

Jane Austen, Game Theorist

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It has been suggested that the driving force behind the evolutionary explosion of the size (and complexity) of the humanoid brain is due to the mental challenges of increased social interaction (which of course in its turn can have been a result of increased brain power, starting a powerful feed-back loop). Be it as it may, speculations about specific evolutionary scenarios are always very risky, there is no limit to the kind of kiplinesque stories that can be concocted, still it points out how much social interaction is part of our mental set-up. It has been indicated by brain scans that when calculating prodigies perform their feats of memory and computation they actually tap in on the parts of the brain normally involved in social interaction, the idea being that if those powerful resources are not used for socializing they are free to do other wonders, at the terrible price of becoming socially crippled, literally 'idiots savants'. This is of course a comfort to us, who lack such spectacular gifts to be told that we do in fact possess them, but we choose to use them more meaningfully and profitably. To take just one example, face recognition is a minor but yet crucial component of social interaction, and something we take for granted, but any attempts at computer simulation, involves a lot of computing. Now one thing does not exclude another, not all calculating prodigies are idiots savants, and Keith Devlin suggests that mathematicians are able to work with abstract concepts by turning the process into a kind of soap-opera (and conversely the social intricacies of a soap are well at the level of your standard mathematical proof.). There are many subtleties in social interaction. Not only do I know that you know that I know, but I know that you know that I know that you know. I used to naively think that this could go on for ever and actually manifested infinity, as the repeated reflections of two mirrors, but just as with the mirrors where the grainyness of matter forces a stop, you cannot pursue too many levels before it stops to make sense. What would the sense be of repeating this mutual knowledge twenty times? It is the same thing with abstractions in mathematics, you cannot really meaningfully talk about more than a handful. In formal logic there is no limit to the number of levels of quantifiers to a statement, in actual mathematics nothing serious goes beyond two!

Economics is about money of course. But more seriously it is about the macro-effects of micro-causes involving individual and social decisions, (and note that true socializing goes on in numerically very limited circles). This is epitomized by Adam Smiths invisible hand, bread on your table is not the result of the benevolence of the baker, getting up very early in the morning in order to serve you, but paradoxically to his egotism. This has led to the view of us all being myopic agents intently set upon egoistically maximizing our individual benefits. This reductive idea of people is something most of us instinctively rebel against, just as we deep down may resent the idea that we are made of material particles, and can be explained in mechanical terms. The very idea of consistent rational behaviour and the view of happiness in terms of utility are scornfully rejected by Dostoevskys underground man, whom we, for all his hysterical faults, tend to sympathize with. Now Adam

Smith is the guru of non-sentimental economic liberalism but above all he was like Marx foremost a moralist. Similarly in more recent times Hayek has been simplified by friends and foes alike for his championship of economic freedom, seeing economics ultimately as a way of setting priorities in the private sphere.

Micheal Suk-Young Chwe is an associate professor of political science at UCLA, thus neither a mathematician nor an economist. But of course politics as well as economics, of which the latter is a most important part, is ultimately based on social interaction. The science of social interaction *par excellence* is game theory, and hence given the fact of the pivotal importance of social life, he is not shy of quoting Robert Leonard to the effect that Game Theory may be one of the more significant scientific contributions of the 20th century. Game theory as we know it, is the invention of von Neumann and the economist Morgenstern, with the ambition to mathematically model social behavior. A mathematical model has the purpose of being able to simulate. In the case of game theory, its purpose is to simulate and thus to some extent predict social behaviour. This necessitates some simplifying assumptions, such as consistently ordered preferences, often supplemented by utility functions, and the assumption of rational behaviours, so called rational choice. Note that rational choice does not mean that the preferences may be rational, only that given them, you act rationally upon them. There is of course much to object to in this, but you have to start somewhere. As the historian and philosopher R.G. Collingwood points out, a skeptic does not budge, but a critic travels with you. Besides you should not take a model literally, it does not mean that life really is nothing but a game, and that you are reduced to play according to its rules. The archetypical model is that of Ptolemy, with his epi-cycles. He had the sense not to believe in them literally, he designed them to enable computations, i.e. simulations and predictions. The same thing with Game theory, it should not be judged on its assumptions, but on its consequences. If it produces interesting, i.e. non-trivial and unexpected results, which are in accordance with factual circumstances, it legitimizes its pursuit as well as our curiosity to carry on that pursuit to its limits. This is the modern, somewhat pragmatic attitude to science as informed by Popper, and something that the author, at least implicitly acknowledges.

Game Theory takes as its point of departure the most fundamental facts about social life. First that you do not live in a solipsistic universe, there are other actors out there, independent of you with their own agendas, which may very well be in conflict with yours. Secondly, although you have no privileged access to their minds, i.e. their thoughts, intentions and motivations, still they are not entirely opaque to you, you have some instinctive understanding, which is usually referred to as empathy (not to be confused with sympathy, at least not in its ordinary, somewhat misleading, connotation). As to the mysterious understanding, C.G.Jung referred to it as collective unconsciousness, an idea with potent metaphorical content, but of course ridiculed when taken literally. Instead the modern explanation is that of a common evolutionary and genetic inheritance, to which also Jung hinted at. Of course this explanation is very vague and really not superior to the more fanciful Jungian one, but there is no need to digress on this.

The archetypical game situation is the game of chicken. In its classical form two actors are driving at full speed towards each other and the one who first relents and swerves is the chicken and thus loses. Both actors want to win, and they can only win by refusing

to swerve, but if so the result will be catastrophic, and both parties will lose in a sense that goes far beyond the notion of just being a chicken. As with all mathematical models it has applications to a great variety of situations, that share the same structural features. Another more ominous interpretation is the nuclear arms race during the Cold War and the concomitant brinkmanship. To treat this mathematically a simple matrix is set up, whose entries corresponds to the possible outcomes. This matrix does of course not tell you how to act in a real-life situation, that is too simple, it just sets the stage. The first subtlety is that the matrix of your opponent may not be identical to yours. He may be a madman who will never swerve because he does not mind the worst scenario. This gives you a strong clue as how the opponent will act, and then looking at the matrix, you see that you have no choice but to chicken out. Looking it from the other side you see that if your opponent firmly believes you are a madman, you can rely on him, provided you believe he is rational, to chose the alternative that gives you the advantage of pursuing your winning strategy without risking disaster. Being thought of as crazy is not always a disadvantage in a social setting. Of course the whole thing can be given a further twist, which I leave to the imagination of the reader. Just as the liars paradox, with which this has many features in common, goes back to antiquity, this kind of consideration must go back a very long way. And just as logic of the 1930's brought the liars paradox to the incompleteness theorem of Gödel, the game of chicken has spawned an intricate mathematical theory after the war, with notable features such as the Nash equilibrium. To the disappointment of many readers I will not pursue the mathematics of game theory, for the simple reason that it does not lie at the heart of Chwe's book. Admittedly he brings up matrices, and discusses a fairly complicated example based on a fairy-tale using it to illustrate the above mentioned equilibrium, but it is all done in passing, the real concern of the author are the novels of Jane Austen, as indicated by the eponymous title.

Game Theory has been given a bad name, partly because of its strong mathematical content, which is seen by many as something mechanical and soulless and ignoring the human element, partly because of that as seen as a tool of the powerful to manipulate the weak, e.g. by its use by the military RAND Corporation. The author wants to humanize Game Theory by persuading the reader that it is indeed central to social intercourse and can more often than not be used by the powerless to manipulate the powerful and that its basic tenets have indeed been known and practiced for a long time (as already speculated on above). What better example than Jane Austen to legitimize the theory than to illustrate it by Austens beloved novels, which are as far from mathematics as you can think. The reader, who expects to be shown surprising connections between mathematics and Austen will be disappointed, and more seriously anyone who expects her novels to be a good introduction to Game Theory is likewise to be disappointed. Nevertheless his discussion touches on matters of general interest, some of them even with some tenuous connection to mathematics, so it might be worthwhile to continue the review.

Jane Austen completed six novels during her short life, some of which were only published posthumously, and started on a seventh. Many of the novels have been repeatedly been turned into custume dramas to be savored, often in serializations. Thus I guess they are fairly widely known. Charming as the dramatizations may be, they are no substitutes for the real thing. Those are characterized by wit and occasional sarcasm and keen obser-

vations of social mores, expressed in a limpid prose, which strikes the contemporary reader by its modernity. They center about marriage, ostensibly a most mundane subject, but for most people also a most momentous one regardless of how thoughtlessly entered into. Fiction by its very nature is a very rewarding source for social commentary, and one may argue that the most convincing case histories of Freud concern fictional characters. This gives rise to the idea that fiction is very instructive as to social behavior and on that basis socially useful and legitimate, although of course its supposed effectiveness in instruction can also work the other way. The main thesis of the author is that Austen was deep down a game theorist, or as she puts it, an 'imaginist'. By this he seems to mean not much more than she allows her characters to exercise strategic thinking, meaning being both aware of the otherness of other people, yet to be able to empathize, reading their minds, and act accordingly. People who lack this ability, or chooses not to exercise it, are referred to as clueless. The pleasure in reading Austen consists to a large extent in the delineation of the various verbal stratagems employed. To really enjoy the book you need to be familiar with her novels, the plot summaries that the author supplies are no substitutes, and I fear they rather tend to spoil the future pleasure than enhance it. Personally before reading the book I set myself the task to read through her complete oeuvre, but time did not allow it, so 'Sense and Sensibility' and 'Persuasion' remain on the shelf, thus I skipped their summaries, and tried to pass lightly on examples derived from them, lest disclosure of plot would compromise future enjoyment. However, those parts pertaining to with what I was familiar with I read with pleasure, not so much because of the game theoretical insights the author professes to impart, as the simple enjoyment we all find in gossip, meaning speaking about people we know, be they fictional. Or maybe especially if they are fictional, because cynically we can argue that we are often more intimately acquainted with fictional figures than we are with people of flesh and blood among our acquaintances.

The author certainly has enjoyed the exercise of reading through Austen, further enhanced by his game of looking for and finding game theoretical interpretations. The bulk of the book consists in an exhaustive and systematic exemplification out of the novels. One can hardly fault the author for not having done his homework. It would be pointless to extensively quote from his examples, so let me be content by bringing up some issues.

One is choice versus, what I would term as mere decisions. In life you have to choose one way or another, and often you have no choice, or you have made a meta-decision, to follow some rules or algorithms, such as always choosing to do what you are told, or following what you believe are the dictates of proper behavior. Central to the novels of Austen is the idea that there are choices you have to make using your free will, so to speak (a mathematical game theorist may easily dismiss the notion of a free will, it would rather complicate matters), based on your real intrinsic preferences, not sham ones imposed from the outside. Tragedy in the world of Austen often consists in not being able to choose, meaning to accept that choosing something automatically also means permanently rejecting the alternative, and hence trying both to have the cake and eat it too. In order to make progress in life you have to make choices and stick to them, just as science progresses by rejecting the false paths. Or not even having the opportunity to choose, as in the case of Fanny Price in 'Mansfield Park',

Strategic thinking, according to the author, means to be able to anticipate the actions

of others, through the imaginative effort of putting yourself in their shoes. In practice it means to be able to create a tree of possibilities, and depending on the responses of the opponent deciding how you can respond. This is of course very close to what happens in a real game, such as cards or chess, but Austen makes a point that cleverness in games has little or nothing to do with ability to navigate the social world, because of the lack of a wider context. Chess players are supposedly good at thinking many moves ahead, but how much psychologically does really enter into the process, and thus how much deception is employed? I would hazard very little. A chess player tries to play an objectively strong move, leaving the opponent as few options as possible, not a weak one in order to confuse him. For this reason, and other more obvious ones, chess is not considered a prime activity for developing social skills, rather to the contrary. The cleverness displayed in the game is out of any significant context. Admittedly chess is not played in Austen, but backgammon and many card games are, but those illustrate the point almost as well.

If you fail to play the strategic game it could be due to many reasons. You could be lazy, because it does take an effort. You could be a social superior, in which case you may expect the other to do your bidding and you have no need to imagine his or her point of view; and the effort could even be distasteful, as the author muses, because it literally means inhabiting the body of an inferior. Or you could be so estranged from the actual reference frames that you have no clues. The last two are suggested as the explanations for the disastrous performances of the US be it in Vietnam, Iraq or Afghanistan. Most interestingly though is when this clueness is not a voluntary choice (remember feigned cluelessness could be a powerful chip on the bargaining table), but innate. People who lack the ability to adhere to the basic facts of social interaction, by not realizing that other people are different agents from themselves, and lacking any intuition for what their actions and statements really mean. They are nowadays said to belong to an autistic spectrum (to explicitly refer to them as autistic is not politically correct, as it should not be, in view of the fact that clinical autism is a tragic mental condition, and hence should not be used as a term of disparagement or abuse). Symptoms of this include, numeracy, attention to visual detail and social rank, and literal interpretations of ironies and metaphors, in other words blind to the higher levels of verbal abstraction. It is not hard to find marginal characters amply illustrating those traits in Austen, testifying to her being aware of the phenomenon. We only have to refer to Mr Rushworth in 'Mansfield Park', Emmas father Woodhouse in 'Emma' or Mr Collins in 'Pride and Prejudice' and various silly older women sprinkled in the novels. Those characters tend to be caricatures more at home on the pages of a Dickens novel than within the covers of an Austen. Note that the emphasis on social rank, more relevant in the society of early 19th century English life than today, has perhaps nothing to do with snobbishness per se, as convenient markers for easy detection and guidance in the social labyrinth. Another symptom is the nerd, and Austen gets credit for describing the first nerd in the literature through Mary Bennet in 'Pride and Prejudice'. A young woman who is more interested in musical notation than music as a vehicle of emotional communication.

The issue of numeracy is a sensitive one for mathematicians, many of us feel comfortable with numbers, maybe even friendly, playing with them for no reasons at all. It may thus not be surprising that people outside mathematics tend to think of mathematicians

as generally clueless socially, and to be honest we all have colleagues who make us suspect that such prejudices may have some basis in fact. However, this is a vulgar conception, and one should never underestimate the social astuteness even of the most nerdish of our colleagues. I think the problem is that many people take too literally the so called scientific findings in the social sciences.

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