Time to abandon group thinking in economics

Sergio Da Silva

Federal University of Santa Catarina

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Department of Economics, Federal University of Santa Catarina, Brazil

1. Introduction

The notion that animals do those things that maximize the chance of survival of their *species* plagued evolutionary biology almost from the moment Darwin's theory was launched, as observed by Robert Trivers (2011), but has eventually been put aside by mainstream evolutionary biology. Very recently, however, group selection faced a revival of interest. (Dawkins 2012 discusses this unwelcome trend.)

Group thinking is wrong because natural selection does not favor what is good for the group or the species; it favors what is good for the individual, measured in survival and reproduction. Most precisely, natural selection works on the *genes* within an individual to promote their own survival and reproduction. One good example is provided by Richard Dawkins (2012): the fact that the American gray squirrel is driving the native British red squirrel to extinction has certain advantages, but this does not mean that any part of a squirrel evolved to promote the welfare of the gray squirrel over the red.

Here, I show through a couple of examples how group thinking also pervades economics. Economics should be correctly seen as the logical attempt to rationalize how to best allocate scarce resources that have alternative uses. And this is ultimately accomplished in order to promote survival. However, the issue of survival is not explicitly addressed by economists. This is not inconsequential. Actually, it means that economics fails to ground itself in the underlying knowledge provided by biology. This topic I also discuss in connection with the fallacy of group thinking.

2. Group thinking in biology

In his latest book, Robert Trivers (2011) observed that group thinking serves the purpose of justifying an individual behavior by claiming that such behavior benefits the group, and also to create the ideal of a conflict-free world.

Some examples provided by Trivers are as follows. First, male infanticide. This is known to happen for more than one hundred species. Because a nursing infant inhibits its mother's ovulation, murder of the infant aids the male's reproduction. The benefit for the male occurs, of course, at a cost to the dead infant and mother. If one is prepared to make a rather questionable utilitarian arithmetic, the group could profit only if the benefit for the male outweighs the costs imposed to the mother and the dead infant.

Adherents of group selection rationalized male infanticide as a population-control mechanism that kept the species from eating itself. In this sense, male murder of dependent offspring fathered by a previous male served the interests of all. However, evidence is not rosy for this. In some populations of langur monkeys, for example, the deaths are unrelated to population density and thus cannot serve a population-regulation function. The deaths are only correlated with the frequency with which males take over new groups. While as many as 10 percent of all young are murdered by adult males, there is arguably a modest male gain of two months of female labor compared with the female loss of twelve months of maternal care. Adding to this arithmetic the fact that the infant is murdered, it emerges a huge social cost levied every generation by natural selection on males. Thus, there is no such a thing as benefit for all: the male profits, the mother loses, and the infant dies.

Another canonical example is male aggression. Adherents of group thinking argued as being intrinsically good for the species if the stronger of two males takes control of a favored female. But because “good genes” relative to a given environment can perfectly turn “bad” relative to another, whether an aggressively successful male has genes that are beneficial to his progeny in another context is an open question; and this should be better answered by the choosing female. Besides, genes contributing to aggressiveness are clearly useless for the species in the case of a female’s daughters.

As for the objective of creating an ideal conflict-free world, one example is mother-offspring coevolution, where each party is supposed to evolve to help the other. However, evidence for this is also poor. Even in the formation of the placenta, the mother does not help the “invading” fetal tissue. Perhaps to avoid later excess investment, the mother creates chemical and physical barriers. Supposedly monogamous birds are another favorite example of a conflict-free arrangement. As it happens, this is also unlikely, as evidence suggests. Rates of extra-pair paternity exceeding 20 percent were regularly reported since the bird watchers of the 1960s imagined their ideal families.

Unfortunately, the fallacy of group thinking of evolutionary biology has spread out elsewhere the notion that evolution favors what is good for the family, the group, the culture, the species, the ecosystem, while minimizing the reality of conflict within any of these entities, as Trivers (2011) noted. As shown next through a couple of examples, economists, politicians, the media, and the public at large routinely make the mistake of group thinking. In many situations, what is clearly good for some individuals is commonly identified as something that is also good for the economy as a whole.

3. Examples of group thinking in economics

For convenience in the choice of examples, I consider those presented in the economics book of Thomas Sowell (2011), which is addressed to the general audience. Though Sowell in many cases makes it clear which individuals profit and which lose in the course of a given analysis, he himself is sometimes caught in the trap of group thinking. Then, I distill Sowell’s examples to make my case neater. I leave for the reader the task of searching for other examples along the lines I depict here.

Let me begin with an assertion that most people will probably find it distasteful, namely that large corporations are good for all. Most economists argue that large corporations can achieve economies of scale and then lower prices. This enables vast numbers of consumers to be able to afford many goods that would otherwise be beyond their financial means. Thus, the significance of the corporation in the economy at large extends far beyond those people who own, manage, or work for corporations, the argument goes. Higher standards of living are then the end result.

In this argument the economists get trapped in the group thinking fallacy. This seems like self-deception because they are well aware of the result in standard microeconomic theory that it is impossible to get a social welfare function after making interpersonal comparisons of utility. This dismisses group thinking at root. Notwithstanding, if one considers a “second-best,” though still ad hoc, utilitarian social welfare function, one can do some arithmetic from scratch. Disappointedly, the arithmetic will still disprove the case for large corporations to be, unambiguously, good for all.

The consumers of the products the corporations sell make a gain as well as the people who own, manage and work for them. But those small enterprises that could not afford the economies of scale, the other big corporations that lose the competition in lowering prices, and the consumers of the products of such potential companies all lose. So what is the meaning of "the economy at large benefits"? Like in natural selection, competition in the business world brings obvious costs to the losers.

Another case made by many economists which is disliked by the general public is that property rights are good for all. For a biologist this sounds like saying bird competitors in establishing territories (pieces of ground containing resources) all profits. In fact, only the first birds that occupy the richer habitat profit. Newcomers that are forced to occupy poorer habitats and further competitors that are excluded from the resource altogether clearly lose.

But the economists can provide an argument such as this. Some people buy bonds and wait for them to mature. There must be some overall assurance that the reward will be there when it is due. There must be property rights which specify who has exclusive access to particular things and to the financial benefits that flow from those things. Thus, protection of the property rights of individuals is a precondition for the economic benefits to be reaped by all, the argument goes. However, continuing with the use of the Benthamite utilitarian arithmetic, the people with no property and who holds no bonds have not been included in the "all."

True, the case can be distilled further. The value of private property rights to all, including people who own no property, is usually connected with the supposed benefit from the greater economic efficiency that property rights create, which translates into a higher standard of living for all. Property rights are not only special privileges for the rich, they may be valuable to people who are not rich too, the argument goes. Here, the concept of efficiency in production has been used to mean the rate at which inputs are turned into output. But how to know in advance that the economy at large will become more efficient in that very sense when the contribution possibly made by the wannabe production of the losers in the process failed to materialize?

Now let me invert the roles and select an example that is popular among the general public but rightly repelled by most economists, namely that protectionism is good for a country. Protectionism is often invoked by governments in order to protect jobs of a domestic industry. Public opinion, which in general fears "globalization," is often deluded and usually also endorses protectionist measures. However, these are self-serving arguments used by those who wish to escape the consequences of having to compete in the marketplace with foreign producers.

Jobs can be lost by industries adversely affected by the protection given to one particular industry. Protectionism is never about saving jobs, but about saving specific jobs of politically useful groups. Representatives of industries and regions that stand to lose business and jobs because of international competition are almost certain to seek restrictions on imported goods or resources which threaten their particular well-being, however beneficial such international transactions may be to the rest of the population.

Another example that is very popular among politicians, the media, and the general public is the notion that price controls benefit all. This is a perennial delusion, as most economists correctly warn. The record of price controls goes as far back as human history. Price controls produced essentially the same results under the Nixon administration in 1971 as they had produced in the Roman Empire under Diocletian, in France after the French Revolution, in seventeenth-century Italy, in eighteenth-century India, in Russia after the Bolshevik revolution, and in a number of African countries after their independence during the 1960s.

The political rationales all try to sell the idea that price controls are good for all, but in practice they are a political expedient to hold down some people's prices in the interest of other people whose political support seems more important. One popular rationale is to get affordable prices for all. But to say that prices should be "fair" is to say that economic realities have to adjust to one's budget, or to what one is willing to pay, because one is not going to adjust to the realities. In fact, many lose with price ceilings. Because more is demanded at a lower price and because price controls allow lower priority uses to preempt higher priority uses, the end result is severe shortages for the other people who are not the beneficiaries. By limiting price fluctuations to allocate scarce resources that have alternative uses, price controls reduce the incentives for individuals to limit their own use of the scarce resources desired by others. What price controls do is reducing the incentives for self-rationing.

4. Biology at the root of economics

Rigorously, the economic theory of choice should be considered as a branch of applied logic. And that is all for now. One can straightforwardly jump to this conclusion after reading, for example, the entry "applied logic" in the *Encyclopedia Britannica* (Hintikka 2012) along with the entry "preferences" in the *Stanford Encyclopedia of Philosophy* (Hansson and Grune-Yanoff 2011). Logic and mathematics are not sciences. They are not about the real thing. Economics, as it stands today, is just applied logic and thus it is not a science *yet*. Of course, employing logic to inform reasoned choices remains useful. But one can demand more: it is possible to turn economics into science.

Robert Trivers (2011) showed how. When asking what an individual is up to, economists answer she maximizes her utility. But which utility? Well, that of anything she wishes to maximize. Here, economists play a shell game, as Trivers observed. True, from a purely logical point of view such an attitude can be still justified in that it allows analysis to be extended to a huge range of applications. However, from a strict scientific standpoint it fails to ground economics in underlying knowledge, in this case, biology. Economists then take preference functions to rank the utilities in order to inform when one kind of utility takes precedence over another. But the logic of preferences, axiomatic in nature, can provide no theory for how the individual is expected to do those rankings. However, biology has a well-developed theory of exactly what utility is based on Darwin's concept of reproductive success.

In its current logical form, economics still does require stopping to think, as Thomas Sowell (2011) observed. It is not in the realm of what Daniel Kahneman (2011) called "fast thinking." The basic logic of economic thinking is not easy to grasp possibly because the human brain is not that good in understanding economics as well as logic and maths, as noted by Steven Pinker (2002). Psychologists and, yes, behavioral economists correctly accept that human thinking and decision making are biological adaptations rather than engines of pure rationality. Fast, automatic decisions are often taken and it does require slow thinking for rationality to take control (Kahneman 2011). Both fast and slow thinking ultimately serve evolutionary goals. The logical economics belongs to the realm of slow thinking and thus cannot be promptly grasped by everyone. This may explain the perennial, widespread economic illiteracy. Sowell indirectly showed this point through lots of examples, in addition to the ones I selected earlier.

The reason why people fail to understand the logic of economics can be fully appreciated as we make the final link by putting biology at the basis of economics. Darwin well understood that survival, which should be the objective of economics were it an empirically meaningful science, was only a means to the end of reproduction (Dawkins 2012). Unlike biology, economics does not make the distinction between ultimate and proximate explanations. Factors influencing survival value are called "ultimate" while causal factors are referred to as "proximate." Why starlings sing in the spring? Because this attracts mates for breeding; this is a functional explanation. And because the increasing in day length triggers changes in hormone levels; this is a causal explanation. Importantly, both ultimate and proximate explanations should be complementary. When economists talk about the scope of their discipline, they refer to the study of how to best allocate scarce resources that have alternative uses; and this can be accomplished in an extraordinary diversity of situations. This is the realm of proximate explanations. The survival value of such choices is currently missing from economics, but can — and should be — added to couple with the causal explanations. For example, when experimentally observing the anomaly to the basic theory known as the endowment effect — where people put a higher price for owned goods than for equally preferred goods that are not yet owned — a functional explanation can be as follows. Assurance that the other party will not escape after getting one's good is not at first guaranteed. After all, both parties must first understand that the trade will be mutually beneficial; and this requires stopping to think. Fast thinking favors running. People will engage in trade only after effortful, slow thinking. Thus, there is survival value in putting a higher price for the good at hand. That is why monkeys and other nonhuman animals also exhibit the endowment effect. As can be seen, the "anomaly" vanishes after considering the ultimate explanation.

Broadly viewed in these terms, one can argue that traditionally microeconomics focused exclusively on the survival part of the utility function whenever an individual maximizes the consumption of wherever goods. The reproduction part was largely neglected. An exception, of course, was the work of Gary Becker (1991). But he narrowly considered the issue by pushing too far the logic of economic reasoning, attributing empirical content to a rationality that is purely logical, and thus failing to inform his models with relevant information from biology. Even when he explicitly tried out going biological, he made mistakes. For example, when analyzing human mating markets he made a lek assumption, which a biologist will find inappropriate for mammals in general, to say the least.

Benefit to a living creature ultimately refers to the individual's inclusive fitness: the number of its surviving offspring plus positive and negative effects on the reproductive success of relatives, each devalued by its relatedness to them. That is what utility exactly is for biology. Trivers (2011) observed that by resolutely acting as if they can produce a science independent of noneconomic scientific knowledge, economists miss out on a whole series of linkages that may be critical.

Richard Dawkins (2012) noted that fitness became that which is maximized in natural selection when biology deployed mathematics to bridge Darwinism with Mendelian genetics. However, while inclusive fitness is that quantity which an individual will appear to maximize, what is really being maximized is gene survival. Thus, a starting point for a scientific microeconomics will consider not only maximization of consumption of wherever goods it happens to be available as an argument of the utility function, but also the inclusive fitness term. Doing so, both survival (through the consumption of resources) and reproduction (trough decisions based on inclusive fitness) will be considered. And all this should be done without neglecting both proximate and ultimate explanations. This will imply a full-blown reproduction analysis, where Becker's will be extended to consider the relevant information from biology, to couple with the analysis of survival.

Current purely-logical economic choice theory is constructed upon the individual, which in itself is good news. But its implications for *social* choice can be and have been studied. And the striking results put limits on all procedures in which social preferences, choices or decisions are supposed to be responsive to individual preferences. This includes, for example, social planning and voting procedures (Hansson and Grune-Yanoff 2011). It is logically impossible to aggregate individual preferences and get as an end result a social welfare function. As observed, this discovery limits at root the top-down approach of group thinking.

In current economics, utility is not only incomplete (lacking the fitness term) but has also ambiguity built into it. It can refer to utility of one individual's actions to him or to the group. Trivers (2011) lamented that economists easily imagine that the two kinds of utility are well aligned, in the sense that individuals acting for personal utility will tend to benefit the group, providing general utility. This is the fallacy of group thinking, as shown through the examples of the previous section. In the most popular textbook of microeconomics for example (Varian 2010), each consumer starts as an individualist in that he does not care about what others get. But when analyzing welfare of the group, each consumer can now have preferences toward all the baskets of goods, in which case he can continue to be individualistic or not, and things such as envy becomes possible. When the analysis resume and the result of a social welfare function cannot materialize, stubborn microeconomists continue considering "second-best" welfare functions. But by doing so, they blind themselves to the possibility that unrestrained pursuit of personal utility can have disastrous effects on group benefit. The door cracks open to group thinking. Trivers (2011) observed that nowhere do biologists assume in advance that the two kinds of utility are positively aligned. This must be shown separately for any given case. What can at best be shown is a situation where every individual benefits, in which case group welfare ends up strictly incidental. This is what microeconomists call a Pareto-improvement.

5. Statistical physics for the economy as a whole

At this point the reader might wonder what the right way to conduct the analysis of group in economics is. Definitely not as currently done by official "macroeconomics," which is a reductionist approach that relies on the belief that the properties of the macroeconomy are nothing else than the properties of their constituent individuals. The whole is viewed as merely the sum of the parts. Of course, this would be so if the constituent individuals were homogeneous. But they are not. Despite that, macroeconomics assumes homogeneity of individuals and focuses on a "representative individual." Rather than explaining collective behavior from the interactions between the constituent individuals, macroeconomics studies the behavior of the average individual. Is this justified? It would be if the macroeconomy exhibited the property of "self-averaging." If the representative-individual macroeconomics were valid then the aggregation of individuals had to be modeled by a Poisson model where, as more and more individuals were aggregated, the model coefficient of variation approached zero. But this is unlikely for the macroeconomy in light of the aforementioned discovery that there is no social welfare function. For this reason, macroeconomics has no choice but to accept the heterogeneity of interacting individuals in order to explain group behavior. And here, importantly, group phenomena of repeated interactions among many distinct individuals will produce patterns on a scale larger than themselves.

It is thus no surprise that reductionist macroeconomics had been criticized as being fundamentally flawed (Bouchaud 2008, Da Silva 2009, Farmer and Foley 2009, Lux and Westerhoff 2009). During the 1970's, microeconomists studying the properties of a general equilibrium for the economy found that every kind of behavior on the part of microeconomic units was irrelevant for macroeconomics. This warning has been ignored by macroeconomists until the present days, who continue to stick with the analysis of the dynamics of aggregate variables averaged over many individual variables. This attitude massively neglects an aggregation problem that can never be solved.

So, how biology tackles collective animal behavior? Like physics and chemistry, it evokes a different approach when focusing in macro systems made up of a large number of micro units (see the recent book of David Sumpter 2010). The precise behavior of the micro units is irrelevant; one needs a statistical approach. There is no reason for economics not to adopt the same perspective. Because macroeconomics is about a large number of heterogeneous micro units, a statistical physics approach to the entire macro system is the right thing to do. One needs to think in terms of complex patterns of "social atoms," as Mark Buchanan (2007) hinted. The patterns that the group creates are complex in that they are neither entirely regular nor entirely random.

One good news is that the same set of techniques can be applied to understand systems at many different physical scales. This is so because there are operational similarities between such systems. For example, the mathematics of fluid flow can apply for any type of matter, be it swarms of locust, flow of traffic, or crowds leaving football grounds. As a result, mathematical modeling tools have been developed to be used within different fields of research (as surveyed in Sumpter 2010). In biology, collective animal behavior provides case studies of complex phenomena that can be readily employed by economists. Some of those are: ant trails, cockroach aggregations, fish schools, bird migrations, honeybee swarms, homing pigeons finding their route home, web construction by spiders, as well as locust marching. Here, there are two clearly defined levels of organization: the animal and the group.

Like axiomatic microeconomics, the similar mathematical modeling of complex patterns of seemly unrelated systems suggests a purely-logical approach to the problem of group behavior, too. Where the real science will step in is in connecting ultimate and proximate theories. As Sumpter (2010) put it, while functional explanations play a role in understanding why individuals cooperate or not to form collective patterns which are, themselves, consistent or not with selfish individuals and genes, the study of collective phenomena and complex systems is associated with mechanistic, proximate explanations. Fortunately, increasing understanding of natural systems also arises from simply playing with mathematical models. But modeling cannot be confused with the genuine article because it is often the case that two completely different mathematical descriptions of a system are entirely compatible with each other.

How, then, group behavior emerges from individual behavior? Dividing the individual and the group as distinct levels of analysis leads to "emergence" and "self-organization." From some relatively simple assumptions about individual behavior it can *emerge* predictions about group behavior. The group level pattern *self-organizes* in that it is not encoded directly in the individual-level rules. Precisely, the mathematical models allow one to deduce the built-in connections between the interactions of individuals and the patterns created at the group level (Sumpter 2010).

The same mathematical model can have explanatory power across different systems. In literature, one model has connected firefly flashing and human applause, another one connected ants foraging for food and cockroaches finding a shelter. One can then pick up the assumptions used to describe a given system and apply them directly to produce predictions about another. In addition, the model can be perturbed for one to see whether the same predictions are generated or to see changes in the predictions that may reflect differences between the systems. And all this suggests fundamental laws encoded within these models (Sumpter 2010).

Economics can profit from the already existing models in biology, too, as far as group behavior is concerned. As an example, my students and I borrowed models of both cockroaches finding a shelter and information transfer in fish shoals, and applied them to the stock market (Suhadolnik et al. 2010). Ill-equipped with reductionist macroeconomics, it is not so surprising that the recent crisis caught policymakers in a misplaced consensus of "one instrument, one target." The instrument was the nominal interest rate, and monetary policy focused exclusively on an implicit inflation target. Incredible as it may sounds, stock market bubbles were dismissed as unimportant. But after the bursting of the subprime housing bubble, the collapse of the theory prompted an unwelcome rebirth of old-style Keynesianism, along with talks of an elusive "macroprudential" regulation. Needless to say, such approaches fail to recognize the basic fact that stock markets are complex systems. The main problem here is that regulation cannot succeed using conventional policy tools. But one can rely, for example, on the control theory of self-organized systems, which has been applied to influence such things as the mentioned cockroach aggregations. Some engineers have devised autonomous cockroach-robots and relied on self-organization as the main coordination mechanism. The controller of individual robots was designed using reactive, behavior-based techniques. Socially integrated autonomous robots, perceived as congeners by the group of cockroaches and acting as interactive decoys, were able to control their self-organized group choices of shelter. Inspired by this, we then suggested the use of socially integrated robot traders in stock markets to function as an anti-bubble decoy (Suhadolnik et al. 2010). This, if correctly engineered, may offer a credible alternative to stabilizing stock markets.

6. Concluding remarks

Economists resolutely refuse to make the final link to evolutionary theory. In case they will do so in future, group thinking — which is pervasive in economics — will easily be perceived as fallacious. This can be straightforwardly accomplished because all that is needed is one to get informed about the discussions already taking place in biology. Economics, unlike most other attempts of social science, was correctly founded on individual behavior. This will make it easier for economists eventually reject widespread ideas where group trumps individual.

The recent crisis of 2008 created a general sentiment among the public that economics is not a well-developed science. The public is right on this respect, as Doyne Farmer and Duncan Foley (2009) illustrated. Despite that, economists themselves seemed unimpressed. Todd Gitlin (2012) observed that the academy is busy protecting itself, journalism is busy avoiding ideas, and public media are besotted by personalities. Nobel prize-winner Paul Krugman (2009) identified one problem at the time: infatuation with beautiful mathematics at the cost of attention to reality. But, as Robert Trivers (2011) commented in the follow up, Krugman himself failed to suggest the first piece of reality economists should pay attention to: biological self-interest, one fact that has been obvious for some thirty years now in evolutionary biology. Trivers anticipated that the right route could have prevented ideas of "built-in anti-deception mechanisms kicking in to protect us from the harmful effects of unrestrained economic egotism by those already at the top."

Moreover, economists need to redirect their conventional approach in the study of group behavior. Current macroeconomics is reductionist while the route followed by biology, physics, and chemistry was to resort to a different approach when focusing on macro systems made up of a large number of heterogeneous micro units. The quest of microfoundations for macroeconomics is a misleading agenda because what one will get from the simple assumptions about individual behavior in explaining group behavior will be more than the sum of the parts. Macroeconomists have never seriously accepted that their entire endeavor involves an intrinsic "fallacy of composition," a term ironically coined by themselves. They have to concede that the group level pattern self-organizes as it is not encoded directly in the individual-level rules. And here the right mathematical models can help deduce hidden connections between the interactions of individuals and the patterns that emerge at the group level.

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