

The social sciences focus on the effect of man's actions. Whether these regard immigration, employment, financial markets, technological innovation or political elections, any phenomenon that is the aggregate outcome of individual behaviour involving choice and human action is studied by a particular branch of the social sciences.

So far, in general, no objections can be raised to the definition of the aims of the social sciences. The situation becomes more intricate when we try to answer the following question: how can we explain the effect of human action? In the first place, some social scientists deny the relevance of this question. As they see it, the cognitive purpose of social sciences is the relationship between statistical aggregates of individual actions. Whether dealing with the relationship between internal demand and the rate of inflation or between the percentage of clandestine immigration and the level of assault, the ultimate goal is to identify statistical techniques and key quantitative figures that enable the researcher to signal the presence of a causal link between the aggregates. Seen from this point of view, to ensure that the question makes sense, we should decline it in the plural: how can we explain the aggregate effects of human actions? The answer is given in the aggregate terms of other human actions that play a causal role in determining the effect in question. Furthermore, they also identify the causal effects of the social phenomenon in the form of other aggregates of human actions. To sum up, the statistical explanation of a particular social phenomenon is sought by analysing the underlying causes and the consequent effects, always in the form of quantitative macrovariables of aggregates of human actions.

Those who would unhesitatingly answer the first question are the social scientists who, for a variety of reasons – metaphysical, epistemological and methodological – do not consider it possible to decline the question in the plural. If the goal of the study is to identify the laws and causal explanations, the line of inquiry must be directed at the real causal determinants of human action in the singular, whose aggregation is responsible for the social phenomenon. The relationship between statistical aggregates cannot a priori have any causal relevance because it represents mathematical invention, not real entities endowed with causal power.

Anyone who does not hesitate to answer the question about explaining human action, should not have any doubt in identifying the causal factors responsible for action in the mind. What else except the mind, through its processes of reasoning, judgement and decision, could produce the outcome of action? The goal of the social scientist should therefore be to identify the psychological mechanisms that generate a particular action and can be generalised to the same type of action accomplished by others. The social phenomenon, translatable in the aggregate of several actions of the same type, can be explained by laws and by starting conditions that refer to the psychological mechanisms of reasoning, judgement and decision.

However, this solution is not accepted by a third group of social scientists who, on the contrary, share the answer to the first question. Human action cannot be explained causally, as with natural events, but must instead be interpreted rationally. It is not possible to reduce action to a natural event and try to derive it from causal laws. There are several reasons. On the whole, the most important seems to be the one that highlights the specificity of intentional human action, complete with meaning and a subjective content that cannot be deduced from general natural laws. Moreover, the action is chosen by the individual and interpreted by the researcher on the basis of a principle of rationality that is assumed to be general but which, being *a priori*, cannot be explained in naturalistic terms.

This chapter is dedicated to a short historical excursus on the fortunes and misfortunes of psychologism (a term coined by E. Husserl) in methodology of social science. A number of key positions will be illustrated, without any desire for historical completeness but with the aim of establishing the premises for the arguments developed later in the book.

2.1 The Psychologism of J.S. Mill

Although numerous important contributions to the methodology of the social sciences were made earlier, the work of John Stuart Mill represents a milestone for the psychologist position. In Book VI of *System of Logic Ratiocinative and Inductive* (1st edition 1843; 8th edition 1956; Italian translation 1968) the brilliant “official of the East India Company” provides a relatively complete and to a certain extent definitive exposé of the theoretical primacy of psychologism in the social sciences. Book VI, which is entitled *The Logic of Moral Sciences* and was published at the end of the other five books dedicated to “a comprehensive explanation of the principles of evidence and methods of scientific investigation,” summarises the conceptual signposts of a position that would be neglected by later social science methodology. The book starts with a classic question “Are human actions subject to invariable laws like all other natural events? Are they really ruled by the constant of causality that underlies every scientific theory of successive phenomena?” (Mill, 1st edition 1843; 8th edition 1956; Italian translation 1968, VI, I, § 1, p. 827). Mill’s answer is complex. The actions of individuals can never be predicted with certainty owing to the variety of circumstances and initial conditions that precede the action

itself. On the other hand, “approximate generalisations” can be formulated that do not apply to all the actions of the members of a society, but only to the majority. In this case, it is possible to expect with certainty that a particular phenomenon will take place at a mass level, even if some individuals may act in a contrary manner. Seen from this point of view, the approximate generalisations that may assume universal validity for a given society from which they are derived and to which they apply, only reach the “base status of empirical laws.” In order to ensure that the study of society meets the requisites of scientific study they must be connected in deductive terms to the causal laws on the nature of human action. In fact, an empirical law is a true uniformity in all cases of the predicative field of observation. However, this does not guarantee its validity for a wider sector of reality because its generalisation is based on contingent and external aspects of reality and not on the intimate causal mechanisms of human nature: “Empirical law derives its truth from causal laws, of which it is the consequence. If we are familiar with those laws, we know the limits of the derived law; instead, if we have not yet justified the empirical law – if it is based on observation alone – then there is no guarantee in applying it outwith the limits of time, place and circumstance in which the observations were made” (Mill, 1st edition 1843; 8th edition 1956; Italian translation 1968, VI, V, § 1, p. 853). The empirical laws of those phenomena that depend on known causes, according to the general theory, have no other function except to verify the conclusions of the theory.

Causal laws that can justify empirical generalisations must refer to the human mind. However, in Mill’s opinion, there are two theoretical levels concerning the causal representation of the mind. At a lower, more general level are the principles of “ethology” or science of the character, and at a higher level the psychology or science of the elementary laws of the mind: “The principles of ethology are really average principles, the *axiomata media* (as Bacon would have said) of the science of the mind, because they can be distinguished, on the one hand, from the empirical laws based on simple observation, and on the other from higher generalisations” (Mill, 1st edition 1843; 8th edition 1956; Italian translation 1968, VI, V, § 5, p. 861).

Ethology is a deductive science, namely a system of corollaries of psychology which, on the contrary, is an experimental science. It is therefore necessary to generate the simplest laws of causality of psychology by induction, and then to derive the more complex laws of causality of ethology by deduction. In turn the science of character can be verified by empirical laws. How can ethology be represented? As the series of causal laws on the general character of the members of a given society in relation to the different cultural, material, political and other circumstances responsible for developing the character in one direction rather than another. In other words, the laws of ethology, derived deductively from the laws of psychology, should allow us to explain the different characters of social or national contexts in the presence of different starting conditions. Mill is concerned to underline that, in addition to this a priori activity of the deductive type, it is essential also to use an experimental kind of a posteriori activity: “The inference given by theory regarding the type of character formed by particular circumstances must be proved by the specific experience of those circumstances, if it can be

obtained” (Mill, 1st edition 1843; 8th edition 1956; Italian translation 1968, VI, V, § 6, p. 865).

Mill’s position was either neglected or criticised by later contributions to scientific methodology. These were marked by a generalised antipsychologism expressed by authors whose theses were radically divergent on other essential methodological questions. Marx, Weber, Menger, L. von Mises, Popper, von Hayek, Watkins, Boudon, Elster all share a stringent criticism of Mill’s psychologism and, more in general, of the thesis concerning the reduction of social action to causal mechanisms of the human mind.

In order to illustrate the general tenets of antipsychologism, it seems appropriate to refer to the position of Karl Popper that is most clearly contrary to Mill.

It is significant that in *The Open Society and its Enemies* (5th edition 1966; Italian translation 1974) Popper takes Marx as one of the main objects of his critical analysis, but he finds himself in complete agreement with his antipsychologism. For Popper, the aim of the 14 chapter – *The Autonomy of Sociology* (*The Open Society and its Enemies*, 5th edition 1966; Italian translation 1974, vol. II, pp. 119–131) is to illustrate Marx’s famous maxim: “It is not men’s conscience that determines their being, but, on the contrary, their social being that determines their conscience” (Marx, Italian translation 1971, p. 5). According to Popper, the fact that Marx attacked psychologism and, consequently, contributed to reinstating the autonomy of sociology and social laws is his greatest achievement as a sociologist. In fact, “The error of psychologism consists in claiming that methodological individualism in the field of social sciences entails the need to reduce all social phenomena and all social regularities to psychological phenomena and psychological laws” (Popper, 5th edition 1966; Italian translation 1974, vol. II, p. 131).

2.2 The Historicist Accusation

According to Popper, the reasons why this reduction is unacceptable can be summed up as follows. In the first place, psychologism is “obliged to adopt historicist methods.” According to Millian psychologism, all the regularities of society, its institutions, traditions, customs and culture must be explained and reduced, in the last resort, to the “actions and passions of human beings.” This is not the same as the historicist claim that, starting from the laws of the mind and the initial circumstances of the human species, it is possible to “determine a priori the order in which human development must occur and as a result predict the general facts of history up to the present time” (Mill, 1st edition 1843; 8th edition 1956; Italian translation 1968, p. 906). Nonetheless, for Popper this admission is not enough to save Mill from the accusation of being a historicist. In fact, Mill appears to mean that, although it is not proposable to explain the complete development of human history, it is however possible to explain the “idea of the *first steps* of this development.” But this implies that there must be a stage when the explanation of social regularities like institutions, culture and traditions is only based on pure, uncontaminated psychological factors, independent of social elements.

“Psychologism is therefore obliged, like it or not, to operate with the idea of a *start of society* and with the idea of a human nature and human psychology which exist prior to society” (Popper, 5th edition 1966; Italian translation 1974, vol. II, p.124). The theory of a pre-social human nature is, however, according to Popper, a historical and methodological myth. Because it is likely that man’s forebears were “social before being human.” This implies that the social dimension and the laws that explain it existed before the subjective human dimension and its relative psychological laws. “If a reduction is to be attempted at all costs, it would be more promising to attempt to reduce or interpret psychology in terms of sociology rather than the other way round” (Popper, 5th edition 1966; Italian translation 1974, vol. II, p.124). This criticism of Mill’s supposed historicism is motivated by the equally debatable hypothesis (one need only consider the studies on sociobiology and cognitive primatology) regarding man’s ancestors who were “social before being human.” Popper’s assertion appears to presuppose a genetic and hereditary basis of sociality that would account for its manifestation in species predating man’s appearance. Sociality as instinctive behaviour would leave out the psychological component for explaining the action and could therefore not be reduced to it. This ingenuous vision of the relationship between mind and heredity overlooks a number of points. Firstly, the hereditary component is not presumed to be a prerogative of sociality, but of more fundamental cognitive activities like causal attribution, which is present in man and in primates right from the very earliest age (Viale 1999). On the other hand, sociality understood as instinctive behaviour without mental activity is present and is a feature of species that are very distant from humans, like ants. Thirdly, the combination of sociality with reflex and instinctive behaviour, like that in ants, is the basis for justifying the organicistic and teleological theses of society as a body whose individual parts act unconsciously solely for the purpose of ensuring the survival of the community. This outcome is in contrast with Popper’s supposed methodological individualism. This apparent contradiction reveals, in my opinion, an anomaly that undermines all the individualistic theses contrary to psychologism. Even when they do not create such explicit contradictions as that proposed by Popper, they end up by legitimating a conceptual and ontological superiority and priority of the contextual and social dimension – for example, situational logic or the symbolic context – compared to the individual dimension. Consequently, they implicitly reduce individualism to a masqueraded form of contextualism, or in other words methodological holism.

In short, to return to Popper, if we are interested in referring to the sociality of man’s forebears as the premise of our sociality, this should not be thought of as resembling the reflex behaviour of termites, but rather that tendency to interact, to organise ourselves collectively and to create a division of roles in order to solve problems which is guided by their (the forebears) and our own cognitive and perceptive activities, whose foundations are, above all in our earliest stages of life, mainly hereditary. Sociality without an underlying mental activity can only be of the reflex and instinctive type. In this case, the individual, like a cell in the body, acts according to positive or negative mechanisms of action and retroaction that have been selected through evolution depending on their effect in terms of the

individual's better adaptation to the environment. However, in these cases, individual adaptability has been selected as being dependent on his role within a particular society of individuals of the same species, organised in a more or less hierarchical fashion. Sociality in this instance is obligatory, it presents constant organisational configurations and the individual, whether it is an ant or a cell, has no chance of autonomous survival outside these configurations. In conclusion, by taking this position Popper either supports strong theses of the innate type – which suggest that our sociality stems from and is founded on the conditional instinctual reflex of socialisation – which even the most radical modern sociobiology does not dare to affirm and which imply an organicist derivation, or he does not intend to support these theses, but could not avoid admitting that sociality – understood as an intentional or non-intentional artefact produced by human actions – although it may perhaps also be present in some superior primates – and therefore in pre-human species – can only be traced, even in these cases, to the psychological laws that explain human or pre-human actions in causal terms.

2.3 The Psychological Irreducibility of Unintentional Consequences

The second reason for opposing psychologism can be found in Popper's affirmation that while institutions, traditions and social groups are the result of human actions and decisions, this does not mean that they can be explained on this basis. "On the contrary, even those that occur as the outcome of conscious and intentional human actions are usually *the indirect, unintentional and often undesired by-products of these actions*," (Popper, 5th edition 1966; Italian translation 1974, vol. II, p. 124). Any institution barring a few rare exceptions, is not the product of a conscious plan of construction, but instead is the unexpected result of human actions. And even when an institution is directly related to a conscious project, its final characteristics elude the original intentions of its creator. If this is true therefore, in Popper's opinion, society, in all its various forms, cannot be reduced to mental activity, given that it is not its direct expression. Popper's anti-psychologistic arguments, which are also shared by other authors like von Hayek, are based on a serious misunderstanding of the concept of mental. They are founded on the rationalist prejudice that mental equals rational. If mental is identified with rational, then any outcome of human actions that does not correspond to the original rational decision cannot be explained solely on this basis, but requires external explanations of a social and environmental nature. Millian psychologism is not distorted by this "Cartesian bias." Instead, in his description of psychological and ethological laws Mill reveals an interest in the least rational and intentional aspects of the mind, for example character, personality, etc.

At all events, it is strange that Popper did not take into due consideration in the first place the difference between absolute rational action, relative rational action and intentional action. An intentional action is such if it is a means chosen consciously to reach an end based on given beliefs regarding the world

(which may be true, false, complete or incomplete). A relative rational action is such if it is the best means consciously chosen to reach a goal in relation to given beliefs regarding the world (which may be true or false, complete or incomplete). An absolute rational action is such if it is the best means consciously chosen to reach a goal based on true and complete beliefs regarding the world. The term best means is conventionally understood to mean, in this case, that deriving from the theory of rational action, namely the maximisation of expected subjective utility.

The use of the terms information and beliefs does not only mean those immediately local and relative to the present, but also the expected future effects of our actions on surrounding phenomena. This is particularly important when the variables involved are not of the parametric type, but our action must strategically consider the interaction of other individual actions. The decision-making problem is further complicated when the goal of our actions is not immediate but protracted over time, thus opening up the possibility of the combinatorial explosion of the decision-making tree. It could be said that the complexity and consequent incompleteness or falsity of information is directly in proportion to the number of strategic players involved and the increased length of time required to achieve the goal. A last clarification concerns the resources we must use to reach our goal. In a world of infinite and unlimited resources, our information and our inferences aimed at attaining a goal, for example studying to achieve a good social position, might overlook complex analyses over time of the effects of the strategic interaction with other players pursuing the same purpose. On the contrary, in a world where resources are scarce, if we are pursuing the goal of social ascent, we are compelled to think strategically with medium and long-term plans. Otherwise, we will find ourselves making choices together with many other players, for example the mass pursuit of a particular profession, leading to the final perverse outcome that the supply well outstrips the demand leading to professional dequalification and failure to achieve our aim of social advancement.

In short, an intentional action may be irrational for two reasons: because it is based on incomplete or false information or because it uses inferential-deductive and inductive-fallacious procedures to choose the action. A relative rational action can only be irrational for one reason: because it is based on incomplete or false information. To these three categories we can also add that of unintentional actions, namely those carried out thoughtlessly, as in the case of reflex actions, or those deriving from violent emotions, or from lapsus and forgetfulness (that, according some authors, like Gigerenzer, that conceive intentionality and rationality as distinct concepts, can also be rational).¹

All these categories of actions can be explained by psychological laws regarding the nature of the mind. Except for absolute rational actions, which are possible in

¹ In the second part of the volume I will introduce the current debate on duality of mind and ecological rationality. According to this debate most of mental activity is not intentional, but unaware and in the same time adaptive and rational as a good solution to the environmental decisional problem (Gigerenzer 2007).

principle but impossible in practice, apart in rare cases of transparent decision-making settings, with few parametric variables and with immediate outcomes and not medium-term deadlines and unintentional actions, the other two categories of action may produce unintentional consequences. How can we explain these undesired consequences? Through two elements. The first refers to informative limits or to the limits of the social player's inferential ability. Instead, the second refers to the resulting aggregate motive for the interaction of various individual actions generated on the basis of the informative and inferential limits. A simple classical example will suffice. How can we explain the overcrowded motorways and queues on the night before the start of the holidays? All other reasons being equal, like enjoying travelling by night or making use of every available minute of the holidays, the people who decide to start their journey during the night tend to base their choice on information that is incomplete, e.g. not taking account of the strategic dimension of similar actions taken by other individuals like them, or false, e.g. believing that the majority of holidaymakers leave the following morning, a statistic based on incorrect data published for the previous year. Based on these assumptions, they take the rational action of travelling by night with the aim of travelling comfortably on the motorway with no heavy traffic and queues. The aggregate result of all these similar relative rational actions aimed at achieving the purpose of travelling in comfort and the presence of a relative scarcity of the resource, namely road space, causes the unintentional phenomenon of queues and traffic jams which frustrates the hopes of the would-be crafty motorists. In this way, an unintentional social phenomenon can be explained in psychological terms, namely the cognitive mechanisms underlying the relative rational action of numerous motorists and the presence of an environmental constraint, like the relative scarcity of road space.

2.4 The Subalternity of Mental Causes to Situational Logic

The third reason why Popper affirms that psychologism is not acceptable is linked to the *logic of the situation* (Antiseri, 1996). The analysis of the situation plays an important role in all social sciences, starting with economics. Situational logic is dictated by the external circumstances in which the action occurs. It is the environmental constraints that shape the subject's rationality. "...when we talk of 'rational behaviour' or 'irrational behaviour', we mean a form of behaviour that is or is not in harmony with the logic of that situation" (Popper, 5th edition 1966; Italian translation 1974, vol. II, p. 129). The psychological motives are subordinate to the situational logic. In fact, "the psychological analysis of an action in terms of its motives (whether rational or irrational) presupposes (...) that the criteria for what should be considered rational in that situation have been defined beforehand" (Popper, 5th edition 1966; Italian translation 1974, vol. II, p.129). What Popper seems to be saying is that the situation, understood as the context in which the individual finds himself acting, dictates his explanatory priorities over the psychological mechanisms that are responsible for the action. It is as if the action is

swallowed up by the contextual situation and without it has no possibility of being deciphered.

There are two ways of interpreting Popper's thesis. The first, which I would describe as weak, could be summed up as the need when explaining any social action to identify the context of the problem to which it is addressed. Every action could be defined as a solution to a problem, and in order to explain it we must therefore first clarify what it is addressing. This weak interpretation, which is easy to agree with, does not present the antipsychologist claims present in Popper's thesis. In fact, it could easily be compatible with the psychological tradition of decision analysis as a problem-solving activity which attributes the explanation of the action to the psychological mechanisms – heuristic, problem representation, empiric and deontic rules, etc. – responsible for the solving processes.²

The second interpretation, which could be called “strong,” reverses the viewpoint of the relationship between situation and action. It is not the action which, as the response to a problem, allows the crucial characteristics of a situation to be defined, or in other words allows the formation of its semantic field, but rather the situation which contains all the possible explanatory meanings of the action. It is the situation that lays down the boundaries and determines the lines of strength if not the specific courses of human action. It is the situation that rationally structures the factual map so that the course of human action can be adequately explained through these facts. In short, Popper appears to suggest a reduction – in terms of rationality – of individual human action to the collective logic – namely the social context – of the situation in which the individual acts. By doing this, Popper appears to favour a form of holism that we might call *contextualism* or *methodological situationism*.

A number of critical considerations can be made regarding the position taken by Popper. First of all, it is not clear how a situational logic can exist with an independent foundation, external to individual logic. If by this, he means that the situation presents contextual constraints to the decision-making process – e.g. scarcity or otherwise of material resources, objectives and strategies of other players, time constraints, etc. – it is not clear what this has to do with logic. Even in the metaphorical sense, when we use the term logic we mean a set of a priori rules of an analytical type used to derive assertions from other assertions.

In the case of constraints on the situational context, if we want to unearth some sort of logic at all costs, it can be identified to a greater extent in the rules guiding the player's representative and decision-making processes which underlie the representation of the problematic situation, the search for a solution and the consequent action. In fact, the so-called environmental constraints characteristic

² As we will see in the second part of the volume, bounded rationality thesis represented by the metaphor of two blades of the scissors (Simon 1956; Gigerenzer and Selten 2001a) conceives rationality as the fitting of the environmental complexity represented by the structure of the problem and inferential ability of the problem solver. Therefore the rationality of a solution or of a decision is also assessed in relation to a problem that is contextually based.

of the situation have no logical form other than how they are represented by the player. The scarcity or otherwise of material resources present in a particular situational context is always relative to the objectives and the means chosen to achieve them, elaborated by a player using representative and inferential processes. If the material resources present in a given environment are equal, their relative scarcity or abundance is a function of how we represent them, the player's aims and the consequent actions taken to achieve them – e.g. the limited supplies of fossil fuels on earth makes this a resource that is scarce or abundant depending on the choice between combustion technologies and alternative energies and on consumption and energy saving policies.

The same argument could be applied to the constraint of time. Like material goods this, obviously, is a limited resource. However, its greater or lesser scarcity depends on the needs in terms of the player's aims and decisions, as well as on other variables regarding the situation. If other constraints are equal, the time variable either will or will not become a scarce resource depending on the aims and decisions of players requiring more "time consuming" actions – for example, in a chess match, the decision whether or not to adopt a decision-making strategy of the optimising type compared to a "satisficing" one. At any rate, it is the player who determines the value of the time variable, and not any form of external situational logic.

The third and most important aspect of a social situation is the interaction between players. In this case, situational logic can be compared to all the decision-making logics used by the players, each of whom attempts to pursue his own goal, trying to evaluate and foresee the moves made by the other individuals with whom he has to interact. Other people's decision-making logics represent important constraints on inferential processes and individual action. From this, can it be supposed that the logic of individual choice is annihilated by that of the situation? No. Let us take two extreme examples. In the first, the player interacts with other subjects who, for various reasons – lesser decision-making ability or rigid routine behaviour – present a less sophisticated rationality than his own, so that he can regard them as parameters within his decision-making processes – e.g. the manager of an organisation whose employees follow rigid routines. This is the case that comes closest to an example of situational logic. The decision-maker can formulate his choice on the basis of a rigidly structured environment. If he has a goal, he can only reach it by moulding the choice of the means to the rigid form of the parametric behaviour of other individuals. If we compare this situation with that represented by an interactive strategic-type environment made up of players who symmetrically possess sophisticated rationality – e.g. negotiations regarding an employment contract or the acquisition of a company, or talks on nuclear disarmament – the difference is clear. Because of the symmetric condition of the capacities of reasoning, decision and strategic interaction, the social player knows that the choices of other players in the situation cannot be foreseen using deterministic methods, nor is their behaviour rigidly conditioned by routines and decision-making models, but instead there is a potential symmetry in the opportunities for decision and action. The situation therefore becomes a continuous evolution in which the player's

ability to calculate, interpret and anticipate the behaviour of others is at the basis of his strategic choices. Social action is closely dependent on the psychological ability to evaluate and foresee actions taken by other players in the social situation. Therefore, there is no logic outside the reasoning and decision-making capacity of the individual situational player. The only forms of logic are the representational, inferential and decision-making logics that oversee, as Mill would say, the mental activity of the individual in his attempt to interact strategically with other situational players. In a situation of this type, the barycentre is obviously at the level of the other individual social players involved. On the other hand, in the previous situation, it appears to be focused on the rigid constraints of the routine behaviour of the active members in this context. On the surface, this extreme case might be seen as situational logic capable of explaining individual action. This interpretation should be rejected on a number of grounds. In the first place, in the real world, no situations exist where routine behaviour is so rigid that it does not leave space for individual variability. Variability may derive from a variety of reasons: for example, it may be caused by the incorrect, but involuntary application of the assigned routine, or by the voluntary attempt to create decision-making spaces in the margin of one's own assigned role. In doing this, the individual assumes decision-making characteristics of a strategic type that present the aforesaid characteristics of non-predictability. The same could also be said of hypothetical social contexts peopled by parametric individuals whose rational abilities are less sophisticated than their own. Those who act in these contexts cannot assume with certainty the predictability of other people's actions. For the simple reason that there is no homogeneity in the expression of this rationality. Instead, subrational behaviour is often, owing to its instability and variability, less easy to interpret and foresee than rational behaviour.

Secondly, even in these parametric cases, the player who wants to formulate a decision does so on the basis of the constraints and characteristics deriving from his unique ability to represent reality. The elements making up the real situation with which he intends to interact have no life and meaning for the social player if they are not "reified" ("*mentalized*") as social entities by his mental processes of representation. Outside the cone of shade of attention and representation, they are simple entities without a role or social value. But mental social reification occurs both according to inclinations, distortions and "biases" that amplify or underestimate special aspects of the situation, and above all in different ways by different minds. The first order of effects has been studied and demonstrated by cognitive psychology. It leads to various phenomena – of a perceptive and inferential type – concerning the suboptimal representation of reality – e.g. perceptive distortions based on expectations or the mistaken estimate of the characteristics of an object based on overconfidence or "heuristics of representativeness." The second order of effects is based not only on the findings of psychological experiments which show a constant, albeit infinitesimal variability in the responses given by individuals. It is also justified by the variability between one individual and another in neuronal structure – in terms of the number of neurons and type of synaptic

connections – and the unique personal experience that has resulted in the unique structure of his central nervous system and relative psychological abilities.

2.5 Mental Atomism and Psychologism

The reasons for the criticism of psychologism raised by Popper and many other authors can be traced back to methodological individualism. The structure and complexity of this school of social science methodology is often not taken sufficiently into account (Antiseri, 1996). The contraposition of methodological individualism (MI) to the various holistic theses often overshadows that the fact that it contains incompatible and contradictory positions. The first reason for this confusion is the lack of differentiation between the different philosophical dimensions present within this approach (Bhargava, 1992).

In the first place, a distinction should be drawn between at least three forms within MI: *explanatory individualism* (EI), *ontological individualism* (OI) and *semantic individualism* (SI). The first can be summed up in the thesis that all social phenomena can, in principle, be explained using methods that refer to individuals and their properties. The second aims to demonstrate that because only individuals and their properties exist, then social phenomena must be identified with them. *Semantic individualism* is based on a different thesis from the first two, although it can be derived from them. Every noun and attribute referring to social attributes can be reduced to nouns and attributes referring to individual entities.

The structure of psychologistic or antipsychologistic theses belongs, mainly to the dimension of OI, even if, according to the position expressed in EI, consequences can be derived in favour of one or other position.

In the first place (see Fig. 2.1 taken from Bhargava 1992, p. 33), there are two main variants of EI which correspond respectively with support or lack of support for the *nomological-deductive model*. As far as concerns the first family of EI, *support of the nomological-deductive model* is combined with the formal constraint that the explanation is an argument in which the matter to be explained, the explanandum, must be deduced from at least two premises, the explanans. The two principal members of the nomological-deductive family are the *reductionist* option which affirms the possibility of reducing social laws to laws on individual behaviour combined with either bridge laws or assertions of identity (micro-reductions), and the *non-reductionist* option which follows the standard nomologic-deductive model of deducing the particular social event from general laws on individual behaviour and the starting conditions for individuals and their properties.

At first sight, the *reductionist* version and above all the *microreductionist* version seem to be closer to psychologism. By asserting the identity of social phenomena, on the one hand, and individuals and their psychological properties on the other, the epistemological barycentre of social analysis shifts towards the reality of individual minds. To do this, however, we must assume the existence of social laws, the object of the reduction. If this type of assumption corresponds to an

Forms of Methodological Individualism

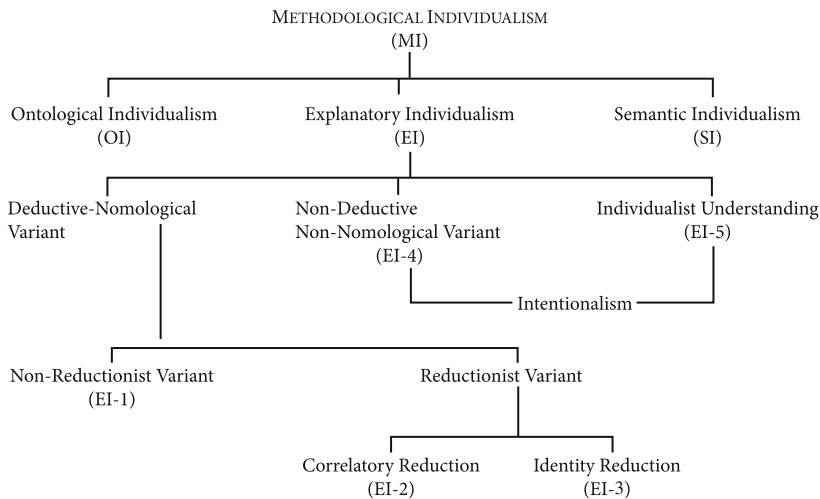


Fig 2.1 Forms of methodological individualism (Bhargava 1992)

affirmation of the epistemological reality of social laws, this would not be accepted by Millian psychologism because, according to it, only the laws of the human mind are real. The reason for this position is clearly ontological, because a scientific law aims to establish regular relations between real entities. According to the Millian position, a social law cannot exist because the social phenomena do not exist. In the words of scientific realism, it is impossible to accept as scientific a law describing the behaviour of entities that are not real.³ Therefore, given that the reality of social entities is denied by psychologism at an ontological level, it is not possible to talk of social laws that describe constant relations between them. The only epistemological position that might support the role of the social laws at an explanatory level would be a radical conventionalistic position that affirms the conventional nature of both the entities and the scientific laws.

³ This goal is not only pursued by the epistemological current known as scientific realism. Even the supporters of a conventionalist position on the reality of scientific laws, namely the lack of correspondence between the linguistic assertion called law and the world, might have a realistic position in terms of the entities to which the law applies (Hacking, 1983). For example, it is possible to support a Humean conception on the conventionality of causal laws and at the same time to support the epistemological reality of the entities to which the law applies. Even if it is asserted, for example, that the law of gases refers to the regularity of relations between real entities like the pressure and temperature of gas, it is still possible to deny its epistemological reality as a causal law.

On the contrary, according to the *non-reductionist* option, what can be explained is only the particular social event⁴ and the explanation is based on laws and the starting conditions of individuals and their properties.⁵ This variation of EI has no substantive ontological implications relating to what we propose as laws on individuals and their properties. The possibility of social laws is implicitly denied because the ontological existence of social phenomena is rejected. It is not assumed, however, which type of entity and individual properties are important for the explanation. The entities might be everything related to individual action. They might be psychological entities causally linked to action, like memory, reasoning, emotion, decision, and so on. Or they might be intentional entities linked to action through some principle of rationality. In fact, while psychologism may be favourable to *non-reductionist* option of EI, its greatest supporters also include convinced antipsychologists like Popper (1960) and Watkins (1973).

The *non nomological-deductive* version denies that social phenomena must be explained deductively with the aid of general laws. Social phenomena can only be explained or understood through particular facts on individuals. Singular facts like the dispositions and the intentions are the explanans that enable us to explain the social explanandum in a non-deductive manner. This allows us to establish causal relations of a particular type without the aid of deductions from general laws. Intentional and rational explanations are an example of this position (Elster 1983). Or, in the case of the “*understanding*” variant, through the description of beliefs, desires, individual intentions, an attempt is made to understand the social action, without trying to explain the meaning of social phenomena in causal terms. Hermeneutic understanding or empathic analysis are examples of this approach.

There are a number of well-known arguments (Hempel 1966; Rosenberg 1988) which demonstrate the implicit use of general laws also in this type of explanations. The hermeneutic model of beliefs-desires-intentions represents a general psychological theory known as “folk psychology.” The implicit use of these theories or general laws is often done in a deductive manner, even if the resulting deduction is not usually complete. At all events, the methodological negation of the use of causal laws for social explanation obviously places this variation of EI in an antipsychologistic position. In fact, as Mill pointed out, the laws of the nature of the human mind represent the barycentre for the explanation of social phenomena.

Situational logic can be included in the category of *non-reductionist* EI, or if deprived of its nomological-deductive component also in the *non-nomological-deductive* variant of EI (Popper 1960, pp. 147–152).

In conclusion, the epistemological analysis does not, at first sight, appear to be resolutive for the acceptance or otherwise of the psychologist thesis (except for reinforcing and detailing the explanatory model with a series of epistemological

⁴ Social event is considered as a linguistic fiction with pragmatic utility for the discussion but without any real content.

⁵ Therefore this EI can be considered an explanatory reduction of a social event to the laws and facts of individuals.

constraints on the causal nature of laws and on scientific realism). Historically, the psychologistic and antipsychologistic theses of MI have found the strongest arguments in their favour only at an ontological level.

Ontological Individualism (OI) deals with the domain of the application of individualist theses. What characteristics and properties of the individual are crucial and determinant at an explanatory level? In the first place, the most likely attributes are those of a physical and psychic kind. An individual is made up of a physical and a psychic component. As will be seen later on, this simple and banal consideration presupposes some form of dualism, if not of the substance at least of the properties, which present several areas of weakness. For the time being, let us consider psychic as referring to the mind-brain concept, leaving a critical analysis of the dualism of these properties to the next chapter.

Psychologism assumes that the relevant properties for explaining social actions are mental and not physical. Clearly, individual behaviour – gestures, communications, etc. – produce reactions from other individuals. All social interactions are based on behaviour. From verbal and written language to non-verbal and body language man's social expressiveness is conveyed through his body. However in the individual, this is the effect of a cause that precedes the various types of behaviour. It is the mind that causes action and social communication is generated by the individual's mental and psychological activity. Even social interaction is first represented at a mental level and then made operative at a behavioural level. It is true that in some cases the action does not correspond to the original intention. In some instances intention is not translated perfectly into behaviour due to disturbance linked to the emotional and unconscious sphere. Or in other cases, corporeal expression appears to be entirely derived from the subconscious sphere or from reflex mechanism, and not from conscious knowledge. At all events, even in situations in which the action cannot be explained by a conscious mental mechanism, it can always be traced back to a psychological type genesis. Psychologism does not constrain the psychological entities and properties solely to the conscious dimension. Rather, it is the entire set of individual neurocognitive entities and properties that is causally responsible for the social action.

In any case, psychologism does not include *physical atomism* which seeks to explain social events on the basis of the physical and behavioural properties of single individuals. On the contrary, psychologism can be interpreted as a form of *psychological atomism* that intends to trace social events back to the individual's mental properties.

This is the aspect that most clearly distinguishes psychologism from anti-psychologism. As pointed out by Bhargava (1992, pp. 42–45), psychological atomism can be regarded as the version of OI that supports the following theses:

1. The only acceptable explanations of mental states are those accomplished by empirical science, by knowledge on human psychology. Only causal laws of the mind rather than the conceptual analyses of philosophy can be used for the explanatory purposes of EI. The antipsychologism of Weber (1978, p. 19) and Dilthey is aimed precisely at challenging this position.

2. The only relevant facts for individualistic explanation are the mental ones. This form of psychologism is disputed by various authors like Popper (1966; Italian translation, 1974, pp. 75–76), Agassi (1973, pp. 187–188), von Hayek (1973, p. 40) and Elster (1983). In addition to those illustrated earlier when describing Popper's antipsychologism, the reasons for their opposition also include the refusal to exclude, as psychologism requests, the physical causes and the role of the action.

Von Hayek criticises both versions of psychologism. In his criticism of scientism, he takes on the opposition of the first version. According to von Hayek (1952a), scientism seeks to deny the subjective character of the social sciences and aims to construct a science founded on the objectivist methods used by the natural sciences. His polemical goal is clearly the scientist claim of some schools of methodological holism, like statistical structuralism. His criticism also touched on the scientific claim of psychologism which, in his opinion, tried to overturn the subjective and special character of human action, making it a natural and objective fact that could almost be described as a physical phenomenon. Moreover – and this is the criticism of the second version – von Hayek (1952a) thought that the social sciences fail to explain the action because this remained a task of psychology. The problems that social sciences tackle are those determined by the unforeseen effects of the interaction of a multiplicity of actions, in particular when these show a certain regularity or order. Unintentional orders are produced as the unplanned effect of individual actions which are the result of beliefs and individual ideas. However, as Watkins (1973) underlines, these beliefs should not be identified with psychological states. They are dispositions that do not refer to any one individual, but rather to a sort of “anonymous” individual, and therefore the explanations are of the “anonymous” type. “The reduced demand for consumer goods caused by an increase in prices” is just one example of anonymous type of explanation.

As I pointed out before, the psychologistic position does not claim to deny the presence of the physical and behavioural causes of social interaction. Instead, it acknowledges that all forms of social interaction are conveyed by individual actions and behaviour. The aim of psychologism is to explain these physical causes. The response is that they are a downstream effect of an upstream cause, the psychological cause. It is precisely these explanatory aims that make us search for regularity at a level that precedes the physical and behavioural one. This is justified above all by the complexity of social interaction. An individual's physical, linguistic or other behaviour may play a causal role in determining the physical and behavioural response in one or more individuals. This however takes place using a different mechanism from that in an amoeba, in which the physical stimulation by an individual on the body of another individual generates a peripheral reflex mechanism that causes a movement or an internal biochemical modification. In man, as in most of the animal kingdom, the generation of a behavioural response derives from a cortical type mental representation – or a subcortical reaction – by the “target” individual of the behaviour deriving from the “source” individual. Only after

having represented the behaviour of the source individual and having made this representation the premise of a process of reasoning and decision is the target individual able to generate or otherwise the response action. The explanation of social interaction cannot therefore be satisfied by physical-behavioural atomism, as it was for the purposes of the behaviourist school. However, this does not rule out that different causal levels exist within the individual, ranging from the conscious cognitive level to reflex reactions of the peripheral type.

2.6 In Defence of Psychologism

While the main stream of MI was antipsychologist until the recent past, from the 70s onwards the Millian tradition started to put forward new interpreters. Goldstein (1958, 1974) criticises Watkins position on the anonymity of social explanations. For him methodological individualism only makes sense if it can demonstrate the relevance of psychological characteristics in explaining and describing social institutions. The reference to anonymous rules does not seem an appropriate way of complying with the requisites of methodological individualism which, according to Goldstein, presupposes the reference to special individuals with their psychological peculiarities. However, Goldstein seems to confuse the criticism of antipsychological dispositions and the need for generalisations, not only of Watkins thesis, but of any genuinely psychologist programme. If we take EI of the nomological-deductive type and psychic atomism as OI, then our aim is to construct generalisations of the psychological mechanisms underlying the actions that we use as the premises for our social explanations.

This goal is pursued to a certain extent by Homans (1967, 1970). He supports EI of the nomological-deductive type, and on this basis he denies legitimacy to the other types of explanation put forward by the social sciences: the structuralist explanation because it does not meet the nomological-deductive requirements; the functionalist explanation because of the empiric non-falsifiability of the general propositions on social balance and survival; the historical explanation because it is a disguised form of the psychological explanation.

Social explanation must use two kinds of proposition as general premises: that of *rationality* and that of *behavioural psychology*. The first takes the following form: “...every man, in choosing between alternative actions, is likely to take that one for which, as perceived by him at the time, the value (v) of the result, multiplied by the probability (p) of getting the result, is the greater; and the larger the excess of pxv , for the one action over the alternative, the more likely he is to take the former action” (Homans 1970, p. 318). According to Homans, this is a fundamental proposition for a widely varied range of explanations, in particular historical and above all economic. However, this proposition is sufficient for explanatory purposes when individual values and perceptions can be taken as data and are shared by a large number of persons. In the field of microeconomic explanations, the proposition of rationality has often proved sufficient. In other explanatory fields of the

social sciences, it is important to add the second type of premises, those taken from behavioural psychology. There are the two main types of proposition. The first, which is also known as a “success proposition” would run as follows: “if a man takes an action that is followed by a reward, the probability that he will repeat the action increases” (Homans 1970, p. 321). The second referred to as a “stimulus-situation” is summed up as follows: “if in the past the occurrence of a particular stimulus-situation has been the occasion on which a person’s action was rewarded, the recurrence of the stimuli in the present makes it more probable that the man will repeat the action” (Homans 1970, p. 322).

Homans’ thesis is that the explanation of social events by psychological propositions cannot be proved philosophically. It is a matter of empirical investigation and analysis. “There is no philosophical argument that will resolve the issue. (...) there are no general sociological propositions at present that meet the two following conditions: they cannot be derived from psychological ones, and from them many features of social behaviour can themselves be derived. (...) But a sociological proposition with the right properties may be discovered tomorrow, and if it is, mere argument will be at an end in face of the fact” (Homans 1970, p. 325).

Homans seems to assume a sceptical aptitude towards methodological holism. He states that all social phenomena can be analysed without residue into the actions of individuals. And since methodological individualism entails psychologism, all sociological facts can be explained by the use of psychological propositions. However, he leaves the door open to emergent sociological propositions and properties. The psychologism of Homans has three weaknesses.

The first weakness is his lack of philosophical justification. If psychologism is only a matter of pragmatic choice when faced with the empirical data and if it is not the necessary consequence of explanatory or ontological individualism, it lacks any persuasive force in the methodology of social sciences.

The second weakness concerns the rationality proposition. Homans regards it as a psychological general proposition with respect to the behaviour of men, rather than with respect to societies or social groups as such. As will be shown in the following chapters, the rationality proposition is not so general. On the contrary, it applies only to a very limited set of decisions taken in ideal conditions for the rational computation of the choice.

The third weakness regards the proposal that behavioural psychology is the main psychological theory. Homans is a product of the time when the behavioural approach was dominant. The concept of stimulus and reward are an example. Nowadays cognitive science has completely changed the possibility of applying psychology to the social sciences.

Homans is an example of the handful of previous attempts that have been made to pursue the Millian approach. The following chapters will show how the Millian approach has found in cognitive science the proper foundation for a theory of social action that fulfils the desiderata of psychologism.

2.7 Beyond Methodological Individualism: The Methodological Cognitivism

This final paragraph will draft the outline of an hypothesis, which I dub *methodological cognitivism*. It can be regarded as an evolution of methodological individualism given that it appears to neutralise some of its epistemological and methodological difficulties and is more firmly rooted in the fabric of scientific knowledge, which is now more widely accredited in the study of human society.

It is an hypothesis whose arguments will be developed in the chapters of the two volumes. Therefore it should be considered the abstract of the entire work. For this reason it is elliptical and a little cryptic.

The first component concerns the *type of explanation* we prefer to use (see also Viale forthcoming, *Epistemology, Cognition, and Innovation*, part I, for a better analysis of this topic). In order to respond to the “social interrogatives”, various models of explanation have been put forward over the past years. After the failures of the *nomological-deductive explanation* model due to the well-known paradoxes that it allowed and to the difficulties of generating nomological universals in the social world (Salmon 1984), the proposal of Hempel’s *inductive statistical* model of explanation, or subsequently of Salmon’s model of *statistical relevance*, and finally the more elaborate *screening-off* variant was thought to overcome some difficulties (Salmon 1984). Nevertheless their critical analysis produced a series of drawbacks: the high probability that is a requisite of the inductive statistical model does not allow relevant explanations to be drawn; and Salmon’s elaboration of the statistical relevance model and the screening-off variant cannot avoid misleading explanations, the fallacy of substitutive causation and epiphenomenism. Finding high levels of correlation cannot avoid the trap of results lacking explanatory value. Moreover, the explanatory value appears to have coordinates that are not only epistemological but also pragmatic. In short, two key problems have emerged regarding explanation: one *pragmatic*, the other *causal*. The first was examined in an interesting article by van Fraassen (1980), above all concerning the logic of answers to the questions “why”, using what he also called *erotetic logic*.⁶ The pragmatic context K, which includes all contextual factors, ranging from knowledge of the phenomenon to our philosophical points of view and our interests, is what makes us select the reference class of the *explanans* when we try to provide an explanation. This factor is particularly valid when we are dealing with several causal chains, whose choice and selection cannot be justified solely on methodological grounds, or when we have to decide the level of aggregation at which to stop the explanation. However, factor K cannot rule out a spurious explanation or strong regularities without explanatory value. This difficulty leads us to the second problem, the *causal* one. What matters in an explanation is not the formal

⁶ While the main task of logic is to define the consistency (or inconsistency) of ideas (sentences) and the definition of inference in the erotetic logic the definition of questions and rules have to ascertain whether a sentence can be conceived as an answer to a given question.

subsumption among assertions, as in the case of water and various combinations of H₂O, but the physical subsumption among facts. This is based on the nomological- or probabilistic-type causal relation that describes the physical connection – either *constitutive* (the micro intimate causes of the macro) or *non-constitutive* (the causal relation between phenomena at the same level of aggregation) – between facts. It can be identified for its *productive* or *propagative* typology, through the empirical control of conjunctive and counterfactual conditionals on the effects of the perturbation or modification of the causal chain. Therefore, only in causal mode is it possible to avoid the false steps of earlier models. Instead, in explanations for the social sciences social scientists are usually satisfied by the requirement for statistical relevance which, although generally meeting the criterion of predictive adequacy, does not, as was seen earlier, satisfy that of explanatory adequacy (see also Viale forthcoming, *Epistemology, Cognition, and Innovation*, part I).

The causal problem, that is the explanatory need to identify the causal chain that “constitutes” the social phenomena, brings us to the heart of the debate on methodological individualism. Given that the epistemic purpose is causal explanation, in particular of the constitutive type when attempting more fundamental explanations, the study of social phenomena must use an individualistic type approach. But what kind of individualism is this? As we have seen above the candidates for this role include three versions of individualism.

The first, that of Watkins and the Popperians in general, can be ruled out because it uses the logical-argumentation model of explanation, which, as I mentioned earlier, cannot select and separate valid explanations from the spurious ones. The second is a form of reductionist individualism, which attempts to reduce social laws and theories to those of the actor through the use of “bridge” laws or correlation. This type of individualism, which has been adopted by authors like Nozick, Levine and Sober, appears to be quite vulnerable to the anti-reductionist arguments, in particular to that of *supervenience*.⁷ According to some authors, society is supervenient on the individual because we are dealing with two different sets of properties, and while the individual’s identity implicates that of society, the opposite is not true since various combinations of individuals can generate a given social property (*multiple realization*). If this argument is valid, the necessary nomological correlation between society and the individual cannot be present and therefore it is impossible to find “bridge” laws that allow the reduction of one property to another. In addition to this conceptual attack, there is also the clear absence, on the “market”, of these connecting laws, even in the weakest disjunctive form. How can one respond to this attack? The lack of laws of correlation or the multiple realisation is not sufficient to demonstrate the impossibility of the reduction. Firstly, because multiple realisation, as Davidson affirms (Vermazen and Hintikka 1985, p. 252), is also present in the relationship between phenomena from the natural

⁷ A set of properties *A* supervenes upon another set *B* just in case no two things can differ with respect to *A*-properties without also differing with respect to their *B*-properties. In slogan form, “there cannot be an *A*-difference without a *B*-difference”.

world, as in the case of water and various combinations of H_2O , but, for example, this does not prevent us from reducing water to its molecular structure. Secondly, the impossibility of highlighting correlations may simply be due to the fact that one of the two terms to be correlated does not exist, given that the property of the society is identical to that of the individual. This consideration introduces the second type of reductionist individualism: the reduction must occur between laws and social theories and laws and individual theories with the help of assertions of identity. This microreduction allows the social macro properties to be identified with individual micro properties, which may have an unlimited number of specific combinations. Indeed, the identity is not token-token or type-token, but *type-type* (Bhargava 1992, pp. 68–78). Furthermore, this microreductionist individualism offers fundamental, rock-bottom explanations, whose essential nature is decided – by convention – according to the pragmatic Factor K mentioned earlier with reference to van Fraassen. This type of individualism therefore offers causal and constitutive type explanations that seem to satisfy our epistemic desiderata. As we have seen before at first sight, the *reductionist* version and above all the *microreductionist* version seem to be closer to psychologism. By asserting the identity of social phenomena, on the one hand, and individuals and their psychological properties on the other, the epistemological barycentre of social analysis shifts towards the reality of individual minds. To do this, however, as we saw above, we must assume the existence of social laws and social properties, the object of the reduction. If this type of assumption corresponds to an affirmation of the epistemological reality of social laws, this would not be accepted by psychologism because, according to it, only the laws of the human mind are real. On the contrary, according to the *non-reductionist* option, what can be explained is only the particular social event and the explanation is based on laws and the starting conditions of individuals and their properties. This variation of EI has no substantive ontological implications relating to what we propose as laws on individuals and their properties. But since our aim is to establish constitutive causal explanations the preferred laws are psychological. The possibility of social laws is implicitly denied because the ontological existence of social phenomena is rejected. The exclusion of social laws and properties makes the use of social terms only a conventional and pragmatic choice without any ontological engagement on their real existence. From this point of view this option can be dubbed *eliminative*.

Having outlined the epistemological framework of our individualist hypothesis, we must now clarify its scientific content. If the ultimate aim, the motive for our research, is to explain, if the best form of explanation is causal or constitutive, if the methodological individualism that meets this causal model is eliminative individualism, as defined earlier, then at what level of aggregation should we position our fundamental explanations? I define the proposed methodology as *methodological cognitivism* precisely because I feel that the conventional base level of our attempts of explanation must be the cognitive. I use the cognitive attribute in a narrow sense compared to most sociologists, but in a broader sense than cognitive scientists, to include all the psychological mechanisms responsible for the decision and therefore the action. Therefore, not only the superior

psychological processes, like memory, learning, reasoning, but also emotion, instinct, perception.

Explanation based on cognitive mechanisms cannot always be accomplished. In some cases the state of our knowledge of the subject will make us raise the level of aggregation to the concepts of *folk psychology*, or commonsense psychology. But given that that this psychology is a theoretical fiction, with instrumental value, its use in social explanations can only be temporary. Instead, it is at the cognitive and, in prospect, at the neurocognitive level, as indicated by the programme of Patricia Churchland (1986) and Paul Churchland (1989), that these rock-bottom explanations must be sought, in macro-micro explanation.

In conclusion, we can sum up the epistemological reasons for choosing cognitive science as a source of models to give scientific content to our individualist hypothesis (Viale 1994a):

1. *Causality*: cognitive science, in all its variants, includes the search for compatibility of mental states and processes with their cerebral substratum. This physicality of mental activity meets the requisite for continuity and spatial and temporal contiguity that is typical of all causal relations. The type of explanation of action offered by cognitive science is of a constituent nature in that it aims to identify the intimate causal mechanisms responsible for behavioural output. These mechanisms, most of which are of a theoretical type, can be inferred both through experimental research using tests and through computer simulation using the principle of the common cause.
2. *Empirical nature*: cognitive science gives considerable importance to empirical research for the construction and checking of hypotheses. In experimental research, in the form of tests and in computer simulation, it is possible to make an independent determination of the starting conditions and the falsification of the hypothesis. Both when describing an event through the subsumptive model, and above all in causal explanation, the danger of the linguistic reformulation of the *explanandum*, albeit present, is not of a structural and constitutive type, as in commonsense psychology.
3. *Irrationality*: cognitive science satisfies the principle of symmetry so dear to the Edinburgh School of cognitive sociology of science. Not only so-called rational behaviours but also irrational ones are explained by the same type of hypothesis (Simon et al. 1992; Gigerenzer 2007). One need only think of the studies on decision psychology by Kahneman, Tversky, Hogarth, etc. Given that the quantity of mental life deviating from rational schemes is not marginal, a psychology, like commonsense psychology, which does not guarantee explanatory cover of this part, is destined to become insignificant in social sciences.
4. *Theoretical support*: cognitive science is not alone, instead it has or tries to have the theoretical support of some of the most accredited hypotheses of the scientific community. The search for this link is shown by the current debate on whether an overly strong characterisation of cognitive activity in linguistic terms is compatible or not with evolutionary theory, in view to the evolutionary delay with which language appeared. There are also significant links with Shannon's

information theory, with Wiener's cybernetics, with Turing's and von Neumann's mathematical and computational models, and with the predominant theories of neurochemistry, neurobiology, neurophysiology and neuropathology. Support for cognitive science could also be found in the opposite direction. The importance of language and of inferential activity in moulding social relations is beyond doubt. The relationship is clearly biunique, but the constraints and limits with which the mind elaborates and filters return input from social relations are fundamental to explain the role of social factors in individual action. These constraints show a certain degree of regularity, which allows generalisations to be drawn that are useful, also at a predictive level, and which can provide support for compatible so-called *social theories*. One need only think of the potential importance of the decision-making heuristics in relation to economic theory, or of the theory of mental models in relation to the sociology of knowledge.

It is worth noting the epistemic advantage of this model compared to microreductionist attempts. Instead of proposing two types of explanation, causal for physical constraints and intentional for action, there is only one type for both. Instead of being a timid and incoherent microreductionist hypothesis, ready to surrender before a mentalistic, dualistic-type language, lacking empirical content to explain the action, it arrives at the point where empirical hypotheses, accepted in the scientific community, are available to explain the real mechanisms of the action. Instead of proposing a priori assumptions of rationality that are systematically falsified by human behaviour, rationality is built a posteriori, along the lines of the *fil rouge* leading from Quine, to Goldman and Stich, as an empirical generalisation or cognitive theory of probabilistic and deductive reasoning (Viale 1997a).

Moreover, in conclusion, this approach offers a number of advantages. I refer only to two. Unlike the rationalist models that find it difficult to explain the various forms of social change, *methodological cognitivism* emphasises the creative and innovative aspects of thought, above all in problem-solving, inductive reasoning and conceptual learning, which manage to explain the introduction of novelties and new models of social interaction. Moreover, the difficulty of explaining the social structural stability of many social theories is solved at a more fundamental level than that of social language or rules. Indeed, it seems that cognitive procedures, underlying much of the fallacious reasoning, are responsible for the commensurability of communications between individuals, for the possibility of building common meanings, and in short, for synergy and inferential coordination (Viale 1991, pp. 288–298).



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