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ALTERITY AND INTERSUBJECTIVITY IN THE MIDST OF MATHEMATICS AND NETWORKS

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Summary:

This paper discusses the question about alterity and intersubjectivity within the frame of informational and computational systems. After presenting a general philosophical survey of how and why the problem about intersubjectivity arose in history, it shows the current spectrum of the relationship between the I and the other. A special importance is given to mathematics and networks where (inter)subjectivity is modeled and simulated. At the end several questions are asked which shed new lights about intersubjectivity, our culture and philosophy.

Key Words:

Complex networks, control, complexity, social philosophy, political philosophy, strategy

Introduction

It is the merit of phenomenological philosophy in general, and E. Husserl's philosophy in particular to have discovered intersubjectivity. Here I want to briefly trace the history of modern philosophy throughout which we are led to Husserl's discovery of the other, i.e. alterity and intersubjectivity. After that, I want to argue that in the context of complex networks intersubjectivity the encounter between the I and the other becomes a matter of control. I criticize such a fact and I claim that alterity can and should be viewed as the greatest challenge ever posed to mankind. The guideline to my study is a philosophy of technology and of complex systems.

Brief history that led to the discovery of intersubjectivity

It is well known that modern philosophy arises thanks to Descartes's discovery of the I that means I think therefore I am. The Cartesian "I think" properly means so much so as I perceive, I remember, I feel, I decide, and I want. To be sure, the modern discovery of the I was a revolutionary act vis-à-vis the medieval absence or subrogation of the I in terms of its belonging to casts, classes, institutions, or stances, namely, the church, the nobility, the people, and the like. Crossing through the Quattrocento, the discovery or the invention of the I meant the discovery of the human body. Such was notoriously the case shown by Rubens: human body and nakedness. Art, when taken in its largest sense, incarnated such a revolution by inventing perspective, thanks by Brunelleschi. Since then the world is going to have a certain point of view, which refers to the centrality of the I. Later philosophy will claim and translate this as: the centrality of the subject.

Descartes' revolution goes hand in hand with the Copernican revolution that places a man in the center of creation, whether in an astronomical and astrophysical sense or in a truly mathematical or philosophical sense. The latter will be expressed by the invention of the Cartesian plane in which the point zero origin of the x-axis and of the y-axis refers to the very "I think" postulated by Descartes in the Third Metaphysical Meditation or else also in the third part of the *Method*.

However, The consequence of the Cartesian revolution, the cost of it if you wish was very high, namely, it led by the same tenure to the dualism *res cogitans – res extensa*, one of the strongest modes of dualism in the history of Western civilization.

I want to argue here that the further history of modern philosophy as it is well known, especially by philosophers, is the explicit or tacit effort to fill the gap between the reflective I and the body.

After Descartes, the history that leads to Kant, passing directly or indirectly through such thinkers and philosophers such as Spinoza, Malebranche, Hume, Locke or Berkeley, consists basically in the stressing of the ways, properties and capabilities of the I, or else also in the effort to work on the complementary of the Cartesian ego cogito. But it is in Kant's philosophy where that history knows a true radical inflection.

It can safely be said that Kant's philosophy is based on the paragraph No. 16 of the *Kritik der reinen Vernunft* in which it is said: "The I think must accompany all my representations" (*Das Ich denke muss alle meine Vorstellungen begleiten können*). In other words, that means that the I is a logical function that unites the experiences and gives meaning to the world. What the I does is simply giving a coherence to the manifold of representations that cross, surround and try to determine the I. Thanks to that logical function the world appears ordered, the experience can be grasped in terms of general forms (*Gestalt*), and nature does not overwhelm the subject. The "I think" is hence a true Archimedic point for all real and possible considerations.

The real roots of the "I think" that must accompany all our representations are three, according to Kant: the synthesis of imagination, the synthesis of representation, and the

synthesis of memory. After pointing to that capacity of synthesis the I accomplishes, claims Kant, the real and final roots of the I lie “in the profundity of the human soul”.

In this point, we can claim, the Cartesian I finds both a pole to earth, so to speak, and a pole to air. The latter can be seen as the practical consequences and entailments of the I think, which will be the subject of the *Kritik der praktischen Vernunft* as well as of the *Grundrissen der Metaphysik der Sitten*. As for the former, it is what sets the ground to the philosophy to come after Kant.

It was indeed Hegel’s task to show that the “I think” is not a mere logical function but, rather that it –he or she- has a family, it belongs to society and even to a special form of society, namely civil society, and that it is subject to the state and the state-like reasons, norms and stance. This all was achieved by Hegel in his *Philosophy of Law* which was to be complimented and developed in/by Hegel’s *Lectures in the Philosophy of History*. In this book Hegel strives to show that the state, which is the real accomplishment of the family and of society, realizes itself in the realm of universal history. The core of universal history is the very history of liberty or freedom in its threefold stage: One is free, at the beginning of the times, going to the stage where some are free to finally arrive in the modern times at the stage where all are free or everyone is free. As such we face the end of history, claims Hegel, at least in the mode of the concept of freedom. What remains to be seen or accomplished is just the very practical or factual realization that everyone is to be free, or else also that all are to be free.

After Hegel, Marx shows that what really defines the I is not to be found within himself or herself, but in its encounter with other(s) through work. Hence, the I does not just think or cogito but foremost it works. The story of the I is truly the story of his working, i.e. producing goods, merchandises, commodities, and wealth.

The problem lies however in the very fact that due to the relationship to the means of production, the I finds himself in the working and the products produced, or else it does not identify or recognize himself or herself neither in that relationship nor in the products produced. Hence, he or she is alienated. The fight or struggle begins therefore to either free himself or herself from those social, political and economical relationships that impede a true recognition of himself, or else also to supersede those who confine him to an inhuman life. Necessarily the problem becomes a political if not a historical one. Reason, as it was pointed out by Marcuse, becomes revolution.

The philosophy after Marx can be pursued through such philosophers as Schopenhauer and Nietzsche, in the first place. Schopenhauer plays an important place in this history because he is the first to displace the reflective nature of the I. For Schopenhauer the I is but will and representation, not just thought and perception. Being will, the I affirms himself or herself via bodily acts, or even emotional stances. But it is Nietzsche who really understand Schopenhauer and by the same tenure overcomes him.

According to Nietzsche the story of the I can be abridged as the transition from camel to lion to childhood, in *Also sprach Zarathustra*. By that metaphor Nietzsche stresses that

man's nature is not just confined to the realm of norms, oughts, and rules (= the "Thou must.."), but neither it is truly represented by willingness, wants and desires. Instead, the real nature of the I is condensed in the will to live of childhood. Over against a will to nothing or a will to otherness, the very nature of mankind is to be seen in the will to live that wants nothing else by to live – without any (external) *telos* or without any value regardless of its foundation, its justification or its meaning and usefulness.

Freud is to be placed next thanks to his acknowledgement of the very pulse (*Trieb*) that characterizes human beings: a force to live and love (eros) and a force to die and kill (tanatos). Language and culture, reason and science just hide these forces or help them act in a variety of forms. Mankind just cares for her own pleasure and when pleasure is extremely repressed neurosis, psychosis and death can happen.

Being as it might be, however, so far human beings are mute. We owe to Wittgenstein the discovery that human beings talk, they carry out various speech acts and speech games. It all depends on which kind of speech game one is playing or on the circumstance. We speak and we talk, but at the end we all must reckon that of what we cannot talk about, we better keep silence. Man's capability to speak and talk opens a wide perspective of society, nature and the world. For the first time (perhaps since Plato's *Lysis*) we can safely say that very often in life we solve the problems of the world in terms of problems of language.

If this story is meaningful, then the set is ready for the next accomplishment where we encounter Husserl. Thanks to Husserl for the first time in history human beings are placed in the everyday world. Such a world is conceptually conceived as the life-world (*Lebenswelt*), where all other actions and stances root and find meaning. Moreover, it is the absence of reference to the life-world which generates crises, boredom, and extinction. The life-world is therefore the real stance where the I is rooted and where all meaning finds its root and significance.

When translated in real everyday life, Husserl sets the ground to a manifold of living experiences, many of them even anonymous such as coiffing, eating, loving and hating, dressing and producing waste and garbage, and the like. We can even dare that without Husserl's discovery of the life-world, such a revolution as the *École des Annales* could never had taken place. In other words, we could have never imagined that the Romans or the Egiptians, the Mayans or the Aztecan had an everyday-life.

The discovery of everyday life by Husserl is complementary of Husserls' largest and most significance work, namely, intersubjectivity. The other is discovered via four ways or modes, thus: a) by *Einfühlung* which designates the capacity to introject the other in terms of sensibility, subjectivity, emotionality, and history; b) by placing oneself in the other's place; c) by living a bodily experience, and d) by sharing one same space with him or her.

Next to Husserl in this story we must place Sartre. Sartre's philosophy shows for the first time that we first exist and then we think, if at all. Moreover, we must not first

think in order to be. This is recognized for the first time when going back to Kant's above mentioned paragraph Sartre asks: "The I think must accompany all my representations, but what if it does not accompany them?" (*La transcendance de l'ego*). The superposition of reflection over existence is promptly recognized by Sartre as "bad faith" (*la mauvaise foi*), which is not a mere moral happening, but an ontological structure, namely that structure by which one denies one's factual situation, or also one escapes a situation by faking or playing a role.

As the accomplishment an final chapter of modern philosophy, we encounter Habermas. We owe to Habermas the recognition that the critique of knowledge is only possible as the critique of society. As a consequence, we must face and deal with the dialectic between knowledge and interest. After this, Habermas quits "pure" philosophy and affirms of himself as a sociologist. The subsequent history of philosophy will take two main roads: one marked by sociology in its broadest sense, and the other as the critique of modernity and the emergence of postmodernity. I must stop here, for the sake of the goal of this paper.

When intersubjectivity meets mathematics: strategy

This story about intersubjectivity certainly does not stop here. A rigorous account of the origins and development of alterity needs include the contributions made by E. Lévinas concerning the relevance and singularity of the other's glance: *le regard de l'autre*, and through this the encounter with the face of the other. I do not exaggerate at all if I add to the previous account the fact that thanks to Lévinas for the first time the other has a face in the history of the Western world. Previously to Levinas, the other was a faceless subjectivity, with no regard, no glance and, furthermore, no wrinkles, smile, laugh and expressions. If we extrapolate this to robotics and artificial intelligence we can easily recognize the technical difficulty of figuring out a robot with human-like expressions. In the absence of them, we barely have mechanical figures. Much more humane can and should be taken into account some animals' faces and glances – where we can guess a kind of subjectivity of not a soul or something of the kind.

Being as it might be, the case is that the problem of the other technically known in philosophical jargon as intersubjectivity and alterity, can be presented in two ways, thus:

- i) On the one hand, the problem concerns the charge of subjectivity and the encounter with somebody very much alike ourselves. In this research line we must place without any doubt the SETI program (Search for Extra-Terrestrial Intelligence), exo-biology and Earth-formation. So far we look for some form of life that may correspond to our own expectations.
- ii) On the other hand, the problem has to do with an encounter and, therefore, a complementation of ourselves, if not an extension or a similarity or identity of or with ourselves. In other others, the question has never been raised about a subjectivity that exceeds, overcomes or overwhelms the human image of subjectivity and humanity. Implicitly or

by definition the question has never been posed in terms of an empty set in the union or intersection with mankind. Such a possibility simply lies beyond normal human imagination.

Plato's *Symposium* is to be placed in the very philosophical origin of the problem concerning alterity and intersubjectivity. While discussing the nature and experience of love the question arises concerning: who is the other? The structure of the problem is the following:

When A loves B, there are three times and/or experiences that fulfill the question:

- i) In time x A ignores B, and B does not stand out particularly before A; it is as if B does not exist for A, and it does certainly not exist;
- ii) In time x' A falls in love with B so much so that A's being is B and B fully embodies A's thoughts, feelings, and concerns. We can safely say that A's life is B;
- iii) In time x'', A is not in love with B for whatever reason we might consider. Moreover, A does not want to know anything about B and A rejects any memory or association with B.

As a consequence, the question raises: who really is B? Is it the person considered in time x, the one in time x' or in time x''. Moreover, if we stress the problem, who is truly A? Is it the one existing in time x, the one in time x' or that one in time x''.

As it normally happens, the question finds no answer in Plato's work. It remains open and the reader is abandoned with the problem towards the end of the book or the dialogue.

The way ancient Greeks conceived of intersubjectivity was as an experience of love in the Archaic period and later on especially during the Hellenistic period as friendship, particularly in Aristotle. It is by this tenure that some aristotelian philosophers like to claim that intersubjectivity was discovered early on by Aristotle. That, however, is a serious historic-philosophical mistake.

After the Greeks, the Middle Age, the *Quattrocento* and later on Modernity barely were confronted with the question about intersubjectivity or alterity. It becomes a mayor problem with the philosophical, scientific, cultural, social, and political events of the 20th century until our days.

In the philosophical and scientific story of the 20th century, the problem goes as follows:

In the backstage of Sartre's philosophy there is one novel of significance regarding the problem of the other. It is H. Barbusse's *L'Enfer*. To be sure, our inferno is, according to Barbusse, the other; his or her glance precisely. However, literature has never been in the forefront of cultural history during the life of the 20th century.

The scientific endeavor to deal with the other finds its departure point with game theory firstly and then also with the theory of rational choice. The other is considered in strategic terms deciding the certainty, the uncertainty or the risk of one's decisions. This frame will be further developed with the theory of collective action. Crossing the three theories we find the problem of the free-rider and the workings with cooperative and non-cooperative games. The three theories compound the hard-core of social sciences and deeply entail a mathematical approach of the problem.

In a few words: the other is considered in terms of cooperative or non-cooperative strategies. The other is considered basically in terms of his or her rationality and this rationality is subject to a matrix of individual or social choices over selfishness or altruism. The study is carried out on terms of a certain mathematization which enables a better comprehension of the strategies faced or avoided by the other, whether in algebraic terms, or in mere arithmetic values. To be sure, the mathematics here is not really a hard stuff.

There is, nonetheless, a conspicuous scientific, cultural and even philosophical stance that underlies the whole problem of intersubjectivity in any respect, whether social, philosophical, political, economical, anthropological or linguistic. I am thinking of the role played by computers and, hence, by computing science and mathematics.

Alterity, mathematics, control and networks

It has been claimed that the first half of the 20th century was physical, and the second half biological. By this it is said that the century begins with the discoveries made already in 1900 by M. Plack, then the wonderful year of 1905 by A. Einstein, and later on the development of quantum physics in the 1920s by physicists like Bohr, Born, Dirac, de Broglie, Heisenberg, Schrödinger. This half of century ended with the Manhattan Project and its awful and disastrous consequences: the bombs dropped in Hiroshima and Nakasaki, leading the road to atomic physics.

As for the second half the general picture departs with the discovery of the structure of the DNA by Watson and Crick, and leads to biotechnology, genetic engineering, cloning, up to the Human Genome Project first identified in 2000 and made public by T. Blair and B. Clinton in a world conference.

In a more dramatic view, it has been said that the First World War was chemical, the Second World War was physical and the Third World War will be, if it ever happens at all, mathematical. By this we can easily see the kind of science that lies underneath or behind every world war, whether real or fictitious.

As a consequence, we can safely infer, the 21st century will be mathematical. If you wish, it will be computing-mathematical, but since mathematics is the basic science behind computing science, it is not forced to assess that the leading science of the present and the coming and foreseeable future will be mathematics in its broadest, largest and deepest sense.

The development of computing systems went hand in hand with a deep, serious and difficult work around encryption, decryption, deciphering, encoding, decoding. It all happen during the Second World War and the key figure in this story was doubtless A. Turing.

Computing, after all, is about processing information. Such is the basic idea behind the “machines that can think”, to refer to Turing’s original paper, or also to the general purpose machines. Information, though, is made out of data; these are the bricks out of which the whole building is set up.

Yet, on earth, the most important source of all concerning information and data are human beings. Thus as it happens, the basic unit of information processing become human beings, i.e. their behaviors, tastes, preferences, actions, and relationships. As a consequence, we have become both a source and a target for information.

Computing engineers and mathematicians turn bits of our lives into symbols. We live in the age of triumphant symbolic language, due precisely to the ubiquity of informational systems and the crossover of data bases that gather as much and as variable information as possible. In this context, the other is considered as an object to be controlled. There is no real encounter, and the mystery of subjectivity is vanished by a series of numbers containing our basic information or referring to other sources, usually big data bases were our most inner information has been gathered. Thanks to the processing of data, they come to know from the tooth paste we use, to the kind of wines we drink, from the frequency of our purchases to our voids, gaps and needs, from the places we often go to the diseases we have. To be sure, the other are but we ourselves – vis-à-vis the mathematicians, statisticians and experts in information and computing systems who operate the data we are, the date we incarnate, the date we have become.

What the state or the establishment simply needs is to cross several data bases and there we are: the outcome of our existence. Relying on those data they create patterns about ourselves, we are ranked in terms of colors, letters or ciphers that denote a degree of security, a degree of prediction, a degree and mode of a set of preferences and life styles.

We are witnessing the mathematical modeling of humanity at a large scale in the frame of globalization, the information society and the emergence of knowledge society. We can be located at any moment by just crossing a few variables. Algorithms create patterns, sets, and dimensions as flexible as our lives go on, and they trespass any kind of boundaries or disciplines. If we wish and have the expertise enough or if we have the time or we are given the task we can access the other at any time or circumstance given a certain type of technology.

As a matter of fact, our e-mails, faxes, phone calls can be controlled without we realizing it. At work in a company, a university or in any public office, it is euphemistically called “technological auditing”, but it better works in a larger scale through the various IPS we use. Big networks such as Eschelon, Enfopol, Frenchelon,

Sorm, Sato 3, or alternatives or critiques to these such as Sophos, are the engines. Any conversation can be captured, seized, registered.

Therefore, we do not go to encounter other, we have him or her as a sheer set of data. Subjectivity plays no role in such a frame or stage. All that matters is the confidence on the algorithms. Trustworthiness plays a role only in a local level, for at a larger scale it is replaced by accuracy, memory, and reliability on the data bases.

Such a general picture, though, should not give the impression of a rejection of technology or science of any kind. On the contrary, I argue that any real philosophical appraisal of intersubjectivity must be framed, so to speak, within this new context in which informational, computational and mathematical systems that shape and articulate our current existence. Such a consideration has never been a subject of reflection by philosophers, as it is known so far.

One the most interesting fields nowadays is stochastic analysis, which is the mathematics that attempts to tie predictions to random events. And the most random event on earth are individuals. Taken as sets, individuals become more standardized and subject to probability analysis and more accurate predictions. The higher we go from individuals to families, parties, churches, companies, and the likes up to cultures, the more predictable they become. Such a characteristic has become the subject of a particular science, namely complex networks.

Stochastic analysis works in a variety of ways: it creates topologies, it knows very well how to elaborate graphs (and di-graphs, and tri-graphs, and so on), it depicts sets and subsets, and at the end it allows the construction of very useful networks and of maps, whether linear, quadratic or non-linear. The mathematics underlying stochasticity are highly refined and abstract and include equations and formulas that stand beyond the reach of the average culture of the “man in the street”. To introduce them here, and work a bit with them would make necessary a different paper, yet.

But who really is/are “they”?

I wish to conclude here we some quickly and fast remarks – a weird way to conclude, to be sure.

The first remark has to do with the nature of philosophy in the frame of information society and knowledge society at large where mathematics, networks and computational systems play a key role. This is particularly true when dealing with one of the most basic and classical problems in philosophy that was previously considered in mere ethical, epistemological or metaphysical terms. The current trends and tendencies force philosophy to open up magnificently its scope and concerns. I claim that philosophy will not just be transformed by radically enriched when opening up its heart and mind to matters and fields that were never before suspected or appraised by technical or professional philosophers.

For most of the history the other was a question of *encounter* – and meaning. Only once was the problem about the *discovery* of the other (T. Todorov, *La découverte de l'Amérique*). Philosophers were never aware of such a conspicuous matter; only some semiologists, historians, sociologists, and anthropologists were able to realize the importance of the discovery of another I different from oneself. Perhaps the only serious exception among philosophers was Voltaire – but the official history of culture in general and the history of philosophy, in particular, has never been really fond of Voltaire.

In the age of mathematics *and* networks (and this is just a way of speaking about the current science, technology, culture and, I claim, philosophy) the other is subject not to encounter and discovery but to control and prediction. The number of degrees of freedom corresponds exactly to the number of patterns and sets of data the system as a whole and the various systems have about us.

The aim here is not at criticizing algorithms of any kind. Most fundamentally philosophy is – at least partially – about *realizing* about one's existence, one's conditions and facticity, one's limits or possibilities of transcendence. *Realizing* is an act, it has been claimed, or also a process, it has been said; it can be achieved via dialogue and debate or through personal meditation or methodical skepticism. It concerns only one's life or it can also extend to other's lives and possibilities. In any case, whether a limit situation or a matter of pleasure and laugh, realizing one's own existing conditions opens up new horizons and shed new lights into things in general.

The question concerning the discovery, the encounter *and* the control of the other(s) is a philosophical as well as a political, a religious as well as moral, a social as well as an economical, an anthropological as well as military problem and concern - especially when the other comes to be my neighbor, someone from my family, my friend – or me myself.

Therefore, in the frame of control and prediction of the other/myself via a set of data and through various not always public data bases that control is carried out as a modeling and simulation of both one's reality and one's possibilities. To be sure, there is no other as such anymore – since we all in various degrees are subject to algorithms justified by one system or the other (health system, airplane companies, supermarket and malls, telephone company, the financial or the security systems, and the like). The very variety, i.e. depth and width of the data, the modeling and simulation – it all depends either on the concern of the agency or system or also on one's own actions, decisions, mobility and moves.

There is no system in general or abstract. Rather, it is compound of a series of sub-systems. They vary from financial and banks system to supermarkets and malls, to security agencies to health system, to educational to television-phone-and-internet system. There are a variety of frontiers and mobility among them, of communications and crossing, interrelation and dependencies among them. Once again, it all depends on the aim, the goal or the target.

Finally, are we truly what those data bases claim to have and model – are we truly them or it? That is, are we truly what the output of a data base assesses and models? For most of the systems considered we truly are “it”, no question about that.

The question remains open about what we can do after realizing – what the above fresco depicts roughly. For philosophy is certainly not just a matter of realization but foremost also about what we do with or after what we realize – in one way or another. That, I claim, is the most agonistic question of all.

Bibliography

Albin, P. S., (1998). *Barriers and Bound Rationality. Essays on Economic Complexity and Dynamics in Interactive Systems*. Princeton, NJ: Princeton University Press

Baker, S., (2008). *The Numerati. How They'll Get My Number and Yours*. London: Jonathan Cape

Barrat, A., Barthélemy, M., Vespignani, A., (2008). *Dynamical Processes on Complex Networks*. Cambridge: Cambridge University Press

Berger, P. L., and Luckmann, Th., (1966). *The Social Construction of Reality. A Treatise in the Sociology of Knowledge*. Anchor Press

Bicchieri, C., (1997). *Rationality and Coordination*. Cambridge: Cambridge University Press

Bogetoft, P., et al., (2008). *Multiparty Computation Goes Live*. Available at: <http://eprint.iacr.org/2008/068>

Clarke, R., (1995). “Computer Matching by Government Agencies: the Failure of Cost/Benefit Analysis as a Control Mechanism”, in: *Information Infrastructure and Policy*, Vol. 4, No. 1, 29-65

Dawes, R. M., (1988). *Rational Choice in an Uncertain World*. Hartcourt Brace College Publishers

Elster, J., and Hylland, A., (Eds.), (1992). *Foundations of Social Choice Theory*. Cambridge: Cambridge University Press

Green, D. P., Shapiro, I., (1994). *Pathologies of Rational Choice Theory. A Critique of Applications in Political Science*. New Haven and London: Yale University Press

Hardin, R., (1982). *Collective Action*. Baltimore and London: Resources for the Future. The Johns Hopkins University Press

Hargreaves Heap, S., and Varoufakis, Y., (1995). *Game Theory. A Critical Introduction*. London and New York: Routledge

- Hargreaves Heap, S., Hollis, M., Lyons, B., Sugden, R., and Weale, A., (1997). *The theory of Rational Choice. A Critical Guide*. Oxford/Cambridge, MA: Blackwell
- Husserl, E., (1973). *Zur Phänomenologie der Intersubjektivität. Texte aus dem Nachlass*. Erster Teil (1905-1920). *Husserliana XIII*. Martinus Nijhoff
- Husserl, E., (1973). *Zur Phänomenologie der Intersubjektivität. Texte aus dem Nachlass*. (Zweiter Teil (1921-1928)). *Husserliana XIV*. Martinus Nijhoff
- Husserl, E., (1973). *Zur Phänomenologie der Intersubjektivität. Texte aus dem Nachlass*. (Dritter Teil (1929-1935)). *Husserliana XV*. Martinus Nijhoff
- Katz, J., and Lindell, Ch., (2007). *Introduction to Modern Cryptography*. Chapman and Hall/CRC. First chapter available in: www.SK.imd.edu/~jkatz/imc.html
- Kozlowski, R., (1991). *Die Aporien der Intersubjektivität. Eine Auseinandersetzung mit Edmund Husserls Intersubjektivitätstheorie*. Königshausen & Neumann
- Levi, I., (1990). *Hard Choices. Decision Making Under Unresolved Conflict*. Cambridge: Cambridge University Press
- Lewis, H. W., (1997). *Why Flip as Coin? The Art and Science of Good Decisions*. John Wiley & Sons, Inc.
- Loewenstein, G. and Elster, J., (Eds.), (1992). *Choice over Time*. New York: Russell Sage Foundation
- Maldonado, C. E., (1998) “Teoría de la decisión racional. En diálogo con las ciencias sociales”, en *Cuadernos de Administración*, No. 20 (Abril), Universidad Javeriana, pp. 101-118
- Maldonado, C. E., (2000) *Sociedad civil, racionalidad colectiva y acción colectiva*, Bogotá, Ed. Universidad Libre, Colección “Filosofía y Política”, pp. 1-95
- Maldonado, C. E., (2001). “Irracionalidad y decisión colectiva: formulación de un problema de la filosofía de las ciencias sociales”, en: M. Vega, C.E. Maldonado, A. Marcos (Coordinadores), *Racionalidad científica y racionalidad humana. Tendiendo puentes entre ciencia y sociedad*. Valladolid: Ed. Universidad de Valladolid/Universidad El Bosque, pp. 107-118
- Maldonado, C. E., (2009a). *Filosofia Societatii Civilel*. Bucarest: Editura Bastion
- Maldonado, C. E., (2009b). “Una nota sobre criptografía y complejidad”, in *Innovar* (paper accepted, in print)
- Mérö, L., (1998). *Moral Calculations. Game Theory, Logic, and Human Frailty*. New York: Copernicus

- Moser, P. K., (Ed.), (1990). *Rationality in Action. Contemporary Approaches*. Cambridge University Press
- Ostrom, E., (1995). *Governing the Commons. The Evolution of Institutions for Collective Action*. Cambridge: Cambridge University Press
- Revel, J., (Sous la direction de), (1996). *Jeux d'Échelles. La micro-analyse à l'expérience*. Gallimard/Le Seuil
- Sandler, T., (1992). *Collective Action. Theory and Applications*. Ann Arbor: The University of Michigan Press
- Schelling, T. C., (1980). *The Strategy of Conflict*. Cambridge, MA/London: Harvard University
- Schmidtz, D., (1995). *Rational Choice and Moral Agency*. Princeton, NJ: Princeton University Press
- Schutz, A., (1982). *The Problem of Social Reality. Collected Papers 1*. The Hague: Martinus Nijhoff
- Schweers Cook, K., and Levi, M., (Eds.), (1990). *The Limits of Rationality*. Chicago and London: The University of Chicago Press
- Searle, J. R., (1995). *The Construction of Social Reality*. New York: The Free Press
- Simon, H. A., (1983). *Reason in Human Affairs*. Stanford, California: Stanford University Press
- Todorov T., (1982). *La conquête de l'Amérique. La question de l'autre*. Paris: Seuil