Pragmaticism Revisited:
Co-evolution and the Methodology of Social Sciences

Pragmaticismo Revisitado: Co-evolução e a Metodologia das Ciências Sociais

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Abstract: I propose a reinterpretation of Peirce's theory of pragmaticism which sees it to cater a general methodological approach, as well as a historical counterpoint, to a multiplicity of issues arising in contemporary social and behavioural sciences. This interpretation deflects methodological individualism but integrates co-evolution, abduction and triadic forms of emergence into it. It follows that pragmaticism is the methodologically pluralistic theory while the pragmatism of Peirce's contemporaries becomes its degenerated, one-world offshoot.

Keywords: Peirce. Pragmaticism. Methodology of the Social Sciences. Evolution. Abduction. Pluralism.

Resumo: *Proponho uma releitura da teoria do pragmaticismo de Peirce, vendo-a como uma abordagem metodológica geral, bem como um contraponto histórico para uma multiplicidade de temas que surgem nas ciências sociais e comportamentais contemporâneas. Esta interpretação desvia o individualismo metodológico, mas o integra à co-evolução, abdução e formas triádicas que dele emergem. Segue-se que o pragmaticismo é a teoria metodologicamente pluralista, enquanto o pragmatismo dos contemporâneos de Peirce se torna seu desdobramento mundial degenerado.*

Palavras-chave: *Peirce. Pragmaticismo. Metodologia das Ciências Sociais. Evolução. Abdução. Pluralismo.*

Introduction

Contrary to the widespread belief, Peirce's pragmaticism is not restricted to delivering only a theory of the meaning of intellectual concepts, signs and generalities, if by that we mean being engaged solely in conceptual, semiotic or logical analysis. True, Peirce himself stated that "pragmaticism […] is a theory of logical analysis" (CP 6.490, 1908, "Neglected Argument for the Reality of God"). He does describe it as a method that makes or ought to make "no pretension to throwing positive light on any problem.

It is merely a logical maxim for laying the dust of present problems, and thus enabling us to discern what pertinent facts the phenomena may present" (MS 1463).

But Peirce is far too modest here. What he describes is not the be-all and end-all of pragmaticism but rather its beginning point. Importantly, he takes the value of pragmaticism to be in that method's capacity to trace the intellectual purports and meanings of signs to "conceptions of deliberate conduct" (CP 5.442, "Issues of Pragmaticism"). Conceptual analysis or logical investigation of various kinds of semiotic competences that takes place in, say, communicative or social action, ought to be such that could conceivably lead to certain *types* of action. In Peirce's words, they should lead to "conceived conditional resolutions". The resolutions come in the form of conditional propositions which are "of the ultimate nature of meaning" (CP 5.453). Or, as I shall argue, the analysis should lead to something like general policy recommendations concerning action.

What I thus suggest to do is to continue to interpret pragmaticism along the lines drafted by Peirce while at the same time taking into account relevant factors which Peirce could not have done. The entire field of social sciences is of a more recent origin. Yet the germs of solutions may derive from the past and from Peirce's kitchen.[1] This does not oblige us to extend Peirce's thought towards what his contemporaries attempted, either, namely to broaden the range of application of pragmatism. That would be going too far. We can stay entirely within the sensible limits set out by Peirce and yet use our current knowledge to understand the nature of his thought better than was possible in his own times.

I outline a reinterpretation that sees pragmaticism to cater a general methodological approach, as well as a historical counterpoint, to a multiplicity of issues arising in contemporary social and behavioural sciences. As in pragmaticism or in the theory of signs there is nothing of that shopworn Snowian two cultures, my reinterpretation really concerns the nature of scientific methodology and discovery in general. I therefore do not encourage an extension of the area of application but rather a return to the original meaning, with a view of what we now know about the relevant issues. For the most part, I focus on the methodology of social and behavioural sciences, however.

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1   Peirce discussed the scientific role of sociology in MS 1496, "Notes on Ross", including the applicability of analogical reasoning in comparing "social facts" with other kinds of facts: "But an argument from mere similarity, like those under consideration is a pure Abduction and as such concludes in the interrogative mood, only. […] It is necessary to know what is meant by a social group. So far as I know it has not been intelligibly defined by any writer, and certainly is not defined in [Ross's] book. It is odd that three comrades should make a group, but two not. For the essential relation between members of a group is the intercommunication of ideas. Now only two persons are essential to dialogue". He goes on to insist "that no better definition of that conception [a social group] is possible than that a social group is a collection of persons psychically influencing one another to collective action". Peirce ponders on the question of whether there are properties of social groups not found among individuals, and states, "there is no reasoning or self-control" taking place in mobs, nothing to be called a "purpose", rather the mob's behaviour is automatic according to its first objective.

I. Is a Unification of the Social Sciences Conceivable?

The common concern in social and behavioural sciences has for long been how to deal with decision-making and strategic interaction. As pragmaticism is about "conceived conditional resolutions" and "conceptions of deliberate conduct", the contemporary position seems quite promising. Unfortunately, the individual disciplines, among them sociology, psychology, economics, anthropology, cognitive sciences and even biology tend to hypothesize on those concerns in a mutually incompatible fashion, and little has been achieved by way of methodological integration across the diverse fields (GINTIS, 2010).

Yet explanations of complex phenomena ought not to be compartmentalized according to disciplinary boundaries. Markets behave irrationally, actions of organisms and agents are constrained by social norms and selection pressures, and co-evolution of ontogenetic development and structural organization has largely supplanted the modern synthesis in the theory of evolution. However, the real impact of these developments has not yet been widely recognized.

The question to be asked therefore is, can we conceive of a common methodology that is detailed enough not to compromise the explanatory efficiency, yet capable of deflecting the dogmas of social sciences such as the still-prevailing *methodological individualism*? It is easy to see that pragmaticism does not subscribe to it. But why, that is our question. Could pragmaticism present itself as a candidate for a future integrative theory?

II. Farewell to Methodological Individualism

It may no longer be realistic to group all the various disciplines of the social and behavioural sciences under one unifying umbrella. To avoid nostalgia, I only suggest one positive answer coming in three interrelated parts: First, I propose a pragmaticist interpretation of *gene-culture co-evolution*. This interpretation assumes what is known as the *Baldwin Effect*—namely how learning guides the evolution—as a prime mode of inheritance. Peirce described it in terms of generalizing, habit-taking tendencies. Second, I propose to take rational decision theory and the theory of games in the direction in which they blend in with a broader theory of strategic (habitual) interaction. This follows the spirit and letter of Peirce's suggestion that "the purport of any concept is its conceived bearing upon our [self-controlled] conduct" (CP 5.461). A theory of habitual interaction is calculated both to dispense with the neo-classical notion of assuming *common knowledge of rationality* and to take the presence of *off-equilibrium decision points* seriously. This maneuver is largely neglected in the standard literature on rational choice. Third, the central role of *abductive* modes of agent and team reasoning in economic decision-making will be reinstated: abduction can model the possibility of unexpected events in economic theories without assuming *ergodicity, fictionalism*, or *inference to the best explanation* in model-building processes.

A denial of any one of these three interpretations betrays the dogma of methodological individualism. This may happen either in connection with biological, behavioural or mental phenomena. That is, we find the dogma looming large in the daily talk about genes, rational decision-making or mind and reasoning. Pragmaticism,

according to my interpretation, subscribes to none of these. It concerns, first, the models of evolution that are *co-evolutionary*; second, its mode of rationality in choice is *procedural* and not instrumental,[2] and third, abductive modes of inference in inquiry are not inferences to the best explanation and do not establish the model-world connections by assuming models to be convenient fictions.

I will say more about these three hidden facets of pragmaticism in a reverse order. As to this third point, the model-world connections take place by virtue of *hypothetical reasoning* and by taking good note of the *pragmatics* of how to fix the boundary conditions for the systems of our investigation. Imaginary hypotheses and fiction are almost diametrically opposed categories despite the fact that they are commonly conflated in contemporary literature on *fictionalism*[3] (I have argued this point more fully in PIETARINEN, 2012a). Why pragmatic factors are so important in fixing the boundaries of the models for the systems of one's investigation is explained by the fact that, unlike in neoclassical models for economics, the pragmaticist approach leaves room for structural changes in the models, changes that may have a real impact on economic growth, for example. Structural changes were not admitted by the proponents of rational choice who saw decision problems decontextually, or those, such as John von Neumann, who believed in incremental growth. Peirce would have been quite critical of the standard textbook models of economics as well as happy to see some post-autistic steps to be taken away from those models, although it may be too early to tell what the direction of those steps is going to be.[4]

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2   "Prevent his doing so in one way, and he will act in some utterly different way which will produce the same result" (CP 2.66, c.1902).

3   Support comes from Einstein's *Herbert Spencer Lecture* "On the Method of Theoretical Physics" delivered in 1933, in which he remarked: "If you wish to learn from the theoretical physicist anything about the methods which he uses, I would give you the following piece of advice: Don't listen to his words, examine his achievements. For to the discoverer in that field, the constructions of his imagination appear so necessary and so natural that he is apt to treat them not as the creations of his thoughts but as given realities" (EINSTEIN, 1974, pp. 5-6). Cf. Peirce, who took mathematics to smack of intuitionism as it refers to the "creations of thought" (CP 3.426, 3.560, 4.238, 5.8, 7.659). Those creations, however, have a reality which fiction does not have: "for if it be not real it can only be fiction: a Proposition is either True or False" (CP 4.547, 1906, "Prolegomena to an Apology for Pragmaticism").

4   Note Peirce's uncanny scenario in his 1892 "Evolutionary Love": "Well, political economy has its formula of redemption, too. It is this: Intelligence in the service of greed ensures the justest prices, the fairest contracts, the most enlightened conduct of all the dealings between men, and leads to the *summum bonum*, food in plenty and perfect comfort. Food for whom? Why, for the greedy master of intelligence". Yet we also need to recognize the important qualification that follows this paragraph: "I do not mean to say that this is one of the legitimate conclusions of political economy, the scientific character of which I fully acknowledge. But the study of doctrines, themselves true, will often temporarily encourage generalizations extremely false, as the study of physics has encouraged necessitarianism. What I say, then, is that the great attention paid to economical questions during our century has induced an exaggeration of the beneficial effects of greed and of the unfortunate results of sentiment, until there has resulted a philosophy which comes unwittingly to this, that greed is the great agent in the elevation of the human race and in the evolution of the universe" (CP 6.290).

III. Fortune Favours the Diagrammatic Mind

There is an intimate connection between the three suggested interpretational lines of what pragmaticism amounts to. The Baldwin Effect teaches us why instinctive reasoning is less costly than learned logic, while the success of what I argue are the procedural forms of rationality hinges on the abductive modeling capacities of the mind of an inquirer. What are these abductive modeling capacities? This question is significant in relation to the character of scientific methodology—now switching the perspective from the social to what concerns the methodeutic of scientific inquiry in general—since it is an undeniable truth that sciences are based on guessing. Yet there are guesses that outshine some other of our guesses. Now how can that be?

Usual explanations bring in the notions of serendipity and lucky guesses, according to which a solution to a scientific problem, invention or a technological innovation somehow suggests itself when the scientist is not in the lookout for them at all. Now something like serendipity may be a precious thing in suggesting what the means could be for the achievement of certain ends, such as a course of action in applying practical reasoning or some explanatory hypotheses in the case of abduction. But serendipity as a result of blind variation is extremely doubtful. Nor is there any practical value in serendipity, either. It does not help a scientist's mind that lulls in the state of the doubt and indefiniteness to be instructed to look away from the immediate problem as if it would be a mechanistic feat to be performed. "Well maybe you should not think about it so hard" is like asking someone to stop eating. Thoughts and signs are the mind's nutrition. Notable scientific achievements are characterised by looking at them from another, surprising angle. "Take the world from another point of view" was Feynman's favourite dictum. For Peirce, this is the "theoric" step in the type of reasoning which consists "in the transformation of the problem,—or its statement,—due to viewing it from another point of view" (MS 318). The step involves setting up entirely new goals and purposes. In mathematics, for example, the theoric step, which is "the life and soul of each major theorem of mathematics" (MS 905), concerns the development of the idea of the proof, not the brute and painstaking articulation of the proof itself (CP 4.612, MS 201).

As I see it, a radical change in perspectives has to do with a nearly instinctive ability to bracket irrelevant alternatives. Discovery concerns ability to distinguish more from less plausible hypotheses. Kasparov perceives on the chessboard only those processes that lead to something good. Scepticism serves no purpose in science. But how can that happen? What do we mean by a scientific instinct? How is it being developed? Is it, at it seems, co-evolutionary? What is the nature of co-evolution?

Let us take it easy with these questions. A significant element in discovery is in the ability to represent data in certain diagrams. These are interpreted according to their structure (that is, they are *icons*) and in terms of the perceptual *images* contained in them. Second, the logical theory of diagrams is provided by the method of Existential Graphs (EGs), which according to Peirce is "a guide to Pragmaticism" in showing the "construction [of thought] in the barest and plainest manner" (CP 4.7, "The Simplest Mathematics"). What is often neglected but eminently important in the method of EGs are the numerous conventions by which logical diagrams are built up as well as interpreted according to their form and the dialogical conduct of the make-believe players, which Peirce terms the Graphist and the Interpreter. The

building of graphs concerns the *model-construction phase* (PIETARINEN, 2012c) and the latter an imaginative but real method of interpretation having to do with the *semantics* and *pragmatics* of the meaning of graphical assertions (PIETARINEN, 2006). Although the method of logical graphs is designed for analysing the nature of deductive reasoning and as such is not directly about abduction, the method of graphs is useful in presenting a "veritable moving picture of the mind in reasoning" (MS 905) and facilitating the computation of consequences until such assertions are found that can be compared with observations, nature, or our experience to see if they work.[5]

Thirdly, together with images and diagrams, also precious in the method of real discovery are *metaphors*. They express in a concise form what is going on in those mental associations that aim at building complex diagrammatic forms from simple images and from the relationships that obtain in them (PIETARINEN, 2013). I return to the importance of metaphors in a moment.

After having invented the method of EGs, Peirce asserted having come up with the "proof" for the correctness of pragmaticism (PIETARINEN, 2011a). I will say no more about that line of development here but only point out the centrality of association in the method of graphs that brings images and diagrams into a relation. Peirce took association to be the law of mind, thus prefiguring the new, extended evolutionary synthesis over a century (PIGLIUCCI & MÜLLER, 2010).[6] What happens is that the Baldwin Effect—the tendency to learn general habits of behaviour and reasoning, and this tendency to become a genetically inherited trait—of the extended synthesis can serve as a case in point against the consequentialist view that serendipity could be a naturalized form of blind variation and selective retention. That we could just look away from difficult problems as if the lucky coincidence would then miraculously suggest itself does not help or explain anything. Feynman lectured that he needs no more letters from the readers suggesting 'why don't you just try the method number 759 to see if it works'. Guessing is not a dumb man's job.

What a creative mind of a scientist looks for is the diagrammatisation of the vague yet fundamental concepts of the investigation that carry the crucial information by which the objects of the signs could then be sought for at a later stage. Testimonies from scientists are extremely suggestive here:

> The words or the language, as they are written or spoken, do not seem to play any role in my mechanism of thought. The psychical entities which seem to serve as elements in thought are certain signs and more or less clear images which can be 'voluntarily' reproduced and combined. […] This combinatory play seems to be the essential feature in productive thought before there is any connection with logical construction in words or other kinds of signs which can be communicated to others […] The above mentioned elements are, in my case, of visual and

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5   Peirce claimed, without demonstration, that transformation rules for EGs could equally well be given for ampliative forms of inference (MS 905, 1907). His example of a retroductive step in reasoning in this context was the proof of Euclid's XVI's proposition.

6   "Pure mind, as creative of thought, must, so far as it is manifested in time, appear as having a character related to the habit-taking capacity, just as super-order is related to uniformity" (CP 6.490).

some of muscular type. Conventional words or other signs have to be sought for laboriously only in a secondary stage, when the mentioned associative play is sufficiently established and can be reproduced at will. [...] The play with the mentioned elements is aimed to be analogous to certain logical conceptions one is searching for. (EINSTEIN, in HADAMARD, 1949, p. 142-143).

It would be wrong to consider these testimonies as articulations of peculiarly visual methods of thinking in individual scientists—visuality is far too one-sided a notion and not in fact even a necessary requirement for something to be a diagrammatic representation (PIETARINEN, 2010). Recall Einstein's allusion to muscular feelings, shared by Feynman in his 'play of musement' to perceive, even listen, the movements of electrons:

Feynman: "What I am really trying to do is bring birth to clarity, which is really a half-assedly thought-out-pictorial semi-vision thing. I would see the jiggle-jiggle-jiggle or the wiggle of the path. Even now when I talk about the influence functional, I see the coupling and I take this turn—like as if there was a big bag of stuff—and try to collect it in away and to push it. It's all visual. It's hard to explain."

Schweber: "In some ways you see the answer—?"

Feynman: "The character of the answer, absolutely. An inspired method of picturing, I guess. Ordinarily I try to get the pictures clearer, but in the end the mathematics can take over and be more efficient in communicating the idea of the picture. In certain particular problems, that I have done, it was necessary to continue the development of the picture as the method before the mathematics could be really done." (FEYNMAN, in GLEICK, 1992, p. 225).

No loose talk about mental models is helpful here. Had Einstein had Existential Graphs at his disposal, however, he would not have suffered so much. Feynman, on the other hand, had readily deployed the moving pictures of the mind in action. But the building up and the manipulation of logical diagrams have to proceed by having at one's disposal, first, the images, which represent the simple qualities of fundamental concepts and are the windows to the dark rooms of a scientist's study, and second, the set of conventions for the method of building the models of the graphs in which ideas can be precisely represented.[7] Together with the system of conventions, a precise language of diagrams is forged.

But even these two components of images and diagrams are not enough, and we need, third, the metaphors, signs "which represent the representative character of a

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7   The images are the indecomposable elements of thoughts: they interpret the imagistic concepts conceived purely in their qualitative and not in the linguistic-symbolic sense. This may be related to the qualitative interpretation of equations Feynman once alluded to: "The next great era of awakening of human intellect may well produce a method of understanding the qualitative content of equations. Today we cannot. Today we cannot see that the water flow equations contain such things as the barber pole structure of turbulence that one sees between rotating cylinders. Today we cannot see whether Schrödinger's equation contains frogs, musical composers, or morality—or whether it does not. We cannot say whether something beyond it like God is needed, or not. And so we can all hold strong opinions either way." (FEYNMAN *et al.*, 1964, p. 10).

representamen by representing a parallelism in something else" (EP 2.277). Metaphors bring simple qualities and diagrammatic relationships into a continuous relation. Why metaphors? Imagination does not cease when images and diagrammatic relationships linking them are formed. A scientist strives to make such thoughts communicable. Metaphors are a great aid for the communication of complex ideas and suggestive of further hypotheses. True, they are often misused, overdone or misinterpreted say in the fictionalist sense that wishes to lay off the objectivity of the subject matter. But this is not the ultimate effect of metaphors. They accomplish two aims: they make the ideas nearly incommunicable by some other means better understood, by transferring the representation into another media while also making the good but fallible hypotheses uberous enough to suggest further directions for the character of the answer or a proof. Precisely how metaphors function in the diagrammatic sense is somewhat unclear but there is a logic of metaphors based on the method of EGs that takes into account the specific modalities of continuity and intellectual likeness conducive to the processes by which some graphs may turn into metaphors (PIETARINEN, 2012d).

Can there be a logic of abduction, then? Perhaps we cannot answer quite affirmatively to this question as yet, but what we can say is that there is a logic of images, a logic of diagrams and diagrammatic reasoning, and a logic of metaphors.

IV. Co-Evolution in the Light of Pragmaticism

Let me step back and review the role of co-evolutionary factors in the method of pragmaticism. I mentioned that it is the Baldwin Effect that Peirce was articulating in order to figure out the character of the logic of discovery at play in nature. In an undelivered lecture plan, he sets out the following tasks: "The controversy concerning Darwinian and Lamarckian evolution. Abstract statement of Darwinianism, so as to show its inapplicability wherever there is evolution of any Kind. Abstract statement of Lamarckianism; its harmony with idealism", and asks "Is any third mode of evolution conceivable?" (MS 972). Yes, but it is not the modern synthesis from the 1950s but the extended synthesis of the much later genus.

Of historical interest is the fact that the co-evolutionary idea of cultural traits assimilating into forms of instinctive behavior was something suggested, although by no means directly or obviously, in Peirce's writings. His "Evolutionary Love" of 1893 antedated James Mark Baldwin's 1896 account of organic selection, ontogenetic adaption and social heritability for three years. Peirce's paper portrayed precisely the kind of piece Baldwin coveted. Yet it is by the latter that we find the idea routinely referred to in contemporary literature. (PIETARINEN, 2012b suggests terming it the Peirce-Baldwin Effect.)

It falls from these observations that the co-evolutionary approach became a vital ingredient of Peirce's late pragmaticism. But if so, this casts doubt on the claim recently put forth by Short (2010), who argues that Peirce's middle *Monist* series on the grandiose cosmological and evolutionary themes was an aberration and did not accomplish what it was set out to do. I used to think so too and for a long while could not take Evolutionary Love seriously. In short, Short's argument is that Peirce lapses into *petitio principii*: from the absolute randomness laws emerge by habit-taking tendencies while whatever the latter are they already presuppose a conception of a law or a law-like process.

I should like to defend Peirce by noting that the tendency or capacity for habit-taking should not be equated with being a law. Laws are habits and many of the habits are characterized in much of the same way as the laws typically are characterised. It is the *tendencies to learn* a habit that are inheritable according to the Baldwin Effect. There is a world of difference between inheritable habits and tendencies to learn certain habits being passed on to offspring. We do not expect habits as such assimilating into genetically encoded traits, which would be a blunt expression of Lamarckism.[8] Of course, to be relevant in the context of evolutionary cosmology we would need to assume Baldwinian evolution to be applicable in the cosmological scale. But hey, just look at the kinds of evolutionary arguments contemporary cosmologists and theoretical physicists tend to put forward these days, such as Lee Smolin's fecund universes concerning natural selection at the cosmological scale (SMOLIN, 1997).

In the light of the extended synthesis, Peirce's excursion during his middle-year crisis played an important part in the development of his thought, as it suggested a reformulation of pragmaticism towards the direction of co-evolutionary approach to ontogenic development. If this is the import of Evolutionary Love, there is nothing too bizarre in it after all.

However, we might even go a step further and argue that pragmaticism is not only about *co*-evolution as it is understood in the sense of the brain-language development, for example, but about irreducibly triadic forms of emergence. It has to involve the interpretative side of meaning and the mediating practices in how language is connected to the world. We might term that tri-evolution. No matter what the name is, tri-evolution plays an important part in arguing for the kind of methodological pluralism that Peirce's pragmaticism strongly advocates. It is pragmaticism that delivers us the pluralistic version of philosophical methodology, while pragmatism, as advanced by Peirce's contemporaries, is its nominalist-relativist-solipsist 'one-world' version (PIETARINEN, 2008). This point is attested in the remaining two cases supporting my argument: the nature of the theory of habitual interaction calculated to displace the commonplace rational decision theory, and the importance of abductive modes of reasoning in decision-making situations in economics.

V. Towards a Theory of Habitual Interaction

An increasing number of studies in the methodology of social sciences have been concerned with non-instrumentally rational decision and action. We may dub them bounded or procedural forms of rationality, but although their importance is often underscored, there have been grave difficulties in implementing these ideas into

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8   Peirce clearly differentiates tendencies from law-like processes: "But such a state must tend to increase itself. For a tendency to act in any way, combined with a tendency to take habits, must increase the tendency to act in that way. Now substitute in this general statement for 'tendency to act in any way' a tendency to take habits, and we see that that tendency would grow. It would also become differentiated in various ways" (CP 6.490). It is the tendencies to take habits that become inheritable once being forms of cultural and social behaviour over long periods of time.

workable theories of strategic interaction and games.[9] The reason for the difficulties is an influx of a number of solution concepts and the inconsistency of choices given a preferred system of axiomatisation.

Let us merely entertain some implications from supposing that agents are not instrumentally rational. The first effect is that there is little reason not to dispense with common knowledge of rationality. And if so, the ordinary solution concepts such as backwards induction have to go, too.

Significant implications thus concern the gains from basing the theory on less-than-ideal versions of rational choice. The positive effect is that the relevance of playing all sorts of off-equilibrium actions greatly increases. And this is important, since it is on those off-the-beaten-tracks that the unexpected, yet plausible, phenomena occur. But they were never thought to be actually chosen by rational agents due to choice-inconsistency. It has been much harder to identify them since the Nash-type strategies, although taking off-equilibrium points into account at a certain level of modelling of assigning low probabilities to them (trembles), the approach still reads off-equilibrium paths as marginal and largely inconsequential aberrations. However, from the point of view of pragmaticism, the essence of reasoning is not in rationality but in maintaining capacities for abduction. We do not act for a reason; reasons and intentions to act are derivative to habitual and instinctive action. The latter types are co-evolutionary.

But if maintaining rationality is not the ulterior end of decisions, it follows that optimization problems become non-deterministic. Ergodic axiom of conditional probabilities about stochastic processes will be supplanted by abductive modes of reasoning which can 'sample the future' but not to predict it. It is the diversity, not the efficient markets or hyperrational agents from which stable forms of behaviour ultimately emerge (contra FAMA, 1965). But these are only the first steps of a newborn child.

VI. Abductive Reasoning in Decision-Making under Fundamental Uncertainty

How to accommodate the unknown unknowns into predictive models? The 2011 pseudo-Nobel prize went to economists who had investigated the 'shocks'—unexpected events that have short or long-term impact to economies and may even disrupt the functioning of entire societies. Shocks typically are thought to result from changes in government policies concerning, say, the prime interest rate or employment, oil price increase, or consumption decline. They could also be natural disasters. The result was a model that is able to differentiate rationally expected shocks from those that are fundamentally unexpected, given the standard textbook assumptions about human rationality and social norms.

It is nevertheless deeply questionable to what extend standard econometric assumptions work in the presence of fundamental uncertainty. For rational vs. unexpected events is a false dichotomy. The criteria for *scenario building* practiced by large companies and state administrations alike cannot in the cases

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9   Of course there is also the evolutionary game theory that has no use for rationality whatsoever.

of fundamental uncertainty lie in any measure of probability or likelihood of those scenarios. One cannot even commence a Bayesian belief update process if there be no a priori probabilities to be assigned for plausible (possible but 0-probable) events. There is no prognosis or extrapolation to be performed. Consequently, the methods based of the axioms of ergodicity (roughly that the future is largely like the past), of the standard economic toolbox lose their applicability. Rather, the criteria concern the *plausibility* of scenarios by the means which we could select or prepare the leaders or CEOs for the inevitable turbulence of the future. Scenario building is not based on loose talk about visions and brainstorming, either, although imagination is a core feature in it. It is the self-controlled reasoning and imagination that are the keys in suggesting what the reasonable exercises in scenario building would look like.

The shocks, furthermore, are often results of some structural changes on the organisational and institutional levels. Yet such changes in policies are neglected in the mainstream discussion. The reason is that the methods cannot digest the meaning of counterfactuals well. But the understanding of the semantics of counterfactuals is absolutely crucial here. The belief that counterfactuals or subjunctive conditionals do not lend themselves to any kind of logical analysis is just a pernicious myth. But such an analysis cannot be an instrumental one. It cannot lead to a recommendation for a singular action. It concerns the discovery, by creative imagination and intellectual curiosity, as well as by departure from the beaten paths, of how various ends could be achieved or avoided.

Peirce linked pragmaticism with abduction. He denied that pragmaticism, "as originally defined, made the intellectual purport of symbols to consist in our conduct". It consists in our "*concept* of what our conduct *would* be upon *conceivable* occasions" (CP 8.208). Scenario building, performed to achieve or avoid unforeseeable or unexpected events, concerns various conceptions that we could or would formulate about the conceivability of future events. There is a fundamentally subjunctive notion involved in all this: *If certain future occasions were to arise, what conceptions would we formulate about our general conduct upon those occasions?* The semantics of statements falling under such schemas has to be given and analysed first in order to have a meaningful formulation of problems concerning scenario planning at all. Following that semantic task, the result can be a policy recommendation, a strategy to adopt a certain generalizing tendency, or the formation of a habit of action, but it cannot be a guide for any singular action as such.[10]

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10   A late formulation of the maxim of pragmaticism is instructive here as to the nature of habits being in their strategic, generalising tendencies: "[T]he only way to complete our knowledge of its nature is to discover and recognize just what general habits of conduct a belief in the truth of the concept (of any conceivable subject, and under any conceivable circumstances) would reasonably develop; that is to say, what habits would ultimately result from a sufficient consideration of such truth. It is necessary to understand the word 'conduct', here, in the broadest sense. If, for example, the predication of a given concept were to lead to our admitting that a given form of reasoning concerning the subject of which it was affirmed was valid, when it would not otherwise be valid, the recognition of that effect in our reasoning would decidedly be a habit of conduct" (CP 6.481, "Neglected Argument for the Reality of God").

Conclusions

According to my analysis, pragmaticism is not limited to a method of thinking and acting. Nor is its nature explained by loosely positioning it to occupy a middle-ground between the relativist and dogmatist fancies of the varieties of pragmatism and neo-pragmatism (ANDERSON & HAUSMAN, 2012). Methodological pluralism turns pragmaticism into a *wider* playground for creative and imaginative inquiry in the social and behavioural sciences interested in rational decision-making and action; wider than any of its alternatives in the sense argued and in terms of the applications presented can provide. Yes, Peirce stated that "the extra syllable will indicate the narrower meaning" (CP 8.205, Letter to Calderoni). But there is nothing inconsistent in his statement in relation to my suggested reinterpretation, provided that the "narrower meaning" means applying it, in a self-controlled way, to the clarification of our conceptions concerning deliberate conduct.[11] We can make such quests clearer by translating vague conceptions into definite and testable resolutions, in contemporary terms into subjunctives concerning procedural decision and interaction, wherever such conduct is to be found to be conducive to the understanding of certain classes of experiential or observational phenomena. Modern game-theoretic analyses of the nature of strategic reasoning provide some basis in pursuing this understanding. But they do not cater well for reasoning in social contexts that builds upon the procedurally rational and methodologically pluralistic backdrop of habitual decisions on the level of policies and social norms. It is only on such contextual level in which choices are rational, as any of the individual actions may well deviate from their recommendations.

Such is an outcome of adopting a fully contrite fallibilist methodology of science in the context of deliberate and social conduct.

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11   Yet Peirce asserted, somewhat confusingly, that pragmaticism "applies to everything": "That which especially constitutes the man is his sociality, his self-subordination to his fellows. It is this which makes Science so high. Science is social. The achievement of the individual scientist is next to nothing. He works to improve the intellectual situation of a distant posteriority. Pragmaticism seeks to endow intellect in general with the same sort of sublimity by making it clear that not only does it apply to everything, but further that its full meaning can only be evolved in a long future" (MS 499(s), 1907).

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