

# ISSA Proceedings 2006 - The Risk Of Arguing From Persuasion To Dissuasion

✘ Bounded rationality theories are essentially characterized by incorporating limits of knowledge, resources and time as a central feature of the conditions in which we adopt our decisions. Connections between advanced systems of processing information and our usual manner of arguing allow us to analyze some argumentative strategies as quick mechanisms that reduce costs of information in a way that is not too different from the simple and frugal heuristics, as defended by R. Selten or G. Gigerenzer (Gigerenzer and Selten 2001; Gigerenzer, Todd, and ABC Research Group. 1999), that seem to play a salient role in the adoption of decisions in conditions of uncertainty. **[i]**

Taking part in an argumentative process, accepting it as a decision-making mechanism, implies taking some risks if you are not an omniscient agent. The possible dissuasive strength of argumentation arises as part of a procedural decision device and it can help us to show and account for some discursive strategies employed by agents in their argumentative activities.

Some of the problems that come into view when we try to understand polemics and types of polemics may be solved by attending to both participants' spaces of values and the zone where these spaces overlap. A first step, an empirical one, could be to delineate the boundaries of the space of values that participants try to occupy. Their goal is not, or not only, to optimize some singular variables (such as truth, rhetoric force or consistency), but also to satisfy a set of values that they regard as important; their own authorship or agency could even be one of these values. For example, it could make a difference whether we obtain an inaction compromise from another agent after a dissuasion process (possibly including some argumentative interactions) or reach a superficially similar result after a simple refusal due to the proper conviction of the other agent.

I hope that, with some tools from ancient rhetoric, the philosophy of economics, and computer science, we can analyse, for example, the continuum between refutation and reputation (Dascal 2001, 2002; Dascal 2003) and some other non-traditional epistemological questions. There are two key ideas. First, some features of the context could generate rules. Usually, we are prone to ascribe

these rules solely to the participants' cognitive capabilities, but these rules could also be constructed as the output of the relationships themselves. Second, we do not need to assume that participants in the dialogue are provided with absolute and common knowledge (each one knows what the others know), with all the time and all the computational capabilities possible, and both unlimited knowledge and unlimited memory store. Instead, all we need are some flesh and blood human beings in contextual interactions.

As Pierluigi Barrotta and Marcelo Dascal have said in their introduction to *Controversies and Subjectivity*.

If the subjects who carry out scientific research (...) were to follow scrupulously the rules of logic and stipulated methodological procedures, no real disagreement could ever arise between them.

This subject (uniform universal subject -a pure being of reason that embodies the correct rules of logic and methodology) is a fiction. It is a sort of ideal 'representative agent', who is supposed to provide a less ideally universal 'scientific' or 'rational' community with the hallmark of rationality that grants it its legitimacy and superiority" (Barrotta and Dascal 2005).

The real agents cannot be blurred; they must always remain at least as a parameter of the interaction. On the contrary, in the standard view of rationality, our Olympic agents, Olympic because they are similar only to gods on Olympus, could be eliminated or obviated because each agent is similar to every other one; as they are all epistemic gods, none of them are necessary.

We always need concrete agents, to understand the real cognitive process that is embedded in dialogic interactions. We even need them to arrive at some kind of objectivity, because objectivity is not a view from nowhere, but rather a shared view from somewhere (Amartya Sen 1993, p. 127). We cannot eliminate the particular agent; we always need it at least as a parametric reference. Other approaches try to write both absolute capabilities (even those obtained by learning or training) and innate abilities into our models of human beings, but they only fix these traits on abstract humanity, and that is why we cannot understand the bargaining process itself. We are rational but less than gods. "Ideal agents as traditionally conceived may not be idealizations of any actual agent, and hence *ideal agent* epistemology may give us little or no insight into genuine rationality." (Cummins et al. 2004, p. 296)

Our models are always idealizations, and we can have no other kind of model, but

this is not necessarily a bad thing in itself. The mistake appears when we opt for reductionism. Trying to reduce all the variables to a single one, with a single unit of measure, is the main difficulty for understanding the complexity of dialogic interaction. There are several parameters that we must maintain *ab initio*.

As I have mentioned, theories about dialogic interaction usually assume a very debatable notion of rationality. This notion comes from economic studies, but today many discussions, mainly from experimental economics, show that it is a very weak notion. However, an important part of linguistic studies accepts this standard notion as a datum and without any explicit reflection - for instance, Optimality Theory and Relevance Theory. Although the attempt was made to supersede the vision of language as a code and incorporate inferential components, these views maintain a background that assumes an ideal of rationality that is absolutely attached to cost-benefit analysis; consequently, it needs some common or shared knowledge, and some common idea of incentives, as key concepts to achieve some equilibrium in communicative transmission or other linguistic interactions.

However, a simple review of the benefits and drawbacks of economic theory could show the way out of this trap. We must open our minds in order to build a pragmatic orientation that will not be reduced to some kind of sophisticated semantics. Perhaps it would be a good idea to look at the conceptions of rationality from other sides.

As I have said elsewhere, the majority of approaches to dialogic interaction have been built on a very special model of human being, i. e. the rational optimizing decision maker. This is a very special agent that has at least three unbounded capabilities: he or she has, at any time, all possible information and computational abilities, he has no limitations and so, supposedly, is able to achieve an optimal degree of effective communication, although with the corresponding constraints on his set of feasible actions **[ii]**

Herbert Simon's idea of bounded rationality offers another, more radical, option. Simon used the metaphor of a pair of scissors, where one of the blades is the "cognitive limitations" of human beings and the other one is the "structure of the environment," cognitive rationality and ecological rationality, as Gigerenzer calls them. The most important thing is that "minds with limited time, knowledge, and other resources can be nevertheless successful by exploiting structures in their environments" (Gigerenzer and Selten 2001, p. 7).

Increasing the complexity of a task does not necessarily imply a corresponding

complexity of individuals. Sometimes a better comprehension of the environment could help carry out the task. A system of relationships could sometimes allow some fast and frugal mechanism to produce better results than those that an optimal rationality with a high computational complexity is assumed to produce. I will say that the metaphor of a pair of scissors comes close to Marcelo Dascal's idea, when he says: "The centuries-old debate on the nature of the relationship between language and thought was mesmerized by these polar positions regarding which one of them is, in some sense, "dependent" upon the other. Under close scrutiny, however, both sides in the debate acknowledge the existence of language-thought interactions that do not fit the sweeping versions of their claims. For example, avowed "externalists" like Bacon and Locke, undertake to criticize language as a dangerous source of cognitive mistakes and suggest methods (which gave rise to the attempt to elaborate "scientific" languages) to avoid such a danger. Yet, in so doing, they in fact admit that thought is not impervious to the influence of language"(M. Dascal, 2002, p. 38).

I wonder how to go forward and override this kind of dichotomy or false dilemma, as Dascal himself has proposed. Obviously, this could be useful, but we also need some considerations on what the minimal conditions are to make that kind of mixture efficient; the bridges we try to build may come together with the worst effects of the two sides, so we need minimal conditions to counterbalance the bad effects and go ahead with some kind of converging process that enhances human performance.

I think these questions ought to be addressed from a twofold perspective. Bridges and double perspective have not had a very good reputation. They were called eclectics or irenisms and they were assumed to accept the worst of the two sides. But perhaps a good approach to doing philosophy would be to work out and solve false dilemmas. The model of agent that is behind our conceptual construction of language turns out to be decisive when it comes to rebuilding these aspects of linguistic conformation and evolution.

The need to understand language as a cognitive technology from a broad concept of distributed cognition that allows us to attend to pragmatic problems from its very specificity has been proposed by some cognitive and computer science theorists who have developed the line of distributed cognition.

A lot of work dealing with persuasion is coming from Computer Science, mainly in designing artefacts that are built as human-computer interfaces. I mean that it is

noteworthy that a remarkable interest in a lot of issues about language, translatability, adequacy, truth, rhetoric tools and so on is arising from the area of Computer Science. For example, let us look at the beginning of one of these papers: "Intelligent interfaces will need to be persuasive. This means they must have the capability of reasoning on the effectiveness of the message." (Guerini, Stock, and Zancanaro 2004; Guerini, Stock, and Zancanaro 2003; Guerini et al. 2004) These authors (Guerini, Stock and others) continue offering some ideas on persuasion: "In the first place, persuasion is a "superset" of argumentation: while argumentation is concerned with the goal of making the receiver believe a certain proposition (goal to induce a belief), persuasion is concerned with the goal of making the receiver perform a certain action (goal to induce an action). The link relies on the fact that, apart from coercion, the only way to make someone do something is to change his beliefs [Castelfranchi, 96]. That is to say: if our goal is to induce an action, then we must also have the goal to induce a belief. From this perspective, argumentation is a resource for persuasion." (Guerini, Stock, and Zancanaro 2003, p. 2)

Guerini has proposed a framework that includes four key aspects (cognitive, social, emotive, and contextual) for persuasion mechanisms and has offered a schematic computational architecture. Guerini, Stock and Zancanaro have focused on the high-level planning part of this architecture, proposing a model that exploits meta-reasoning to account for the interaction between the four aspects of persuasion (Guerini, Stock, and Zancanaro 2003).

It is not necessary to attend only to present-day approaches. Specifically, in Francis Bacon's work we could find a very broad array of pragmatics and cognitive issues related to these aims. Francis Bacon, in "Of the Colours of Good and Evil," (1597) said:

*"In deliberatives, the point is, what is good, and what is evil; and of good, what is greater, and of evil, what is less. So that the persuader's labour is, to make things appear good or evil, and that in higher or lower degree: which, as it may be performed by true and solid reasons, so it may be represented also by colours, popularities, and circumstances; which are of such force, as they sway the ordinary judgment either of a weak man, or of a wise man, not fully and considerately attending and pondering the matter."*

In fact, Bacon is very clear in his opinionated considerations on rhetoric, but even so he offers us a very nice tool. *"Lastly, to make a true and safe judgment, nothing can be of greater use and defence to the mind, than the discovering and*

*reprehension of these colours, shewing in what cases they hold, and in what they deceive: which, as it cannot be done but out of a very universal knowledge of the nature of things, so, being performed, it so cleareth man's judgement and election, as it is the less apt to slide into any error."*

Bacon offers us "A TABLE of the colours or appearances of Good an Evil, and their degrees, as places of persuasion and dissuasion, and their several fallacies, and the elenches of them."

In that short work, he summarized a large part of the many traits of human cognitive capabilities, which we could currently understand, relating to natural language, as a cognitive technology. Even so, a very explicit idea of risk in arguing also appears: the personal responsibility of being engaged in an argumentative process.

The large group of fallacies that are collected in this paper by Francis Bacon deserves to be distinguished, mainly because, in some approaches to rhetoric and science, these fallacies were forgotten as useful tools to open some pathway to the truth.

To note just one example, there is a mechanism related to the tertium gaudens process, signalled by Bacon:

*"Cui ceteræ partes vel sectæ secundas unanimiter deferunt, cum singulæ principatum sibi vendicent melior reliquis videtur, nam primas quæque ex zelo videtur sumere, secundas autem ex vero et merito tribuere."*

[That which is unanimously given the second place by other factions or sects, when each gives the first place to itself, is seen to be better, since the first place is awarded out of zeal but the second out of truth and merit.]

Bacon explains this with several examples, in particular:

"So Cicero went about to prove the Sect of Academics which suspended all asseveration, for to be the best, for, saith he, ask a Stoic which philosophy is true, he will prefer his own. Then ask him which approacheth next the truth, he will confess the Academics. So deal with the Epicure that will scarce endure the Stoic to be in sight of him, as soon as he hath placed himself, he will place the Academics next him."

"So if a prince took divers competitors to a place, and examined them severally whom next themselves they would rathest commend, it were like the ablest man should have the most second votes."

“The fallax of this colour happeneth oft in respect of envy, for men are accustomed after themselves and their own faction to incline to them which are softest, and are least in their way, in despite and derogation of them that hold them hardest to it. So that this colour of meliority and pre-eminence is oft a sign of enervation and weakness.”

Some of these processes are called fallacies, but we must remember that we applied this name because, in a practical process, they lead to the obtention of different kinds of results, apparently without logical reasons. But mainly with Bacon’s development of the Elenches (refutations) of them, it is very clear that we are looking at procedures that, from another point of view, appear as several simple and frugal heuristics that we use in dealing with the real world. However this may be, we have called them fallacies because they usually are not deterministic processes.

What is going on? If and only if we are able to offer a single and deterministic solution because we already know that the agent is going to do just the action that we want, without any dependence on her beliefs or wishes, we do not need to exert coercion to get the agent to do whatever we want, but to produce a change of belief. In other situations, we need to exert some kind of coercion.

But all coercive strategies are, at the least, risky strategies and sometimes processes of uncertainty. For example, those who consider that refutation is a simple logical process are reasoning from a supposed total availability of information and individuals’ capabilities that would persuade people by the simple coercive force of correct logical arguments. However, in order to accept this result, we must at least adopt a model of individual that incorporates the behavioural acceptance of the consequences of its logic and only these consequences, as a rule of procedure. If we understand, instead, that there are decisive traits of refutation that are related to images of oneself and the reputation of others, the ways of thinking about these issues take on a very different point of view.

The strategy concept used by Thomas Schelling (Schelling 1980) is both significant and useful because the presentation of increasing threats, until the objective changes its behaviour, is a key feature of the mechanism of coercion, even of logical force.

We base our decisions on incomplete and flawed information, so when we opt for argument, it must be clear that we must use some stop rule and accept the

corresponding risks. Some kind of dissuasion appears in the argumentative process mainly if you use some kind of threat point within a bargaining process. The broad literature on bounded rationality offers a very useful manner of understanding this twofold process of refutation and dissuasion (Baron 1998; Barrota and Dascal 2005; Schelling 1980).

We will sustain the consideration of language as a cognitive technology (M. Dascal) to revise the possible strategic use of arguments (J. (Elster 1992) under conditions in which the same argumentative phase means accepting risks instead of other mechanisms of decision.

As Christina Bicchieri has said: "The possibility of using social norms in an explanatory or predictive role hinges upon developing a theory of how and under what circumstances people focus upon norms. Often norm compliance does not follow from intentions or plans, but is rather 'automatic'" (Bicchieri, Jeffrey, and Skyrms 1999) Bicchieri 2000).

A lot of experimental economic studies try to show some regularity in our behaviour that apparently goes beyond the rational economics model of human being. Specifically, the adoption of the norms of arguing could be the result of acting "under the control of schemata that are formed on the basis of repeated behaviour as well as other types of learning" (Bicchieri).

The schemata contain expected sequences of behaviour, telling us what to expect and how to behave in particular settings. Douglas Walton has analyzed the sunk cost fallacy, very common in economic studies, and he accounts for how this fallacy could appear as a strategic device:

"Consider the case of an electronics firm that buys equipment in order to have a strategic effect on its rivals. It makes this move to suggest that it is committed to serious efforts in a particular segment of the market, and that competing with it in this sector would not be profitable for the other firm. This tactical move could be called a strategy of 'sinking costs' for the purpose of deterring a competitor. Many other examples of using a strategy of sinking costs in negotiations are also cited by Elster (2000, p. 43). A union may make a threat by taking steps that indicate its commitment to a certain course of action to the management negotiators. These cases suggest that if you look at the argument of sunk costs in the context of a dialogue, like for example a negotiation, with more than one party involved, the argument could be seen as a rational strategy. It begins to seem less like a fallacy and more like a reasonable argument. Context of use seems to play



an important role in which way it goes.”(Walton 2002, p. 13)

What I mean is that the huge part of Francis Bacon’s work already quoted could also be understood as a group of reasonable arguments, more than simple fallacies. But the main movement is to take into account the relevance of the act of choice in choice itself. And this is relevant precisely when we understand human beings as limited agents.

Walton considers that the argumentation scheme for the sunk costs argument seems to be based on a notion of action commitment over time.

“The proponent of the argument commits herself to a certain action or a certain policy for action at time  $t1$ .

Let’s say this action or policy can be expressed in the form of a statement A. And then later, at time  $t2$ , she is confronted with the decision of whether to carry out this precommitment to A or not.

Reasons for or against either option could be given at  $t2$ . But one of these reasons would be the following argument: I am already committed to therefore given the choice between and not-A family: I should carry out A. In the case of the Ph.D. student, for example, she might reason as follows. I am already committed to the policy of working on my thesis, most especially because I have already sunk so much time and work into it. Therefore, given the choice between (a) quitting work on the thesis and going to law school, and (b) continuing to work on the thesis, the student, using the argument of sunk costs, goes for (b).” (Walton 2002, p. 17)

“Sunk cost” reasoning, precisely because it expresses an intertemporal commitment, at the same time shows a threat for the opposite agent. He knows that previous investments are demanding that the first agent remain in business, not only because of the rewards or deserved payoff, but also because this expresses the individual’s reputation, self-image and social reputation. So this procedure is better understood as an informational constraint, although it was one that caused difficulties in standard rational models. It could also be understood as a path-dependent process and one that helps convincing or dissuading strategies.

Dissuasion seems to be a non-oppositional complement, which reduces the risk of “omnipervasive-pervadent animosity” (C. Marras and Euli, 2006).

Dissuasion looks like skeptical arguments when it urges us to keep searching and not to accept the final explanation.

A big step towards pragmatics could be seen in the following sentences of Sextus Empiricus in which he quoted a very well-known epigram composed by Callimachus referring to Diodorus Cronos:

“Lo and behold how the daws on the rooftops tell us by croaking  
What things are conjoined, also how we shall live on.”

“For it belongs to the philosopher to explain that it is a tenet of Diodorus that nothing moves. For that which moves, moves either in the place where it is or in the place where it is not; but neither the first nor the second (is true); therefore nothing moves.” (Sextus Empiricus, *Against the Professors*, I. 309-310)

In formal terms:

$M \rightarrow L \vee N$

$\neg L \wedge \neg N$

Hence

$\neg M$

So, refutation has some relationship with dissuasion. First of all, there is the distinction made by Amartya Sen on several occasions between maximizing behaviour and non-volitional maximation because of the fundamental relevance of the act of choice, which has to be placed in a central position in analyzing maximizing behaviour (Sen 1997, p. 745); this becomes particularly pertinent when we consider that the user selects information, takes part in conversation and inevitably makes a decision. It is similar to saying that, however we like to interpret Grice’s maxims, it seems necessary to take into account such intentional aspects.

“A person’s preferences over comprehensive outcomes (including the choice process) have to be distinguished from the conditional preferences over culmination outcomes given the acts of choice.” (A. Sen 1997, p. 745)

In the natural sciences, maximization occurs without a deliberate “maximizer,” but when the choice is associated with some kind of responsibility, our ranking of outcomes can be changed. “Choice functions and preference relations may be parametrically influenced by specific features of the act of choice (including the identity of the chooser, the menu over which choice is being made, and the relation of the particular act to behavioural social norms that constrain particular social actions.” (p. 746)

Sen warns us that “Whenever the act of choice has significance,” the

comprehensive analysis of outcomes can have very extensive relevance for problems of economic, political and social behaviour.

I claim that the consideration of language as a cognitive device (instrument) compels us to consider that the act of choice has a decisive significance. For instance, research related to metacognition increasingly leads us to see this self-reference more clearly; the possibility of referring to it that is at the very heart of language is an essential property of language.

The problem is not only reduced to the importance of introducing the act of choice, the process of choice, in what is chosen, but it is, moreover, necessary to consider the act of choice as an inescapable act.

*“A chooser, who may have to balance conflicting considerations to arrive at a reflected judgment, may not, in many cases, be able to converge on a complete ordering when the point of decision comes. If there is no escape from choosing, a choice decision will have to be made even with incompleteness in ranking.”* (p. 746)

The question of dependent choice, including the act of choice, is clearly related to the definability of some binary relation in our natural languages (as Rubinstein has established in the first chapter of his *Economics and Language*), mainly because it leads us to an interpretation of certain forms of sequentiality that could be useful to a rational understanding of the relevance that frugal and simple heuristics could have in decision processes.

This possible connection between argumentation theory and bounded rationality, mainly in Gigerenzer/Selten's interpretation of Simon's works, finds a substantial fulcrum in some methodological and epistemological elements that have appeared in Amartya Sen's works, particularly in the following: Sen, A. (1993), Positional Objectivity,

*Philosophy & Public Affairs*, 22(2), 126-145, Sen, A. (1997), Maximization and the Act of Choice, *Econometrica: Journal of the Econometric Society*, 65(4), 745-779 and Sen, A. (1999), The Possibility of Social Choice, *American Economic Review*, 89(3), 349-378.

Again and again, Sen has explained the importance of taking into account the chooser's dependence and menu dependence in preference relations.

If  $P_i$  is the preference relation of person  $i$  as being conditional on chooser  $j$  and

the set  $S$  from which the choice is being made:  $P_i^{j,S}$ . Chooser dependence and menu dependence relate to the parametric variability of  $P_i$  with  $j$  and  $S$  respectively.

However, even more important is the idea of the menu dependence of preference, precisely what is ruled out by such assumptions as the WARP (weak axiom of revealed preference).

Even other weaker properties, such as the well-known  $\alpha$  and  $\tau$  properties (basic contraction and expansion consistency), which are necessary and sufficient for the binariness of choice functions over finite sets, are violated by such choices (p. 752).

It is possible to wonder whether binary relations are precisely a subset of the permissible preference relations. Whatever the case may be, they must be reflexive, that is, each alternative is seen to be as good as all the others. Thus, according to Sen, it may be possible to establish some very interesting consequences. First, a best alternative must also be maximal, but a maximal alternative need not be the best. In particular, this can occur when the set of the best or optimal choices is empty but the maximal set is not, however, empty. A classic example, related by Sen, is given by one very interesting interpretation of the story of Buridan's ass. "The ass could not rank the two haystacks and had an incomplete preference over this pair. It did not, therefore, have any optimal alternative. Both  $x$  and  $y$  were maximal- neither known to be worse than any of the other alternatives. In fact, since each was also decidedly better for the donkey than dying of starvation  $z$ , the case for a maximal choice is strong. Optimization being impossible here, I suppose we could "sell" the choice act of maximization with two slogans: (i) maximization can save your life, and (ii) only an ass will wait for optimisation." (p. 765)

I mean that if we connect the binary relation explicitly with the function of choice and its binariness, we obtain the pertinence to go with the contextual dependence of menu and it seems that, in the case of language, this kind of menu dependence is precisely one of the essential elements. Therefore, this basic question arises in optimality theories if they do not take care of the importance of distinguishing between optimization and volitional maximization.

In addition, the sequential order, with its uses in solving problems, is a well-

known device in bounded rationality. So sequential selection, definability, and the “language” that a decision maker uses to verbalize his preferences restrict the sets of preferences he may hold (Rubinstein, 2000, p. 55); this is evidence that we must include the act of choice in the set of alternatives.

The philosophical interest of this issue appears when we try to study the conceptual relationship between maximization, optimization and satisfaction.

Recently, Christoph Lumer (Lumer 2005) has presented some observations on the idea of optimality that could be a nice philosophical reenactment (Lumer, C.,2005). There are also some ideas that give more support to that reconsideration, for instance (Dascal 2002).

In a commentary to Ariel Rubinstein (2000), Johan van Benthem has made a series of precisions from the fields of logic and theory of language. One of the main observations is related to what kind of binary relations can be considered nuclear in natural language. Rubinstein upholds that linear orders (completeness, asymmetry and transitivity) (CAT) and tournaments (completeness and asymmetry) have some kind of special position in language. Van Benthem expresses serious doubts about this and says: “To me, the most obvious linguistic category of binary relation are *comparatives*.

They are so basic that language even has a systematic operation for building them: from ‘large’ to ‘larg-er’ (van Benthem 2000, 100). However, in my opinion, this question is so important that it goes beyond the first claims of Rubinstein’s book.

The issue of comparatives appears particularly interesting because of the following question: what we do when we proceed to make some kind of optimization? Accurately, we make a comparison.

The step from a comparison relation -and the use of comparatives- to a linear order relation seems a simple one for those sets where we know the cardinal, but it is related to other problems pertaining to the available information, to the presence of systematic ambiguities, to temporal limitations and to the inevitability of adopting decisions.

Simon explained this link as follows: “Because of the limits on their computing speeds and power, intelligent systems must use approximate methods. Optimality is beyond their capabilities; their rationality is bounded.” As Winograd and Flores maintain (quoted by Fiori, 2005), Simon does not contest the “rationalistic tradition”, but only the version that implies perfect knowledge, perfect foresight,

and optimizational criteria (Winograd and Flores, 1986, p. 22).

With regard to the problem of optimization as a criterion in the field of decision theory, it is convenient to remember that it has very strong similarities with problems of optimizations in science. The proposal that appears in Fermat's Principle or the Principle of Least Action could accurately be brought up here.

The path of a ray of light connecting two points is the one for which the time of transit, not the length, is a minimum. At the time that Fermat developed this principle, his justification was more mystical than scientific. The statement that nature is essentially lazy, and these rays are simply doing the least possible work can summarize his justification.

Today it is usually formulated in terms of a minimization of the time along a curve through space.

The results developed by Sen show that we must attend to maximality because it has a wider scope than optimality, and the difference between maximal choice and optimal choice could be substantial, whether or not there is a non-empty optimal set.

Possibly the most important thing to indicate here for debate could be that, although maximization can be matched by an "as if" optimization exercise, this does not reduce the importance of broadening the focus from optimization to maximization (Sen 1997, 766-777).

It can be extremely enlightening to see how Amartya Sen links the notion of maximization closely to the "important and influential concept of satisficing developed by Herbert Simon, which has often been seen as nonmaximizing behaviour."

Specifically, Sen insists, "The discussion of satisficing versus maximizing has been somewhat deflected by the tendency to identify maximization with optimisation."

With maximization, it is possible to go into the argumentative process and to incorporate the features of the participants as bounded intentional agents. Even strategic movements are suited as risky procedures in "the dynamics of deliberation."

## NOTES

**[i]** I gratefully acknowledge founding support from the Spanish Research Council (MEC-SEUI), Research Project HUM2005-00365.

**[ii]** "Bounded Rationality in Dialogic Games" (2002, Lugano) started with a quote

from Lipman: "I don't know how we can mathematically represent vague knowledge, but I believe that this is what is called for... It is not that people have a precise view of the world but communicate it vaguely; instead, they have a vague view of the world. I know no model which formalizes this" (Lipman 2001, pp. 11-12).

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