

Salvatore Rizzello*

Identity and consciousness in economics

DOI: 10.7413/ 19705476002

Abstract: This paper introduces the concept of consciousness in the debate on the role of identity in economics. After a brief review of the main issues emerged from this literature, it illustrates two neurobiological theories on the nature of consciousness and provides a contribution towards clarifying two controversial theoretical aspects: how economic agents are aware of the decision making process and the relationship between individual identity and social identity. With the help of some ideas borrowed from quantum physics, which are at the basis of the microbiological processes of human consciousness and generation of knowledge, we refer to the cognitive path from which emerges diversity, the imperfect predictability of human behaviour and the interactive connection between individual and social dimension.

Keywords: Identity; consciousness; cognitive economics; personal knowledge; path dependence.

Index: 1. Introduction – 2. Identity and economics – 3. Consciousness and identity – 4. Consequences for economic analysis – 5. Concluding remarks – 6. References

1. Introduction

How are we aware of our identity? If in philosophy, psychology and sociology the answer to this question is complex, and identity and consciousness have always been the subject of controversial and extensive studies, in the standard economic analysis the answer is surprisingly simple and can be summarized as follows: the identity of an economic agent descends by its utility function and its *unaware* ability to maximize its benefits given its preferences.

Recently, however, a new attitude has been emerging and the theme of identity in economics is becoming increasingly important, also thanks to the achievement of new research programs such as game theory, experimental economics, behavioural economics, cognitive economics and, not long ago, neuroeconomics. Some authors have recognized identity as the key concept in

* Salvatore Rizzello, Università del Piemonte Orientale, Italy, salvatore.rizzello@uniupo.it.

This research is original and has a financial support of the Università del Piemonte Orientale.

Thanks to Elisabetta Grande, Cosimo Perrotta and Anna Spada for suggestions on earlier draft. Thanks to Patrizia Magazzù for the revision of my English.

overcoming some relevant limits of standard economic analysis and for placing economy and the study of man closer to the real world. Moving away from this has reduced economic theory to a mere “price theory”, with catastrophic results both for the discipline and for the business community, as Ronald Coase claims (2012).

For just over twenty years, a growing economic literature has finally lifted the veil on the subject of identity. Through an interdisciplinary approach with psychology, philosophy, cognitive sciences and neuroscience, some economists have proposed new and interesting research paths, with solid and innovative answers, by increasing a stimulating debate, harbinger of further and promising developments.

The theme of identity in economics is inevitably intertwined with that of consciousness, and in particular with how much the subjects are aware of their personal and social self-image. Despite its relevance, this aspect has persisted rather on the margins of the literature, probably due to the additional complexity that its consideration introduces in the analysis.

The main purpose of this paper is to explicitly include consciousness as an essential element of the analysis of the role of identity in economics. We will therefore use contributions from the quantum physics, or rather from some of the results achieved by it, as well as from the aforementioned disciplines.

Among the most significant aspects that have so far emerged in the literature there is a diversity of positions on the possibility that identity can be included in the utility function. This aspect is interesting not only from a formal point of view, i. e. if the argument of identity can be approached with the traditional tools of economic analysis, but also if there is a degree of awareness on the part of economic agents in implementing their choices and how much it is extended. The topic of awareness, in turn, is connected with an effective explanation of the relationship between individual and social identity. While on the one hand there is a part of the literature that reduces the first to the second, other more interesting contributions define them in a differentiated manner and investigate their relationships more deeply. Drawing on the most recent findings in neurobiology on the study of consciousness, we will try to help shed light on the most controversial aspects of the role of awareness in decision-making processes. Following the examination of this aspect, we will investigate the complex relationship between individual identity and social identity.

The paper will first present a brief “state of the art” of the literature on identity in economics, through the illustration of the most relevant aspects (section 2). Then, two of the main psycho-neurobiological theories on consciousness will be illustrated, with particular reference to the theme of identity (section 3). Subsequently, the relevance of this new approach for the aspects of economic analysis, partly already emerged in heterodox literature, will be discussed (section 4). Concluding remarks (section 5) will summarize the salient points of the paper.

2. Identity and economics

In recent economic literature, the main authors who have systematically dealt with the notion of identity and its relevance for economics have been above all Akerlof and Kranton (2000, 2002, 2005, 2010), Sen (1999, 2004), Davis (2006, 2007, 2010, 2011), Kirman and his research partners (Kirman 2005 and 2012, Kirman and Teschl 2004 and 2006, Horst, Kirman, Teschl 2007).

Encouraged by the relevance that the concept of identity presents in other disciplines, such as psychology, sociology, anthropology and political science, in *Economics and Identity* (2000) George Akerlof and Rachel Kranton explicitly introduce identity in the economic analysis, convinced that this can help one to understand all economic phenomena in which the social context is relevant and that results very extensive. In particular, Akerlof and Kranton include in the standard utility function also personal identity, such as “sense of self” or “self image”, besides the traditional variables of preferences for goods and services. They formally represent it as a vector that incorporates social categories, norms, ideals and highlight the advantage achieved in acting in accordance with them (2010: 17-18).

The self-image is multidimensional and constitutes the identity of a person in the identification that the same has with respect to the different social categories (Akerlof and Kranton 2000: 720).

The idea of identity proposed by them is “social”, because it is based on the identification with others and is linked to the psychodynamic theory of personality, which considers the internalization of rules relevant to individual behaviour. Specifically, the states of anxiety, that individuals experience when they deviate from internalized rules, are highlighted.

Individual identity emerges from the bijective relationship between social categories and internalized rules of behaviour. Violation or deviation from internalized rules leads to a state of anxiety, which we try to reduce by safeguarding the unity of the sense of self. When this does not happen a situation of “cognitive dissonance” emerges.

Davis (2006, 2007) notes that in this way, however, personal identity is reduced to social identity and, as Kirman (2012) also argued, this leads to considerable problems. Acting in accordance with some social standards can explain conformism, but i) it is a static model of preservation of oneself in correspondence with social characteristics, given exogenously, which does not explain how different social identities are correlated to personal identity, by *de facto* reducing individual differences to “different collections of social identities” (Davis 2006); ii) this does not explain the reverse process, in which individuals have a “private self” that they desire to reach and the choice of specific social groups is aimed at affirming their purpose, by maintaining the possibility of changing groups when this does not happen (Kirman 2012).

This second aspect is further amplified by Akerlof and Kranton’s belief that the sense of self acts in the individual utility function as a mechanism for reducing anxiety, in an unaware manner with respect to motivations (Davis 2007), as hap-

pens in the traditional utility theory standard, based on the well-known *as if* theory, elaborated by Milton Friedman (see further on, sect. 4).

Furthermore, in the social psychology literature there is a wide empirical evidence, according to which subjects in conflict of identity with others tend to review the priority list of different social identities and do not attempt to “adjust” behaviour to a single social identity (Hogg, Terry and White 1995).

By proposing “the self-image” in terms of an exogenous social identity, Akerlof and Kranton are unable to explain how individuals and groups interact to change identity over time. Their model is reduced to a very limited application, a partial equilibrium analysis of identity, with all the classic limits of the standard utility theory, which considers individual choices as mere orders of preference, to maximize well-being, with a very and far different perspective from those research paths, that have more profitably applied contributions from other disciplines and departed from the standard neoclassical program (Davis 2007: 350; see also Fine 2009).

The approach proposed by Amartya Sen is different. Unlike Akerlof and Kranton, he draws attention to the human capacity to “reason” about his own values and purposes and their diversification. In this way the person’s ability to perceive himself and to assess what kind of commitments to take or not towards social groups (different from the social categories of Akerlof and Kranton) becomes central (Sen 2002). Social identities therefore take on an endogenous dimension, being directly connected to the choices and actions of each one. Even when social identities are assigned exogenously, as often happens, a person can evaluate and choose whether or not to continue to identify with them consciously.

The role of awareness of one’s actions and choices therefore emerges explicitly alongside the capacity for evaluation. Actually, it is precisely this last aspect that characterizes personal identity: the ability to evaluate one’s own values and objectives and to freely choose whether to maintain or vary them, accepting other social identities in the act of choosing to identify oneself with others (Sen 2002). Basically, the “disappointed” subject can change the social group that does not accept its preference structure. For the individual well-being, to improve or increase public happiness, the connection from individual becomes collective and finds satisfaction in social commitment. This is the well-known concept of meta-preference introduced by Sen (1985), understood as a faculty of considering “ordering of orderings of preferences”, according to which a subject is not only able to change his own tastes, but also to redefine the entire structure of choice, by changing the social group.

Although Sen’s perspective is more convincing than Akerlof and Kranton’s one, it remains an open problem. While he is able to explain the presence of multiple and dynamic selves, as different social identities of a single person, on the other hand he does not tell us how different people can constitute a social group conceived as their “shared social identity”, if not simply by means of a simple heuristic, according to which individuals reason about their values and purposes, but it does not explain how they actually do it (Davis 2006).

In this regard, Davis (2006 and 2011) proposes to modify the analytical approach on identity, by completely abandoning the idea of meta-preferences. He suggests to shift the attention to the process carried out by individuals in maintaining their identity and to take into consideration the efforts, we could say the costs, sustained to affirm it with respect to the dynamics of the variable social groups. The analytical perspective is then reversed. Instead of extending the utility function, to include the sense or image of self, Davis (2006: 387) proposes to adopt a *production function* as an individual objective function, considering it a more adequate tool to reflect the idea of what people actively spent in terms of effort to maintain or build personal identity. This would also explain more clearly how an individual may have different selves, considered as different social identities.

This change of perspective, which focuses on the active ability of the subject to determine his own identity, opens up new analytical scenarios beyond standard economic theory. In this sense, the most appropriate reference is the theory of economics of complexity and its intertwining with behavioural and cognitive economics. Kirman (1997), in particular, suggested that interindividual dynamics could be better understood by an analysis of the social contexts in which subjects interact, rather than through markets. Individuals form images of themselves not in terms of exogenous social categories, as for Akerlof and Kranton, but directly through their interaction with others in social groups, which are intentionally chosen on the basis on how close they are to their own image of themselves. A feedback process is then triggered between individuals and social contexts, with a reciprocal dynamic influence, in which personal identity must be modelled simultaneously in terms of invariance and change (Kirman 2005). This also includes the question of multiple selves, because in this perspective individuals are considered a different succession of self, as the result of their interaction in social groups and multiple social identities (Horst, Kirman, Teschl 2005). The solidity of this process is further strengthened by the idea that individuals know how “to put themselves in others’ shoes”, through an empathic process.

The theme of empathy, present in economic literature since Adam Smith, has gradually disappeared when, especially from the beginning of the last century, the emphasis was placed on anonymous individuals, who act rationally by means of the market. When the anonymity falls and the theme of identity is faced, empathy re-emerges in an overbearing way (Kirman 2012: 391). In particular, it is clearly expressed in the context of game theory, where individuals continuously interact by placing themselves in the shoes of others. The same happens in behavioural, experimental and cognitive economics. In these areas, the impact of identity on the decision-making process goes beyond the individual definition of personal identity and includes the context in which the process takes place, the ways in which information is received, the moral self-assessment mechanisms, the personal background, past interactions and many other aspects. Even the valuation of losses or gains by the subjects does not take place in absolute terms, but on the basis of assessments anchored to the initial endowments. In this kind of analytical contexts, identity takes on a very different relevance and the process of evaluating

new information is decisively affected by how coherent they are with the prescriptions of the groups to which they belong, in which the formation of identities and groups of identity is guided by the co-evolution of individual group preferences and institutions (Ille 2017).

Empathy is then re-proposed, especially by Kirman (2012), as an essential element of people's ability to reach and sustain equilibria. If we also add attention to the role of social emotions to this element, the distance from the selfish individual interested in himself, typical of the standard approach, is complete.

Within this perspective, the proposal formulated by Kirman and his collaborators, supported also by the results of specific and detailed experiments carried out by them, is that individuals have a "private" image of themselves that they wish to achieve, rather than act to transform one's individual characteristics to get as close as possible to the "social" self-image. This leads them to choose to belong to particular social groups that help them to achieve the desired characteristics. If a group does not favour them in reaching the desired self-image, a feeling of discrepancy or "cognitive dissonance" can be generated between who the person is currently and who he/she would like to be. To alleviate this feeling, the individual may wish to change their participation in the group. The groups are therefore means to "realize oneself" and to change one's identity, not merely aspirations in oneself (Kirman 2012: 395).

The idea of identity formulated by Kirman, while clearly distinguished from the Akerlof and Kranton's model, maintains the concept of "cognitive dissonance", but in a different perspective based on the specific characteristics of an individual and their evolution over time. It is manifested in the conflict between who the person is and who he would like to be, and it can be solved by abandoning the group and adhering to others that allow one to achieve the desired self-image. In a similar way to the perspective proposed by Sen and partly also by Davis, for Kirman personal identity and formation of social groups are determined by endogenous dynamics, which also guarantee a certain stability, thanks to a limited frequency with which displacements occur among groups.

The individual probability of moving is governed by the desirability of the characteristics that the agent can acquire by changing groups but is counterbalanced by the 'cost' of making the transition. The reason why we talk in terms of probability is that some individuals will make the transition, while others will not and the explanations for the differences in the choice lie in factors that are not necessarily known by the model builder. By making the transition stochastic we allow movements that normally would not be expected, but that happen from time to time (Kirman 2012: 397, my transl.).

Kirman's analysis appears as the most effective one among those that emerged in the literature. It is able to explain how personal identity can change, but also why an individual decides to change it within an interactive process with social groups. On this path we can try to deepen the theme of identity, with the aim of providing some interesting contributions to economic theory and some of its applications, as long as it is provided at the same time a comparison with some philosophical aspects related to it. Among these the theme of consciousness appears to be essential.

3. Consciousness and identity

Having an image of oneself means being aware of it. If on the one hand this statement may seem obvious, therefore implicitly contained in the theories on identity considered so far, on the other we might expect that to take also into account the vast scientific literature on consciousness could open very interesting and still little considered scenarios.

Far from being able to propose even a concise examination of the various theories on consciousness, we will limit to briefly illustrate some strands of research in this area that appear to be fruitful and promising, focusing in particular on the aspects that can contribute to opening new or broader perspectives on the subject of identity in the economics.

Giulio Tononi (2004, 2008) has developed a theory of consciousness as integrated information, known in the literature as Integrated Information Theory (ITT). This is a phenomenological approach, which, instead of starting from the study of how the brain is structured and how it functions, identifies the essential properties of consciousness in every physical substrate that contains specific information, integrated through structured relationships.

Moreover, this approach allows us to measure the level of consciousness and to explain why if we remove the cerebellum, that contains more than half of our neurons, consciousness is not eliminated. This means that not all neuronal relationships generate consciousness. It is the level at which information is integrated, the whole, which generates something (consciousness) which is more than the sum of the parts (single information).

The subjective experience of consciousness has therefore to do with the integrated information, generated by a complex of elements that interact and consequently emerges (and depends on) every system that generates integrated information. In itself consciousness is intrinsic, and may have no function or purposefulness. Through natural selection, epigenesis and learning, outside information “moulds” informational relationships within. They are structured on a space-time scale and “shaped” by the organism on the basis of those values that are appropriate to survive. This process can be considered as the experiential analogue of natural selection. “As is well known, selective processes act on organisms through differential survival to modify gene frequencies (genotype), which in turn leads to the evolution of certain body forms and behaviours (extrinsic phenotype)” (Tononi 2008: 240).

To conceive consciousness as an intrinsic property of matter seems to propose an identity between informational structure and phenomenal experience.

We will consider later the consequences this can have on the side of individual and social identity.

Let's now turn to another theory on consciousness, different from that developed by Tononi. Roger Penrose and Stuart Hameroff (Penrose 1994, 2004, Hameroff and Penrose 1996, 2014) believe that consciousness is not computational, but

it emerges from a biologically “orchestrated” quantum processes of vibrations of microtubules present in neurons.

The “Orchestrated objective reduction theory” of the mind predicts that potential quantities of information remain in multiple states until they come together in an instantaneous calculation, called “quantum coherence”, which would occur in protein structures of neurons, the microtubules, which process information and memory through their quantum vibrations.

In addition to the traditional synaptic connections among neurons, there would also be connections between microtubule condensates of a neuron with those of others, through a quantum tunnel that would allow these quantum objects to propagate over a large area of the brain, generating a unique quantum object.

On the basis of this theory, consciousness would therefore have a neural substrate, identified in microtubules, which, in addition to performing other important well-recognized biological functions within cells, would determine quantum coherence through vibrations. These vibrations allow us to outline an indeterministic approach to consciousness, or, to put it more explicitly, would be the basis of free will.

This is a crucial point because it directly involves one of the most relevant issues also in philosophical (as well as in economic) literature, which concerns intentional or unconscious action.

Furthermore, if the emergence of consciousness has its roots in a quantum mechanism, the source of the indeterminacy of human behaviour would be identified.

As known, in quantum physics the microphysical phenomena can only be described probabilistically and not with a causal connection, without the possibility therefore of accurately predicting the occurrence of a phenomenon. One can only consider a probability that it will be realized. The probability of events is represented by a wave function that connects microcosm and macrocosm, determines the extent of the possibility of processes and makes the implementation of the single event impossible. If this were confirmed, then the hypotheses on unaware behaviour would be less and those on “free will” would be strengthened.

It should be noted that this theory is not universally recognized, even though microtubule vibrations have recently been verified empirically by a group of researchers from the National Institute of Material Sciences of Tsukuba in Japan. In particular, what makes one skeptical is the use Hameroff and Penrose make of their theory to explain the soul and to propose the idea that there would be a kind of a unique law of the universe to which consciousness belongs.

Despite these themes, which can be omitted for our purposes, there are some aspects that remain relevant.

Another problem emerges. If the interpretative outcome of a stimulus in terms of information, be it integrated (à la Tononi) or orchestrated (à la Penrose), is unpredictable, random and undefined what determines the behaviour not completely predictable but orderly of the organisms?

The answer to this complex question is provided by Schrodinger (1964), which discriminates between nervous processes that do not possess the characteristic of

consciousness and “conscious” brain processes, although both are completely similar. The central element is the mnemonic processes. Any sequence of phenomena, including peristaltic, respiratory movements, heart rate, digestion, etc., if repeated several times, gradually moves away from the sphere of consciousness, only to return there in the event of sudden mutations. In this case only the perceived modifications will emerge to the consciousness, not the whole process. An experience that occurs only once is meaningless. While the functions and mechanisms, that are useful to reach a goal in circumstances that recur repeatedly, take on a great biological value. As a sequence of phenomena recurs, it becomes less and less interesting but increasingly effective, precise and “less conscious”.

“To give ourselves an image of this, we might say that consciousness is the instructor supervising the education of the living issue, who is called on for help whenever new problems crop up but leaves the pupils to themselves to deal with those in which he knows they have had sufficient practice “(Schrodinger 1964 [1925]: 41-2).

This idea, similarly also present in Alfred Marshall and John Dewey (Rizzello 1997) directly connects consciousness and learning and explains how merely the new “appears” to consciousness when it evolves and generates new forms, while the already acquired competences act in a “supra-conscious” way. Whatever the underlying brain processes are, the conscious dimension is directly connected to the “creative” interpretation (giving meaning) of the stimuli. If the interpretation is successful in the context of environmental and evolutionary constraints, and is frequently repeated, it is gradually relegated to the unaware dimension.

Furthermore, if the conscious “interpretative” process takes place on the basis of unpredictability (even quantum as in the hypothesis of Hameroff and Penrose), we would have identified the source of free behaviour, while, the second process, the “automatic” use of acquired conduct, would explain the order and the partial predictability of the behaviour.

Individual identity would therefore be intimately linked to consciousness and would arise from the relationship between the production of new knowledge and the acquisition of skills and the use of codified knowledge. The self would appear as the imperfect sum of all experiences and memories, but not as a collection of individual data. It is the canvas, the plot, on which they are woven (Schrodinger 1967: 89).

Even in the experimental field, it is emerging that the brain works with mental wave functions and that at least some perceptive-cognitive systems have quantum characteristics (Conte *et al.* 2009). It follows that concrete hypothesis that could explain the human capacity to keep in mind at the same time contradictory ideas. In this way, therefore, the foundations of anxiety states, tensions or cognitive dissonance in the conditions of discrepancy between self-image and social identity, illustrated in the previous section, are also identified.

Furthermore, if we consider that in quantum physics what would be reality are things that can be known, not realities that exist, we must conclude that what we consider consciousness is part of a larger dimension, in which the anthropocentric set of pragmatic rules of conduct represent only a limited aspect that develops

along well-defined paths, even if with different degrees of stochastics, dependent on previous cognitive pathways (Schwartz, Stapp and Beauregard 2005). We could therefore conclude that any stimulus will be perceived and understood in terms of personal knowledge, in an unpredictable way, given the quantum modalities of the process, but along shared paths, which, while safeguarding individual peculiarities, will “direct” to a common dimension different levels of belonging: of species, institutions, organizations and social groups. In other words, this complex process, which connects quantum theory and human knowledge, takes place in path-dependent ways.

4. Consequences for economic analysis

In the standard economic tradition, assumptions about the rationality of agents represent the fundamental requisite of economic behaviour, which is summarized in the unaware capacity to maximize the utility function. Social coordination is guaranteed by the market which, acting as a cybernetic mechanism, harmonizes decision-making processes, rewarding who act “as if” they were able to manage the large amount of information that is needed to optimize individual choices. What follows is a condition of general equilibrium, where the intertwining of individual actions finds a synthesis in the spontaneous emergence of a social dimension, the general equilibrium precisely, which guarantees the best use of the given resources and the achieving maximum satisfaction for each person.

Rational behaviour is the necessary requirement that characterizes the levels of homogeneity in economic subjects. It should be noted that it is not necessary to refer to levels of absolute rationality. Even the assumptions of limited rationality can ensure the achievement of general equilibrium conditions. The high degree of information and levels of rationality that an individual is unable to possess, due to computational, mnemonic and cognitive limitations, is guaranteed by the market as a whole.

As argued elsewhere (Rizzello 1997), the gap with the standard approach becomes unbridgeable if we consider, as crucial elements for economic analysis, the concept of procedural rationality, instead of that of bounded rationality (as Simon proposed) and that of personal knowledge, in place of information, as Hayek (1937) suggested. For some decades now, extensive literature has been revealing the important economic consequences of these different approaches to economic theory (Rizzello 2003; Egidi and Rizzello 2004; Rizzello and Spada 2016), in which we can include the literature on identity, or at least a significant part of it.

Among the many interesting themes in the literature on identity in economics, the most important points, so far *lato sensu* emerged, are two: i) the awareness or not of economic subjects and ii) the relationship between individual identity and social identity. These two aspects are interconnected. The first affects on the relevant topic of individual freedom and free will of economic subjects; the second concerns the equally important relationship between subjectivity and the social dimension. By unifying them in a single question, we might ask: how is it possible for

a stable and satisfactory condition of social order to emerge from heterogeneous individuals who act freely on the basis of subjective and personal interpretations of the external data that shape their action?

A vast literature has already provided many answers to this question, especially in the context of the heterodox research projects, in part already mentioned, which have provided significant contributions in the field of the economics of institutions, the economics of organizations, Austrian economics and cognitive economics. Nevertheless, the explicit reference to the identity connected to consciousness, as proposed in this paper, could consolidate some results already achieved and open up further research paths.

Very briefly, this literature describes human decisions in conditions of uncertainty and bounded rationality, based on the interpretative capacity of the mind to give meaning to external stimuli (information) by transforming them into personal knowledge. This process takes place at a neurobiological level and is largely unaware. Furthermore, in the path of “giving meaning” to new stimuli, the previous successful interpretations, already configured in the synaptic predisposition of neurons and in the previously tested connected cognitive categories, play a fundamental role, to which they are reported as “familiar” (Hayek 1952). In any recurrent or similar circumstance, the corresponding neurocognitive categories are spontaneously reminded. As has been argued elsewhere (Rizzello 2004), this process takes place in a path-dependent manner, i.e. significantly, but not causally, influenced by the previous subjective path in the construction of neurocognitive categories. In turn, these are the result of a path-dependent way that, from the moment of their first appearance, manifests with continuous “adjustments” of the categories to incorporate external environmental and cultural stimuli. Herbert Simon (1976) later explained how, in a highly uncertain and changing context, as well the social environment, we solve problems and acquire knowledge, by means of heuristics and by putting into practice forms of procedural rationality.

This literature, which identifies the source of human diversity in the specific interpretative process of external data, based on the genetic and experiential diversity of each, has even the merit of explaining how a social order arises spontaneously. Shortly, we can say that it is based on the selection of informal and codified group behaviour norms, which in turn are the result of the free action of individuals in pursuing their own interests or solving problems. The most appropriate to the group are consolidated, the others are removed or decline because disused (Hayek 1963). The unifying aspect of this path is the direct connection to the psychoneurobiological mechanisms of the human mind, which generate personal knowledge and individual actions and which, through language and other forms of communication, even tacit, generate rules of conduct, which in turn influence the subjective neurocognitive categories, in a mutual relationship of reciprocal conditioning.

The theories on consciousness described in the previous section highlight some relevant aspects. Among these we mention: our “active” ability to give meaning to external stimuli; the exact predictability of the interpretative outcome of a single event; the presence of a probabilistic spectrum, or wave function, of the possible states of events; the path-dependent dimension of common cognitive pathways.

All these aspects considered together also confirm, from an empirical point of view, the summarized picture of the cognitive approach to economics. As emerged in the 1990s, it seems that the more neurobiological studies on the functioning of the brain and on the nature of the mind and consciousness are deepened, the more Hayek's theoretical microfoundations about human knowledge and social order are confirmed.

Let us now take into account two aspects that, as we have stated before, we consider most relevant, i) individual awareness and ii) its relationship with the social dimension. In the perspective of standard economic theory, the unawareness of individual action is an essential element of the theoretical architecture underlying the process of maximizing the utility function. Accepting the challenge that came from the studies on the bounds of human rationality and from the situations of uncertainty in which economic agents act, in the 1950s Milton Friedman elaborated the famous theory of "as if". As already mentioned, if a subject is not able to possess and/or process all the information necessary to maximize, the important thing is that he acts as if he were following the complicated prescriptions of the model. The rationality of the system (the market) will exceed the limits of its rational capabilities.

It is therefore not surprising that Akerlof and Kranton's attempt to include individual identity in economic analysis involves the unawareness of the agents. But the outcome is not convincing. The neoclassical theoretical framework remains an insuperable obstacle. They cannot leave out consideration the methodological assumption of "as if" that reduces, in fact, the whole process, however complicated it may be, to the problem of rational action. In this sense, even the alleged individual identity disappears within a homogenization of the subjects. As also claimed by other authors (see section 2), it is no casual that in this model the individual identity is reduced to the social one and the main part of the analysis takes place on the level of deviation between this and the internalized rules of behaviour, which are always connected to them. The utility function therefore acts as a reduction mechanism of this hiatus.

We have already mentioned how this model is static and not able to give an account of the dynamics of change of identity and that it is no coincidence that it can explain conformism, more coherent with an idea of behaviours reduced to uniformity. Furthermore it is not consistent with what emerges from the researches on consciousness. Indeed, it could not be argued that the emerging differences in the processes of interpretation with degrees of awareness of external stimuli cancel each other out in conforming to the social dimension, because it would derive from a dynamic process of reciprocal influence between private self and social identity, as claimed above all by Kirman, Sen and, in other ways, also by Hayek.

Moreover, the heterodox literature has also provided other explanations on the causes and on the resolution of the conflict between private and social dimension. Albert Bandura, for example, has directly linked subjects' institutional behaviour to the mechanisms of subjective diversity and production of social learning (social

cognitive theory). For Bandura, individuals are able to learn not only through direct experience, but also through “vicarious learning”, related to the observation of others (Rizzello and Turvani 2002). Observation allows individuals who interpret external behaviour to effectively restrict the range of possible successful interpretations. This is not a process of mere imitation of others, but of active action that gives meaning to the actions of others in a dimension of social learning of reciprocal conditioning. Not only that. A further relevant subjective characteristic is given by the ability to self-evaluate one’s own action in terms of the social effects it produces, before it is accomplished. It is as if each represented himself in the different future scenarios, consequent to his own actions and he chose the one morally most suited to his own identity, on the basis of this conscious self-assessment (Bandura 1991). In this way, institutional behaviour does not exclusively respond to personal interest, but is rooted in the subjective process of acquiring human knowledge, which has a dual private and social nature at the same time.

Finally, it should not be overlooked that an approach such as Akerlof and Kranton proposed would not be able to explain even the well-known “exit-voice” dynamics à la Hirschman of revision of the consolidated routines in the groups and which instead presuppose high degrees of consciousness and capacity for dialogue and negotiating.

The other approaches to the theme of identity in economics illustrated in this paper seem instead to be more coherent with a dynamic vision of identity in which the private self and the social self are in a continuous relationship with a reciprocal conditioning. This certainly is a complex connection, but, taking into account the relationship between identity and conscience, one can try to trace an efficacious analysis.

The conscious interpretation of external stimuli depends on a multiplicity of factors that we can identify at the macro level in the genetic and experiential endowment of each individual and from the feedback emerging from the natural environment and from social interaction (cultural environment). At micro level, instead, we identify them in the integrated information flows or in the vibrations of the microtubules that “collapse” to a single and specific meaning the quantum probabilities expressed by the wave function. Whatever approach you choose at micro level, the ability to generate personal knowledge is consistent with the interactive process we observe in the macro dimension.

Furthermore, the relatively recent complete mapping of the human genome and the more recent results emerging in the field of epigenetics have dissipated any doubts about the static nature of genetic information, predetermined before birth. On the contrary, it has been shown that environmental factors can influence the activity of genes throughout life (Reuter and Montag 2016). In practice it is the demonstration of the so-called phenotypic plasticity which allows an organism to adapt to the environment through the modification of the epigenome, without altering its genetic makeup. This process also demonstrates the ability to be transmitted as epigenetic memory to new generations (Zenk *et al.* 2017).

If this is the case, at this point it could be objected that it becomes crucial to understand how extensive the degree of awareness or consciousness is in the variations of cognitive mental maps from which personal and shared knowledge emerges. There is no doubt that a significant part of this process takes place without awareness and remains not entirely knowable. But if we assumed a zero degree of awareness for the duration of the process, it would be reduced to a mere mechanism and would be perfectly consistent with Akerlof and Kranton's model. Instead, if the stimuli deriving from the feedback with the social environment are the result of analysis and evaluation, more or less in depth, on a personal level and taking into account all the elements of individual uniqueness, then things change and the degree of awareness in the construction of shared knowledge becomes evident.

We could summarize the process as follows. The representation of the possible multiple meanings (or outcomes of an external stimulus) depends on the individual imaginative abilities, which in turn depend on the genetic, epigenetic and experiential path of everyone (path-dependence). Only one definitive meaning will be given to the stimulus, or external information, after the observation of external feedback, in the act of transformation into personal knowledge. In this dimension awareness and freedom become evident.

It is highly probable that the same social dynamics and the feed-backs that emanate from it will be the result of that process of active personal "interpretation" that informs the whole path of knowledge construction. It is equally clear, however, that the social dimension will be the fruit of the free interactive game between all the members of the group. The success of the outcome of the interpretation, the subjective satisfaction, cannot be defined *ex ante*, rather it remains undefined since it derives from the intertwining of all the singular interpretations of each one. It is a dynamic process, but we can identify the elements of stability and those of change. The former are linked to the similarity of the cognitive maps of the subjects involved, because they in turn are affected by the shared approximate conformation. The elements related to the change derive from the original individual interpretation of external stimuli, which find their roots in the neurocognitive processes described above and which are not entirely predictable.

In this complex process from which identity arises, what would happen if, instead, a "bug" were inserted and voluntarily or involuntarily directed it towards a certain condition? This could deeply transform and even compromise the source on which free behaviour is based. That complex path of knowledge production, the result of a very long evolution of our species based on the development of psychoneurobiological feed-back tools with the environment, would be undermined in its ability to widen the spectrum of imagination on the possible states of events, which is at the basis of creative choices.

Imagine a very large computer that collects the data of each individual, analyses them and provides real-time stimuli to adapt behaviour to anyone with a suitable device. This idea is by Norbert Wiener. The father of cybernetics wrote in his 1950 book *Introduction to cybernetics. The human use of human beings* that such a

picture is a madness because it would reduce the study of human behaviour only to a mechanistic level of performance and efficiency.

However this phenomenon is what happens in large part with the use of social media and, more generally, of internet. Everyone's browser data are processed in order to elaborate its particular profile and therefore its identity. The feed-backs received are well targeted and, in fact, reinforce and/or direct preferences, "tightening" the plastic capacities of the creative and original interpretation. Among other things, these mechanisms are particularly powerful because they are manifested through "like" that cause the release of endorphin which creates a feeling of satisfaction and affects the neurobiological dimension from which knowledge and opinions are generated.

This could explain the increase in the levels of conformism and a progressive standardization of cognitive processes generating human knowledge, with significant implications. Even the idea of multiple self, which until now convincingly described human characteristics, would be compromised. If in the perspective proposed above all by Sen and Kirman the multiple self can be considered as the set of cognitive acquisitions sequentially in some cases and synchronous in others, deriving from the complex process described above and in which the conscience plays a decisive role, when it compromises what at the neurocognitive level engenders it, the consequences are relevant.

It could be concluded that the increase in the diffusion and frequency of these mechanisms of "directed feeding" of our identity, would render effective the model of Kirman and Kranton of "unaware personal identity" and of social identity that would progressively identify with the market, as unique cybernetic tool of information allocation.

5. Concluding remarks

This paper aimed to introduce the theme of consciousness in the literature on identity in economics and to evaluate some consequences. In particular, two theories on consciousness have been taken into consideration, the integrated information theory and the orchestrated objective reduction.

The first does not refer to the necessary presence of a biological substrate from which it generates consciousness. The second one instead identifies this substrate in some structures, or better, in the vibrations of these neuronal cell structures so-called microtubules. In both theories the process of processing external data (information) and their knowledge transformation is central.

It emerged that this process is characterized by phenomena typical of quantum physics, at the micro level, which have been briefly illustrated. This element is at the base of the imperfect predictability of human action, of the originality in the behaviours and of the different capacity that the subjects manifest in the interpretation of external data.

This aspect allows a consolidated re-proposal of the Hayekian theory of knowledge, of the nature and evolution of the norms of behavior and of the Simonian theory on procedural rationality, which represent the cornerstones of the cognitive approach in economics.

With specific reference to the theme of identity, these results allow us to contribute to the theories, mainly supported by Kirman, but also by Sen and partly by Davis, which analyse the role of identity in economics outside the framework of the standard economics. These authors consider the active and *conscious* role of people with respect to their individual identity and the relationship that is established between it and the social identity of the groups they decide to adhere to, in a dynamic process of mutual conditioning.

The inclusion of theories on consciousness, on the other hand, does not seem to confirm the model developed by Akerlof and Kranton, which, by inserting personal identity within the utility function, effectively reduce individual identity to social identity, and are not able to explain the dynamic processes of identity evolution. A further critical aspect of this approach concerns the unawareness of the subjects in the process of maximizing their utility function, exactly as it happens in the traditional model, anchored to Friedman's idea of "as if".

Some important innovations that emerge in the context of the new methods of acquiring information flows through the Internet and social media would seem to undermine in the long run the psycho-biological features typical of conscience that are at the base of our ability to generate, to some degree *consciously*, knowledge and to make choices.

This topic deserves to be studied in depth, along with many others which have remained outside the scope of this paper due to space constraints and which concern: migration flows and processes of integration or cultural contamination; the methods of "building" political consensus; the role of religion in the construction of identity and many others. They are themes that cannot be confined only to the economic sphere, but which also have an economic relevance. Never as in this circumstance is a multidisciplinary analysis ever more desirable and necessary.

References

- Akerlof, G. and Kranton, R. (2000), "Economics and identity", *Quarterly Journal of Economics*, 115(3): 715–53.
- Akerlof, G. and Kranton, R. (2002), "Identity and schooling: some lessons for the economics of education", *Journal of Economic Literature*, 40: 1167–1201.
- Akerlof, G. and Kranton, R. (2005), "Identity and the Economics of Organizations", *Journal of Economic Perspectives*, 19 (1): 9–32.
- Akerlof, G. and Kranton, R. (2010), *Identity Economics: How Our Identities Shape Our Work, Wages, and Well-Being*, Princeton: Princeton University Press.
- Bandura, A. (1991), "Social Cognitive Theory of Moral Thought and Action", in W. M. Kurtines and J. L. Gewirtz, *Handbook of Moral Behavior and Development*, Lawrence Erlbaum Associated Editors, Hillsdale, 1: 45–103
- Coase, R. (2012), "Saving Economics from the Economists", *Harvard Business Review*, December.
- Conte, E. *et al.* (2009), "Mental states follow quantum mechanics during perception and cognition of ambiguous figures", *arXiv.org arXiv:0906.4952v1* [physics.gen-ph], Cornell University

- Davis, J. (2006), "Social identity strategies in recent economics", *Journal of Economic Methodology*, 13(3): 371–390.
- Davis, J. (2007), "Akerlof and Kranton on identity in economics: inverting the analysis", *Cambridge Journal of Economics*, 31 (3): 3409-372.
- Davis, J. (2010), "Neuroeconomics: Constructing identity", *Journal of Economic Behavior & Organization*, 72 (3): 574-583.
- Davis, J. (2011), *Individuals and Identity in Economics*, Cambridge: Cambridge University Press.
- Egidi, M. and Rizzello, S. (2004), *Cognitive Economics*, vol. I and II, Cheltenham: E. Elgar.
- Fine, B. (2009), "The Economics of Identity and the Identity of Economics?", *Cambridge Journal of Economics*, 33(2): 175-91.
- Hameroff, S. and Penrose, R. (2014), "Consciousness in the universe. A review of the "Orch Or" theory", *Physics of Life Reviews* 11: 39-78.
- Hameroff, S. and Penrose, R. (1996), "Orchestrated reduction of quantum coherence in brain microtubules: a model for consciousness", in S.R. Hameroff, A.W. Kaszniak and A.C. Scott (Eds.), *Toward a science of consciousness; the first Tucson discussions and debates*, Cambridge (MA): MIT Press: 507-540.
- Hayek, F. A. (1937), "Economics and Knowledge", *Economica*, n.s. IV (13): 96-105.
- Hayek, F. A. (1952), *The Sensory Order. An Inquiry into the Foundations of Theoretical Psychology*, London: Routledge & Kegan Paul.
- Hayek, F. A. (1963), "Rules, Perception and Intelligibility", *Proceedings of the British Academy*, XLVIII: 321-344.
- Hogg, M., Terry, D. and White, K. (1995), "A tale of two theories: a critical comparison of identity theory with social identity theory", *Social Psychology Quarterly*, 58: 255–69.
- Horst, U., Kirman, A. and Teschl M. (2007), "Changing Identity: The Emergence of Social Groups", *Economics Working Papers n° 0078*, Institute for Advanced Study, School of Social Science, Princeton.
- Ille, S. (2017), "Towards Better Economic Models of Social Behaviour? Identity Economics", *Studies in Ethnicity and Nationalism*, 17: 5-24.
- Kirman, A. (2005), "Demand theory and general equilibrium. From observation to introspection a journey down the wrong road", *Paper presented at the HOPE conference*, Duke University, 22–24 April.
- Kirman, A. (2012), "L'identità nell'analisi economica", *Ragion pratica*, 2: 383 -398.
- Kirman, A. (1997), "The economy as an interactive system", in W. B. Arthur, S. Durlauf and D. Lane (eds) *The Economy as an Evolving Complex System II*, Reading, MA: Addison-Wesley: 491–532.
- Kirman, A. and Teschl, M. (2004), "On the Emergence of Economic Identity", *Revue de Philosophie Economique*, 9: 59-86.
- Kirman, A. and Teschl, M. (2006), "Searching for Identity in the Capability Space", *Journal of Economic Methodology*, 13(3): 299-325.
- Penrose, R. (2004), *The Road to Reality: A Complete Guide to the Laws of the Universe*, New York: Alfred A. Knopf.
- Penrose, R. (1994), *Shadows of the Mind: A Search for the Missing Science of Consciousness*, Oxford: Oxford University Press.
- Reuter, M. and Montag, C. (2016), "Genes and Human Decision-Making", in M. Reuter and C. Montag (eds) *Neuroeconomics*, Berlin Heidelberg: Springer: 67-83.
- Rizzello, S. (2003), *Cognitive Developments in Economics*, London: Routledge.
- Rizzello, S. (2004), "Knowledge as Path-dependence Process", *Journal of Bioeconomics*, 6: 255-274.

- Rizzello, S. (1997), *L'economia della mente*, Roma-Bari: Laterza; eng. transl. (1999) *The economics of the mind*, Cheltenham: E. Elgar.
- Rizzello, S. and Spada, A. (2016), "Behavioural and Cognitive Economics", in G. Facca-relllo and H. D. Kurz (eds.), *Handbook on the History of Economics Analysis*, Volume III, Cheltenham: Edward Elgar Publishing: 22-26.
- Rizzello, S. and Turvani, M. (2002), "Subjective Diversity and Social Learning: A cognitive perspective for understanding institutional behavior", *Constitutional Political Economy*, 13: 201-214.
- Schrodinger, E. (1964), "Seek for the Road" [1925], in E. Schrodinger 1964, *My View of the World*, Cambridge: Cambridge University Press (first ed. 1951).
- Schrodinger, E. (1967), *What is Life. The Physical Aspect of the Living Cell*, Cambridge: Cambridge University Press (First publ. 1944).
- Schwartz, J., Stapp, H. and Beauregard, M. (2005), "Quantum physics in neuroscience and psychology: a neurophysical model of mind-brain interaction", *Philos Trans R Soc Lond B Biol Sci.* 360(1458): 1309–1327.
- Sen, A. (2004), "Social identity", *Revue de Philosophie Economique*, 9(1): 7–27.
- Sen, A. (1985), *Commodities and Capabilities*, Amsterdam: North-Holland.
- Sen, A. (1999), *Reason before Identity*, New Delhi: Oxford University Press.
- Sen, A. (2002), *Rationality and Freedom*, Cambridge, MA: Belknap Press.
- Simon, H. A. (1976), "From Substantive to Procedural Rationality", in S. Latsis (ed.) 1976, *Method and Appraisal in Economics*, Cambridge (MA.): Cambridge University Press.
- Tononi, G. (2004), "An information integration theory of consciousness", *BMC Neurosci.* 5 (42).
- Tononi, G. (2008), "Consciousness as Integrated Information: a Provisional Manifesto", *Biol. Bull.* 215: 216- 242.
- Zenk, F. et al. (2017), Germ line-inherited H3K27me3 restricts enhancer function during maternal-to-zygotic transition, *Science*, Vol. 357 (6347): 212-216.