive pressure highly insignificant. This could explain why people can even have goal of life which does not maximize their fitness and sometimes they can even have goal of life that goes against their biological fitness. In addition to minimum requirement of survival and reproduction, fitness wise relative success of other communities' and inequality within community could be used as clue to overrule culturally defined extended identity by instincts. This in turn will lead to reprogramming of the mind to justify the new way of looking at the world as moral, fair and just. The implication being what fair reciprocity is will be culturally defined, having alternative culture in the same competitive environment as reference point. It also implies those who relatively do worst than

others will have tendency to develop antisocial behaviour with internalized morality which can justify it. Such behaviour has to be highly correlated with social status, but most importantly extreme high correlation should be found with fitness that is survival, reproduction and fitness of off springs. The final implication is that social hierarchy, inequality and cultural diversity are not result of agriculture based civilization, but actually predate agriculture based civilization. The existence of social hierarchy, which is tested by existence of differential burial practice with in one community by anthropologists (Haviland et al., 2008), actually is culturally biased test to measure the occurrence of social hierarchy for all times. My informal observation of Ethiopian Muslims and Christians clearly show that the burial sites of Muslims are very homogeneous but not of those Christians. Does this mean Muslims are homogeneous group of communists? Or does it imply Christians are rulers and Muslims are the slaves? It is clear the commonly used test for incidence of hierarchy is not robust for diversified cultural expression of status, especially for time period when competitive pressure is very high. Our next focus is to check if we have evidence for such evolution.

Possible evidence for evolutionary time period of extended identity

Around 4 Million Years Ago (MYA) with evolution of australopithecines, A. Afarensis (4 – 2.7 MYA), A. Africanus (3 – 2.2 MYA) and A. Aarhi (2.7 MYA), the brain parts that evolved are related to self awareness (ego), self awareness of once behaviour from social context (super ego) and capacity to make prediction (Geary 2009). These are everything we need for developing trust based independent mindset. What is missing then is something which could make cost and benefit analysis ineffective. But evidence for that also exists, since following the environmental change from forest to savannah, there is no visible change on cognitive side of the mind (see Geary 2009). In addition bipedal limbs evolved, which could reduce the speed of australopithecines but can also improve temperature regulation capacity (ibid and Haviland et al., 2008). The problem is why bipedal evolved is not clearly answered question in literature (Haviland et al., 2008). Moreover the vision power of australopithecines was poorer than other prime mates, which could be explained by their land dwelling nature (Geary 2009). I think this hypothesis not only can explain what is changed in the head but also what is changed at limbs level.

We know australopithecines were from 1.1 meter to 1.6 meter in height and their height did increase over time (Pinker 1997 and Geary 2009), which clearly shows in grass land 1 to 2 meter long (Geary 2009) an animal which is using four limbs for moment is highly invisible. Especially when they are initially close to 1 meter in height, they will become highly invisible in the middle of 1 to 2 meter long grass. Invisibility is advantageous from safety point of view but it is also information cost too. Under such reality it would not be possible to watch sexual partner or predators all the time to avoid defection and to reduce risk of attack, respectively. The problem is not only information is highly costly but also they are less adapted to the savannah life after living in the jungle for millions of years. In other words their mental schema will not be well adapted to the new environment.

Now let's understand the nature of sexual partnership based on simple tit-for-tat without trust and how much trust can improve on it. Naturally the savannah will be abundantly endowed with roots, vegetables and other vegetation that women can easily forge. The role of males would be providing protection in the form of noticing the appearance of wild predators, which are mostly land dwelling and less understood animals at first, so they can make their escape to the nearby tree. The need to watch after female partner and also to make sure the female partner is not cheating can be effective, if the male can stand in its two feet and can watch farther. This is advantageous when the savannah is long and vision is weaker following increased land dwelling. The role of female is to forge not only for self but also for off springs while being under male protection. The problem she faces is collecting information about the magnitude of protection her partner is supplying, when he can chase other females. Again this can be done better when standing on two feet. Here we have clear imperfect information problem that can be addressed either by trust or by spending more fitness on information.

To collect information about each other not only they ought to stand in two feet often, being exposed to high risk of attack, but need to be closer to each other which increases the risk of attack. In other side, male's warning could be effective, if they could identify the hunter from distance to give adequate time for the female with her off springs to escape. This would create trade off between quantity (and quality) of information and reduction of risk, which increases not only cost of information but also will reduce quality and quantity of information collected. Some information has to be ignored since the cost is greater than the benefit in terms of fitness. The challenge is not only related to problem of imperfect information but also their less adapted mind set in relation to their new environment.

In this setting detection of the right motive is not only highly costly, but can also lead to chaotic process of mutual defection. The female cannot easily predict if the male is doing his protection job well or not. In the new environment, it is not clear how to predict behaviour from outcome with less information and less well developed mental model. The male cannot be sure if the female is having sexual relationship with other male or not. Even if she is having sexual intercourse, he cannot be sure if she is raped or not. In this environment trust can play big role especially for the male. This is because success rate, in terms of conception following sex, is very low and sperm competition can easily reduce the success rate close to zero by selecting more trusting and more sperm wise competitive males. For female once relationship is started, assuming the male is fit and the original contract specific investment is put in place, trust is beneficial to female since she has more to loss by losing the contract. That is why trust by minimizing not only cost of information but also the chance of chaotic mutual defection can improve outcome of cooperative behaviour.

The problem with sanction is, it is only highly effective when used by males, since he will not be making huge initial biological investment and cannot be certain about his fatherhood. Male defection is more effective than female defection. As a result, females will demand high initial investment as collateral in order to build trust, reducing both adverse selection problem before selection and moral hazard problem after selection. Those which are looking for hit

and run will not willing to invest in huge initial fixed investment reducing adverse selection. At the same time after making huge initial investment, if the female observing the male is not trust worthy start cheating or start avoiding him, moving on will become costly by need to make new additional investment with new female mate or in the form of raising somebody's children, if he stays.

In this process standing on two feet could be selected for better vision and easy movement within savannah but also in long run it could be effective selection mechanism to differentiate the new species from others in making selection of a mate. Any tit-for-tat, with or without trust, can do better, if there are clues that can improve prediction about trustworthiness. Capacity to walk or stand on two feet could be the needed information until mutations start to happen to cheat on trust based cooperation. Prediction will not be based completely on bipedal nature since there is issue of initial investment and fitness selection. The advantage of trust is that, it will not demand high information content, before trust is built. The female does not have to wait until the male can prove he is alpha compared to all potential mates. After few fights she could easily make prediction about his behaviour and fitness. This is very important since spending a lot of fitness on making initial investment on the open could be costly, given they are less adapted to the savannah life and potentially dangerous land dwelling predators.

Trust have advantage not only because it can reduce cost of information and can minimize cost of mutual chaotic defection but also since it will improve survival rate of new born infants and immature infants. In addition when the next round of mating starts they could easily use the information of the first round to avoid the first dance all together, which not only reduces information cost but also can improve long term investment on all off springs by creating kind of nucleolus family which sticks for extended period of time. Those advantages can easily compensate for the increased mental processing cost the new mind set demands.

However over time as mutation and deception increase, necessary clues for cheating and making cost and benefit analysis can develop. Based on hypotheses presented here, what created our mindset is trust or to use emotionally loaded term, love. The first extended identity is as result is nucleolus family and the phenotype will promote the welfare of all members, without any cost and benefit analysis. However as cheating mutation and the basic biological instincts over ride this process in some cases, necessary check and balance will evolve over time. Four million years is not only enough to create such check and balances but also to make it dominant nature for all humanity. This family based extended identity can be slowly extended in wider dimensions to create different complex organizations in both prehistory and then after. What is the implication of this hypothesis to our understanding of both human evolution and analysis of humanity is given below; of course assuming it is true.

Implication for both natural sciences and humanities

Let us kick off this section by deciphering the implications of the hypotheses presented in this paper. It is arguable that a conscious mind is an advanced prime-mate mind which can create

extended identity only; but it is certain the nature of a conscious mind includes capacity to create extended identity. We cannot even be certain enough if consciousness is a human thing only and since it should be built in cumulative manner, some traces of it should be found in other 'smart' animals too.

The existence of extended identity is an important foundation stone for human technological and institutional (organizational) advancement. Humans can spend years trying to develop new technology or in search of scientific truth, even at the cost of fitness. This is possible because they can extend themselves to their scientific discovery, knowledge and/or products. Human beings can extend themselves not only to social life, technology and arts but also to super natural powers and entities. Moreover, since the mental program defines itself not only to external social reality but also to, biological stable rules which are elastically expressed in form of, social morality, common sense and idea of justice and fairness that come with it for organizational purpose, it can easily use internalize morality to restrain the self from defection. Those facts will clearly reconcile evolutionary analysis with well accepted theories of conventional psychology and humanity. Now let's turn toward institutional and organizational analysis, which is my area of interest.

Trust is basic to any organization. Trust could be micro based which is built through personal life experience; It could be defined at meso level developed based on statistical discrimination; or it could be macro in nature which is based on trust on organizational system (Dore, 1983, Fafchamps, 2002). But as cost of information declines and as benefit of cooperation become less dominant in relation to cost of being a sucker, the role of trust will decline and other methods of organizational and institutional structure will develop to make cooperation possible. But in all organizations some level of trust is involved because any contract is always incomplete and any formal law or informal norm is always vaguely defined to allow flexibility (Klein et al., 1978). Fortunately, trust opened a new dimension of evolution that is organizational (institutional) and technological in nature. With some redefinition of production technology as software, we can present the idea by evolution of institutions. Intuition of the author is that evolution of institutions that is organizational and technological in nature is actually happening within humanity. Once we approach it from this angle, we could say it is Cultural Evolution; but what are evolving are specific institutions not cultures in general. As biological evolution implies evolution of selfish and fit gene, Cultural Evolution could imply evolution of selfish and fit institutions. For sake of brevity and in order to avoid going out of context the discussion about institutions will stop here.

Turning toward the over politicized debate, it is clear, if the hypothesis presented is right, social scientists did not behave rationally to address scientific issue through scientific method. Whether we like it or not, truth is truth and if it needs approval of a mob, it will not be truth after all. As it is stated by Nietzsche (1886) if truth is frugal enough to need someone's protection, it is nothing but mere opinion. Even if hypothesis or idea is very dangerous, the best way to address the problem is to find ways that can lead to the discovery of the truth. At the same time those who come from natural side of evolution do tend to over conclude on human nature without having all the facts. The hypotheses proposed in this paper

may be right or wrong, but there is no doubt biological evolution by itself cannot explain much of human behaviour as it stands. We need to allow for cultural and institutional expression of biological adaptation and their variation, if we are going to understand human behaviour and human nature.

Conclusion

In general, extended identity is part of the extended phenotype, but flexible enough to accommodate different organizational structures and their dynamics. Say one works in big company. To get his/her salary and associated fitness a cooperative effort of everyone is needed. As result the entire company would be his/her genes' phenotype. To make it worst one's gene phenotype may include the entire world, since different things happening in different part of the world may influence one's fitness in cooperative manner. Such thinking is possible, but will be less useful and impractical. That is why in case of humans, we need to think in terms of goals which are based on extended identity and organizational (institutional) structures built as complex and diversified expression of biological evolution stable behaviours. After all we are not just animals but also highly intelligent and mentally complex animal.

Before this research paper is concluded, some important limitations of the above analysis are given below. The existence of extended identity with in humanity is less disputable, since it is simply impossible to find a single human being without extended social identity. However it could be disputable, if it's specific time of evolution is 4 MYA. To be conclusive there is need to tress the mind set of every specie that branched toward current humanity since 4 MYA. Given lack of data, it was not possible to do so in this research. In addition necessary predictions need to be developed and checked against data, before anyone can clearly accept the above hypothesis.

Given family is the most beneficial organization in terms of fitness and biological altruism, given it is the simplest and foundation stone of any other organization, and given it is based on time wise very extended form of cooperation that could make such mind set very effective and fit, it is highly possible the evolution of extended identity has to happen in form of family based cooperation. However, this conclusion again needs to be proven or other explanation need to be found. It is our hope farther research will clarify those points, if we stop the political bickering, if we return to scientific analysis and if we are able to integrate different disciplines in to one common scientific analysis with many integrated branches.

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