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RATIONALITY AND AFFECTIVE MOTIVATION: NEW IDEAS FROM NEUROBIOLOGY AND PSYCHIATRY FOR ECONOMIC THEORY

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Rationality and affective motivation: new ideas from neurobiology and psychiatry for economic theory?[*]

Maurizio Pugno[**]

Abstract

Psychology has recently attracted renewed attention from economists, since the classical theory of rational choice seems unable to explain various 'anomalies' usually observed in human behaviour. In the attempt to depart from Homo Economicus and achieve a more realistic representation of human behaviour, 'behavioural economics' proposes the conservative integration of the classical theory with inductive hypotheses drawn from psychology. This paper takes the research a step further, because it explores the literature in neurobiology and psychiatry, besides that in psychology. The intuition is that these disciplines suggest a more radical reconsideration of the role of rationality in human behaviour because of other fundamental motivations.

The results of the literature in these disciplines will therefore be organised as working hypotheses of specific interest to economists. A selection of the literature has been inevitable, since some results are still debated in the specialised journals, and different schools of thought persist.

On the basis of some authoritative works in neurobiology, complemented by various strands of analysis in psychology, it can be argued that human behaviour is largely explained by affective motivations arising from the mental image of our bodily reactions (emotions) to perceptions of external or internal stimuli, and which are largely unconscious. First, affective motivations are necessary for rational thought and decision-making, since they provide the information with which to define 'preferences', and make decisions. Secondly, they constitute autonomous motive forces for hedonistic behaviour which are different from the more basic instinctive reactions, and which may instead complement rational thought in many domains of human behaviour. Thirdly, they crucially contribute to forming an individual's specific identity as a state variable in the choice. A self-confident identity both relies more upon, and is strengthened by, the affective motivations. If identity neglects affective motivations, the individual is left to decide mainly on impersonal rational bases, and under the influence of instinctual drives. This latter case is assumed as the standard problematic case by behavioural economics, as exemplified by addiction.

A recent strands of analysis in psychology further shows that motivation for wealth and financial success yields less well-being for individuals than do motivation for self-actualisation and interpersonal relationships, that is, affective motivations.

This literature in neurobiology and psychology, however, does not adequately answer the question of how affective motivations and rationality can develop in a balanced way throughout the human life, rather than leading to materialism and addiction. The answer can be found in psychiatry. From birth and infancy onwards, individuals need not only material things but also, and especially, human relationships. In fact, if these are not satisfactory, the attachment will be diverted to things, so that affects are ignored and a vicious circle is triggered. Motivations become both more rational to buy things and more instinctual to need them, while the unconscious ability to enjoy human relationships diminishes. Unfortunately, economics usually takes human relationships as means and things as an end, rather than the other way around.

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Over the next twenty years, I suspect the contradiction will be increasingly concerned with an interpretation of how beliefs about future preferences are generated and utilized"
- J. G. March (1978)

If we really want to live, we'd better start at once to try;
if we don't, it doesn't matter, but we'd better start to die.
- W. H. Auden

0. Introduction

Recent years have seen a pronounced resurgence of interest in psychology among economists. Surveys and conferences have sought to take stock of this recent body of interdisciplinary inquiry and its endeavour to shift from Homo Economicus to a more realistic account of human behaviour and nature (Rabin 1998; Elster 1998; Rabin 2002; Tirole 2002; Brocas and Carrillo 2003). However, it is acknowledged that a new and robust theory is still far from being at hand: therefore, as Tirole (2002: 642) puts it, "let a thousand flowers bloom".

The inquiry is moving in several directions. So-called 'behavioural economics' attempts to integrate classical rational choice theory with new hypotheses borrowed from psychology, experimental psychology in particular (Mullainahten and Thaler 2000), the reason being the classical theory's inability to account for important aspects of human choices, which thus appear to be 'anomalies' and as 'irrational'. In psychology, by contrast, there is an apparent tendency to find sense in all forms of human behaviour, so that the 'anomalies' appear not to be 'irrational'.

Another, though less recent, attempt to leave Homo Economicus behind draws on psychological studies and Herbert Simon's 'bounded rationality' approach. In this case, as well known, the definition of rationality (procedural) is broader than the classical one (substantive), so that behaviours which the classical theory would have called irrational this approach does not (Simon 1982; 1985).

Hence, studying what comprises the term 'irrationality' is no less interesting than studying what comprises the term 'rationality', although it is on the latter that attention usually focuses. One finds from the economic and economic psychology literature that the most closely studied of non-rational human motives are those that spring from 'emotions' and 'instincts'. Although these terms are used with a variety of meanings, they seem sufficiently precise to indicate that people have characteristic subjective states, observable and apparently explainable, though not deliberate, which significantly influence their decisions. It seems indeed that 'emotions' and 'instincts' may give rise to behaviour that is contrary to self-interest and which may even be self-

destructive. From the point of view of classical choice theory it seems that 'emotions' and 'instincts' account for systematic decision errors or sub-optimal equilibria. It is then the task of behavioural economics to rebut more traditional criticisms by showing that the anomalies found are important, that they are not 'noises', and that they cannot be eliminated by learning or by the workings of the market (Rabin 2002; Shafir and Le Boeuf 2003).

The principal economic approach to 'emotions' and 'instincts' depicts man as an odd combination of Homo Economicus endowed with classical rationality and a non-human animal driven by destructive or self-destructive, immediate or deferred, urges. It thus follows that rational choices are distorted or constrained by 'emotions' and 'instincts'. Consequently, rationality should be pursued through the better management of information – including information about 'emotions' and 'instincts' – in order to bring these under control. The representation of man as 'half animal' is not satisfactory, however, because two objections can be immediately raised against it. First, the behaviour of animals has its own 'rationality' in that it serves to ensure the survival of individuals and their species. Except in only rare cases it is not self-destructive. Second, animals do not suffer from the mental illnesses that unfortunately distinguish humans when, apparently, 'emotions' and 'instincts' overwhelm rationality.

The aim of this paper is to take a different approach to non-rational motives for human behaviour, an approach which is largely unexplored in the economic literature although it is widely recognized in psychology and in two of its kindred disciplines: neurobiology and psychiatry. This approach views humans as having motivations, called 'affective', which differ from those that stem from either rationality or the 'instincts'. 'Affective' motivations are specifically human for two reasons: they are able to give a specific identity to an individual; and the most fundamental of them are shaped by interpersonal relationships. Furthermore, classical rationality cannot operate without 'affective' motivations, and together they determine subjective well-being.[1]

In order to study this approach, it is therefore necessary to analyse the 'affective' motivations, their genesis, their characteristics, and their effects. A minimally rigorous analysis must resort to neurobiology to find out what is known about human nature on the basis of observation of the *brain*, and to psychiatry to find out what is revealed about human nature by observation of the *mind*. Unfortunately, these disciplines address

[1] An 'affective revolution' is coming about in neurobiology (Forgas 2003; Elster 1998), after the 'cognitive revolution' of some decades ago. It is still not clear to what extent 'affects' can be incorporated into the cognitive approach (LeDoux 1998). Numerous contributions to the *Handbook of Affective Sciences* (2003) attempt this synthesis, but other studies show that the brain does not work as the cognitive approach maintains: that is, as a (linear) processor of digital information (Freeman 2000; Panksepp 2003). In economics, by contrast, the cognitive approach has only recently gained ground.

the questions of most interest to economists only incompletely, sometimes hypothetically, and often ambiguously. Debate still continues, in fact, among researchers and schools of thought.

This paper will therefore seek to organize diverse and important findings in the neurobiological, psychiatric and psychological literature in order to answer questions with a crucial bearing on the robustness of the economic theory. For clarity of exposition and to mark out a possible line of interdisciplinary inquiry, the results of this literature will be organized around a number of hypotheses. Owing to the variety of the studies considered, these hypotheses will be stated with a certain degree of terminological autonomy.[2]

The first hypothesis distinguishes three types of human motivation: 'instinctive', 'affective', and 'rational'. These labels are partly evocative, but giving precise definition to them is in itself an interesting aim of this paper. Each type of motivation is hypothesised as subsuming a specific level of human identity, so that there is a 'primitive' identity, an 'unconscious' identity, and a 'conscious' identity.[3]

The second hypothesis, of particular interest to economists, concerns the subjective well-being that derives from these three different types of motivation. Whilst behavioural economics largely ignores 'affective' motivations, a large body of psychological literature suggests that they yield greater subjective well-being than do the other types of motivation.

The third hypothesis concerns the dynamic of motivation and identity: or in other words, how they originate, how they develop, and how they weaken. Although no explicit agreement exists on these issues in the neurobiological, psychiatric and psychological literature, there is broad consensus – also supported by econometric studies – that interpersonal relationships are crucially important for personal well-being. This suggests that interpersonal relationships may influence the development of the identity and the propensity for one or other of the three types of motivation. This approach may also open the way for study on how subjective well-being can be increased.

These three hypotheses provide the basis for answering 'yes' to the question asked in the title to this paper, for they comprise new ideas on certain fundamental problems addressed by economic theory: rationality, choice, and individual behaviour.

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[2] In order not to encumber the text with citations, many of these will refer to surveys.

[3] Camerer et al. (2004) trawl the neurobiological literature for ideas of interest to economics, thus coining the term 'neuroeconomics'. However, more original ideas are forthcoming if one also considers the neurobiological, as well as psychological and psychiatric, literature dealing with the formation of consciousness and, more in general, human identity (LeDoux 1996).

However, the implications of these three hypotheses for economic theory are not discussed here; the concern being instead to show that behavioural economics is still only a very limited attempt to extend classical theory of rational choice.

The paper is organized as follows. Section 1 describes the three types of motivation and the three levels of human identity, doing so mainly on the basis of some neurobiological studies. Section 2 shows that the economic literature has included 'affective' motivations among the 'instinctive' ones, with the result that 'rational' motivations are given exclusive priority in affording subjective well-being. Sections 3 and 4 draws on various strands in the psychological literature to show that 'affective' and 'rational' motivations are complementary, and that the former are particularly efficacious in ensuring subjective well-being. Section 5 addresses a problem that arises in this literature: the balanced development of the various kinds of motivation. In order to solve this problem, Section 6 draws on the psychiatric literature, finding that interpersonal relationships play a crucial role in the origin and development of 'affective' motivations, and therefore in the onset of imbalances and self-destructive forms of behaviour. Sections 7 draws some conclusions.

1. 'Instinctive', 'affective' and 'rational' motivations

Neurobiology has recently made great progress in study of the workings of the human brain, but there is still much to discover. Some results are well-established, others less so: in particular, those that concern the relationship between the brain, which can be objectively observed, and the mind, which requires subjective introspection, are still rather mysterious. Nevertheless there is no lack of attempts to furnish an integrated description of both the workings of the human brain in relation to perception, elaboration and reaction, and the formation and development of the mind.

This section reinterprets and reorganizes the results of this literature, and of other studies in kindred disciplines, the purpose being to determine the extent to which support can be marshalled for an approach to human motivation and behaviour which is at once different from, and more general than, classical rational choice theory and behavioural economics. More specifically, the hypothesis discussed is whether it is possible to distinguish three types of motivation in humans: one 'instinctive, one 'affective', and one 'rational', to each of which corresponds a specific level of identity. The distinction is to be taken as theoretical, given that motivations are usually a mix of the three types.

1.1. *'Instinctive' motivations*

As a preliminary definition we may say that *instinctive* motivations are the body's direct and involuntary responses to the perception of stimuli external and internal to the body, and that they are able to override and inhibit the other forms of motivation.[4] Instinctive motivations are primarily those that ensure the survival of the individual and the species. They are motivations of generally simple and urgent kind and they engender specific forms of behaviour. They may be innate, the result of natural selection, or acquired through learning.

It is possible to identify a specific, but not specialized, circuit in the human body for the innate instinctive motivations, and another circuit for acquired instinctive motivations.[5] More generally, it seems certain that some parts of the brain (and of the system most closely connected to them), called 'lower order' and to be found in all vertebrates, support both the instinctive motivations and, as we shall see, the affective and rational ones. Other parts of the brain, called 'higher order' and present in the most evolved mammals, are instead specialized for the affective motivations and, in distinct manner, for rational activity. Moreover, the lower-order parts of the human brain are more developed than those of other animals (Damasio 1994; LeDoux 1996). These observations already suggest that human behaviour does not spring from a simple 'sum' of motivation elaborated in the same way as in other animals, like the instincts, plus a more evolved specific motivation which is typically rational.

On the basis of neurobiological observations Damasio (1999) offers an explanation of human consciousness and identity. He suggests that three levels of the human self can be distinguished, and that they form the basis of three types of motivation. In order to define the most primitive self, it is advisable to briefly discuss the perception of stimuli, the recording of perceptions in the brain, and the body's reactions – that is, the emotions.

Stimuli are perceived through the five senses, which constitute the peripheral units, the peripheral sensitive and motor nerves, and the blood flow with its neurotransmitters and hormones, which constitute the transmission routes. The sense of touch extends across the skin and into the body as far as the viscera, thus constituting the somato-sensitive complex. The five senses do not usually operate independently

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[4] The typical example is the soldier wounded in battle who flees without noticing the pain. In this case the stimulus is the danger. The instinctive motivation is the fear which makes the body insensitive to the pain, and which overrides any other motivation, and the consequent behaviour is the soldier's flight.

[5] It seems that the former circuit activates mainly the medulla oblongata and the hypothalamus, while the latter mainly involves the amygdala (Damasio 1994; LeDoux 1996; Rolls 2000).

when a stimulus is perceived, because the same stimulus – a sound for example – has various dimensions: for instance the spatial dimension of its provenance (Damasio 1994; 1999; 2003). Perception is also selective: that is, it may be focused/blurred/insensitive because of the organ of perception itself,[6] and because of a biological and acquired filter which orients the attention and prefigures stimuli or classes of stimuli (Boncinelli 2002).

One can therefore deduce that a stimulus – a material object, word, symbol, or even a feeling (see Section 1.2) – almost never exists in pure form as isolated, independent and static. Rather, one stimulus is perceived jointly with others, and together with them it impinges on different senses. One can also deduce that the perception of stimuli is an activity of the individual because it can be increased, reduced or reoriented.

Many of the innate instincts, like hunger, thirst, sex, the need for security and the avoidance of physical pain, arise as relatively pure stimuli only in exceptional circumstances. They occur jointly with other learned stimuli which often predominate.[7] For example, the urge to eat in adults is due to habit or induced stimuli, rather than to the instinct to survive – or at least it is so in the developed countries. Interestingly, the urge to eat in babies seems instead to be a pure instinct; yet its satisfaction is certainly combined with the satisfaction of other urges, primarily that of recognition by whomever is satisfying their hunger, mainly through touch and smell (see Section 6). Thus an apparently pure instinct is conjoint with other stimuli involving several if not all the five senses.

The perception of stimuli is first temporarily codified as a set of information on a neural support, while various predisposed lower-order cerebral sites are activated in parallel. This information is superimposed on the innate knowledge present in the lower-order sites, and on the learned information recorded in the higher-order ones. Recording comes about through the creation and reinforcement of the synapses which connect the neurons. If the synapses are not activated, or not activated sufficiently, they are destroyed (Damasio 1994; LeDoux 2002).

One may therefore define *emotion* as the activation of bodily expressions due to the contrast between the information just perceived and the information already recorded and present. Emotions are transient because they concerns the body, but they become permanent when they are recorded in the brain as reactions to stimuli. Hence

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[6] For example, the retina has greater resolution in the fovea; the ear cannot perceive either infrasounds or ultrasounds.

[7] Damasio (2003) points out that the elementary reactive mechanisms are programmed from birth, whereas the reasons for activating them change during the life-course.

the emotions shape the brain during the life-course and they modify its make-up originally given at birth (Damasio 1994; 1999).

The emotions that directly drive behaviour can be called instinctive motivations. Yet the range of emotions is broader than this. Damasio (2003) calls more evolved emotions like shame or pride the 'emotions proper', and among these he distinguishes 'fundamental emotions', like intangible states of malaise or excitement, of anxiety or tranquillity.

Corresponding to the instinctive motivations is a level of *individual identity* which can be called *primitive* in that it is also possessed by animals more primitive than man. This identity level collects information on the body's current state, and therefore on its reactions to stimuli, from neural sites predisposed for the purpose. 'Automatic' forms of behaviour may also be activated.[8] Perception of the stimulus, the body's reaction, and the ensuing behaviour may come about without awareness (LeDoux 1996).[9]

1.2. *'Affective' motivations*

Affective motivation is the body's *non*-direct response to a stimulus or a set of stimuli. The response is non-direct because modifications occur in the brain between perception and response and, correspondingly, images arise in the mind which represent the relationship between the stimulus and the body. These representations form the basis of the individual's 'unconscious identity'. Affective motivations may be innate or learned, but usually they are due to complex stimuli.[10]

In order to understand the passage from stimulus to response via the affective motivations, it is first necessary to clarify the concepts of 'mental images', 'feelings' and 'unconscious identity'.

The neural representations of stimuli are objective in that they can be observed in the brain.[11] Correspondingly, though not in all cases, these stimuli are perceived as

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[8] Damasio (1999) calls this level of identity the 'proto-self'.

[9] It may be that awareness of instinctive motivation is reconstructed after the event, with the help of the memory of one's behaviour. It was perhaps to this process that James (1890) referred with his 'to be afraid because of my running away' example. The feeling associated with particular stimuli may also be reconstructed in the same way (see Section 1.2). Instead, it seems difficult to argue that the instinctive motivations constitute 'preferences' when they become conscious (Loewenstein 1996).

[10] Also in the case of affective motivations, a specific neurosensory circuit can be identified in the brain. Its main components are, besides the hypothalamus and the amygdala, various regions of the cerebral cortex including the sensory and prefrontal ones (Damasio 1994; 1999).

[11] The techniques most widely used for this purpose are the electroencephalogram (EEG), positron emission topography (PET), and the recent functional magnetic resonance imaging (fMRI). Numerous

mental images – that is, as constructions of the mind – which may be subjectively 'observable' (Farah 2000) and which contain a set of information. Mental images are not photographic replicas of reality, rather they introduce distortions and partial representations.[12] The correspondence between neural representations and mental images is proven, but how neural representations become images is still a mystery (Damasio 2003). These 'images', despite the connotations of the term, are not necessarily solely visual, nor so are the stimuli perceived (Damasio 1994; Boncinelli 2002).

Generated jointly with the mental images of stimuli – the so-called 'primary' images – are images of the *relationship* between the stimuli and the consequent bodily expressions, i.e. the emotions. These 'secondary' images are *feelings*, and they are stored in the higher-order part of the brain (Damasio 2003).

Thought, that most typical of human characteristics, begins when it is possible to store mental images and subsequently retrieve them. By being stored, feelings may become 'somatic markers' for stimuli in that they signal their 'qualities' (Tranel et al. 2000). Stimuli may thus be ordered and classified so that they form secondary meta-images. The retrieval of images enables the association of different images, and the decomposition of old images and their recomposition into new ones. In particular, it becomes possible to form images of possible future scenarios (Damasio 1994; 1999).

Although this activity may be performed unconsciously, it is also the basis for the formation of consciousness (Damasio 1999). Only some stimuli are consciously perceived, whilst the majority of them are perceived unwittingly and as such are recorded permanently (Damasio 2003; Merikle and Daneman 2000). Hence, there can be only partial awareness of the primitive identity. The same applies to current feelings and to feelings that have been stored.[13] Damasio (1994; 1999) finally argues that only rarely is it possible to be aware of the activity underlying the images of which we are conscious: it is in the early years of life that the feelings are classified, and this activity does not necessarily involve language (Damasio 1999). It is obvious that neurobiologists privilege the study of conscious mental images because efficient instruments with which to do so have recently become available; but psychiatry also studies unconscious mental images by tapping into oneiric activity (Fagioli 1971).

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results have also been obtained from the clinical and experimental observation of traumatized patients or ones affected by cerebral impairments, diseases or dysfunctions.

[12] That the memory is constructive in character has been confirmed by several studies (Ochsner and Schacter 2003).

[13] Damasio (1999) calls the conscious description of the proto-self the 'core self'.

The *unconscious identity*, which is typically human, can therefore be defined as the fusion between the primitive identity and the autobiographical memory, or in other words, the organized record of past images and images of the future – whether these are primary or secondary – which form a person's biography.[14] Because the unconscious identity is based on the primitive identity, it may be perceived as a 'flow' because it is constantly recreated with the passage of time. The fusion of the autobiographical memory with the primitive identity enables the unconscious identity to develop in unitary manner: that is, to elaborate an integrated representation of the self *vis-à-vis* internal and external stimuli (Damasio 1999; 2003). The adjective 'unconscious' emphasises that the subject is unaware of large part of image management, thereby contrasting (see Section 1.3) with the conscious identity, whose activity is entirely deliberate.

Affective motivations strictly depend on the unconscious identity, and they can be defined as those particular feelings generated from the emotions and feelings associated, through learning, with experienced outcomes. Affective motivations therefore depend not only on an external stimulus – which may also be a memory – but especially on the person's specific emotional reaction, which is structured according to his or her unconscious identity. Note that the unconscious identity can predict future outcomes as a synthesis of information organized on emotional bases.[15] Like feelings, so too the affective motivations may be completely unconscious, or they may be brought to mind (Berridge and Winkielman 2003). Of course, history and the cultural environment are decisive factors in the shaping of the affective motivations.

The affective emotions may be directed towards the organization and accomplishment of behaviour. To this end, they enable characterization of the primary images as and when they are perceived or remembered along a 'hedonistic' scale from pleasant to painful. 'Preferences' for a rational use of the various options available may then be elaborated on this basis (see Section 1.3). Damasio writes (2003:148-9):

> The emotional signal […] can produce alterations in working memory, attention, and reasoning so that the decision-making process is biased toward selecting the action most likely to lead to the best possible outcome, given prior experience. The

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[14] Damasio calls the fusion of the nuclear self and the autobiographical memory the 'autobiographical self'. Note that Damasio uses the term 'consciousness' in the broad sense as "the process whereby a mind is imbued with a reference we call self" (2003:184), so that it is not a characteristic exclusive to the human race (Damasio 1999). Moreover, the Freudian unconscious – Damasio maintains (1999) – may constitute only a part of the processes and contents that remain unconscious.

[15] "The brain can be called an 'anticipation machine', constantly scanning the environment and trying to determine what will come next. […] Anticipating the future may be a fundamental component of implicit memory, distinct from the capacity to plan for the future [which is] more complex and deliberate" (Siegel 1999:30).

> individual may not ever be cognizant of this covert operation. In these conditions we intuit a decision and enact it, speedily and efficiently, without any knowledge of the intermediate steps.

The affective motivations may also not directly give rise to behaviours because of objective constraints, or because of the subjective inhibition of feelings. The latter case is particularly interesting in regard to its influence on the development of the overall identity.

The inhibition (or more in general the manipulation) of feelings may come about for various reasons. The first of them is clearly recognised by Damasio (1999) by arguing that very often it is more advantageous for us to concentrate our resources on the images that represent problems posed by the environment, rather than on our internal states. This shift of focus, which is not always deliberate, may have obscured the origin and nature of our consciousness.

Secondly, feelings may also be inhibited by the use of narcotics, medicines and alcohol. In this case the perception of the bodily state is altered and, according to Damasio (2003), a spiral of inhibition of the decision-making capacities may ensue.

Thirdly, feelings may be inhibited because they are painful, or sometimes even because they are simply unpleasant. In this case the subject defends him/herself by inhibiting and forgetting the feelings provoked (Morris 1999). However, this inhibition may trigger a perverse dynamic whereby the perception threshold is lowered to block potentially painful stimuli. The consequent reduction in information and images enfeebles the unconscious identity by weakening the primitive identity and by inhibiting memory, with the consequence that the affective motivations are also reduced.

Fortunately, there also exists a reverse dynamic which strengthens the affective motivations and the underlying unconscious identity, and which tends to be self-fuelling.[16] This dynamic may originate from an experience of pleasant stimuli which induces a more or less deliberate search for similar ones. The threshold of unconscious perception is thus raised to enable those stimuli to enter (see Section 1.1), and this fuels the information and images which reinforce the unconscious identity whence affective motivations derive. An important consequence is that behaviour grows more certain even though consciously learned information has not significantly increased. This is an instance of intuition-guided behaviour, or the ability to prefigure an image based on other images which remain unconscious.[17] This image may be made explicit in a

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[16] See Freeman (2000) on identity reinforcement, or more generally on the circular interaction among perception, mind and brain.

[17] It seems that intuition is facilitated by sleep. Experiments (Wagner et al. 2004) show that during sleep human thought is active and has a sense, albeit a non-rational one.

behaviour without its origins being fully known. One might say that an artist is someone able to give concrete representation to this image without there being some sort of useful behaviour involved: indeed, works of art are usually considered to be expressive but not useful. A scientist, by contrast, may be defined as someone who seeks logical proof for an intuition (Damasio 1994), an aspect which has been recognized by several scientists, Poincaré and Einstein among them. In the case of both the artist and the scientist the creative aspect of intuition is evident to its maximum extent.[18]

1.3 *Rational motivations*

Defined as *rational motivation* is the fully deliberate response to stimuli after their transformation into representations in the brain and images in the mind. It results from a logical-sequential procedure which elaborates these images, transforms them into possible future outcomes, and evaluates them. Rational motivations and the procedure underlying them are learned, and they constitute a complex activity.[19] The term 'rational' therefore refers to a subjectively adopted procedure, not to the objective efficiency of this procedure compared to others.[20]

Rational processing consists firstly in the identification, selection and isolation of information important for a pre-established goal on the basis of images drawn from conscious perception. Secondly, it consists in translating this information into workable options. Thirdly, it consists in maintaining the individual's information and the feelings associated therewith simultaneously active in the memory. Note that the information must be virtually fixed as constant, and that the feelings, too, must be isolated like the information. In some cases the impetus for action imparted by the affective motivations must be curbed. Rational evaluation typically consists in the logical-sequential procedure that first tries to compare the options available, and then tries to single out the option which, once accomplished, should maximize subjective well-being.

The rational procedure is therefore a complex activity also because it requires the management of a large quantity of information. It is a substantially deliberate activity intended to control reality through information acquisition and through behaviour. This activity is the fundamental component of the *conscious identity*,

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[18] These conclusions are confirmed by Carson et al. (2003), who show experimentally that the most creative individuals are also those, among persons with high IQs, who pay *less* conscious attention to stimuli.

[19] The neural circuits that support rational motivations seem to be partly different from the ones that support the affective motivations. The former involve more the prefrontal medial or orbital sites, the latter the lateral prefrontal sites (LeDoux 2002).

[20] In this latter sense, affective motivation may be more 'rational' because it is more efficient in raising subjective well-being (cf. de Sousa 1991).

together with the component comprising information retrieved deliberately from the autobiographical memory.[21]

Damasio (1994), however, cites clinical tests which show that rational evaluation is not enough for a decision to be taken: also necessary is the reactive capacity of the body, and therefore intervention by the unconscious identity (see Section 1.2). This evokes the idea of rationality as an hourglass, or as a bottleneck between the 'emotion-based' activity of perception and memorization performed multidimensionally or 'in parallel', on the one hand, and the impulse to decision-making and behaviour, which is also a multiple and 'emotion-based' activity, on the other. Through this bottleneck passes the rational logical-sequential skein in which the parallel nervous processes are aligned in serial sequence (Boncinelli 2002). Note that whilst the unconscious identity is spontaneous, active from the early years of life onwards, and based on an continuative activity, the conscious identity requires deliberate effort which must be learned and undertaken, and which may last for only a few seconds even if it can be repeated with great frequency. The continuity of the conscious identity is an illusion (Boncinelli 2002).

Classical rational choice theory represents one way in which rationality tends to work. The above results of neurobiological research, however, show that it is a highly abstract representation. For it is the assumption of classical rational choice theory not only that attempts at options comparison and maximization are successful but also that preliminary elaboration is unnecessary. It implicitly assumes, in fact, that the information is present in isolated form, that perception and feelings are equally well-defined, and that information and feelings do not change over time.[22]

Classical rationality, therefore, is an approximation which ignores *psychic* costs: in particular, it ignores the uncertainty due to the variability of feelings and of identity. Moreover, classical rationality is posited on the same level as the 'emotions', as if they were two independent and opposed forces. Instead, as Damasio (1994) has remarked, Descartes' famous dictum asserting the autonomy of rationality should be reversed: "I am, therefore I think"!

Classical rationality is an abstraction, therefore. Nevertheless it exerts strong intellectual attraction, and does so for several reasons, mainly because of its great

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[21] Damasio (1999) includes the unconscious and conscious identity in the 'autobiographical self'. The concept of conscious identity is similar to the one developed by Akerlof and Kranton (2000) and to the self-image generally envisaged in behavioural economics (Tirole 2002). In these latter cases, the identity or self-image is entirely observable by the subject and by others, and it can also be changed through behaviour. Indeed, Akerlof and Kranton suggest a possible categorization of identities: female/male, belonging to a particular ethnic, sporting, political, etc., group.

[22] Some of these shortcomings in rational choice theory have been pointed out by March (1978).

information management capacity and its powerful predictive capacity. Yet, since the information considered must be restricted to only what is conscious, the reason for the success of classical rationality is due instead to the fact that the information considered, the computing procedures involved, and their results, can be communicated unambiguously, and that those computations and results can be replicated.

2. The short circuit between 'instinctive' motivations and 'rational' motivations

The recent resurgence of interest in psychology among economists springs from awareness that the discipline is able to shed light on diverse and significant types of human behaviour which classical rational choice theory cannot explain. A good number of experiments, as well as everyday observation, demonstrate that various forms of human behaviour are systematically at odds with the predictions of the classical theory. Tirole (2002) and Rabin (2002) survey these 'anomalies' and outline the literature that has addressed them by extending the classical theory to encompass hypotheses drawn from experimental psychology, thereby giving rise to behavioural economics.

However, it is evident that many of these studies attempt to resolve the anomalies by opposing classical rational motivations with ones that resemble instinctive ones, while they ignore the concept of affective motivation. In other words, an individual who must decide on a good (or a plan of action) is depicted as motivated by the possibility of obtaining maximum benefit in terms of the utility extracted from that good (or plan) according to rational calculation, once a certain set of information is known, and by a conflicting instinctive motivation apparently generated by the good (or by the expected accomplishment of the plan of action).

Loewenstein (1996: 2000) and Gifford (2002) make what are perhaps the most lucid attempts to develop an approach to human behaviour based on rational and instinctive motivations alone. According to Loewenstein (1996: 272), individuals may be "out of rational control" and fail to maximize their utility because they are driven by "visceral factors" like "hunger, thirst sexual desire, moods and emotions, physical pain, and craving for a drug one is addicted to". Gifford, after pointing out that there are diverse neurosensory circuits in the human body, seeks to show that "self-control is […] the result of a problem with the inhibition of the motive force of emotion, where this inhibition is necessary for higher level deliberation". Other studies have used this approach to examine behaviours which though typical are, according to the classical theory, anomalous: like addiction, compulsive consumption, cue consumption, even

altruism, or those behaviours influenced by self-image, by anticipatory feeling, and by projection bias (Tirole 2002; Rabin 2002).

This account of human motivations and its consequent explanation of anomalous behaviours is unsatisfactory for various reasons, all of which concern the opposition between classical rational motivation and a single other type of motivation defined largely by default. Consequently, not only does this account fail to distinguish innate instincts from acquired ones but it ignores the fact that instinctive motivations are generally mixed with affective ones. Individuals must therefore decide with regard to a good on the basis of a powerful rational capacity and a primitive instinctual drive – that is, on the basis of a maximum capacity for abstraction which deprives the individual of all specificity, and of a drive typical of animals which concentrates on acquiring the good. Ignored, though, is the individual's self-image in relation to the good that forms the basis of a third type of motivation, as we have seen.

Introducing instincts, or at any rate non-rational motivations similar to instincts, ignoring the feelings and the unconscious identity, which are instead characteristics of affective motivation, may resolve some 'anomalies' of classical choice theory and thus make more realistic predictions possible (Tirole 2002). However, the consequence is that analysis is distanced from Homo Economicus without coming any closer to human reality. The direction undertaken, in fact, raises more problems than it solves.

The first problem concerns the definition and role of non-rational motivations. The definition to the effect that these motivations have a "usually negative hedonic effect" and modify the desirability of goods (Loewenstein 1996: 272) is somewhat vague. If these factors are understood as restricted to innate instincts alone, then however powerful they may be, one cannot say that they usually arise in pure form. In this case, behavioural economics would extend the classical theory to explanation of cases of little interest in that they are rare. If on the other hand non-rational motivations are viewed as acquired instincts, the problem arises of how these instincts have been acquired. Assuming then as given leaves out the most interesting part of the problem.[23]

The second difficulty is a weakness in the explanation. The main finding of behavioural economics is that the failure to optimize behaviour is due to the presence of

[23] Consider for example the case of drug addiction. The (substantial) economic literature on the subject has been almost exclusively concerned to explain whether or not the choices of addicts are rational, without enquiring as to why some individuals are addicts while others are not (see Section 3 and 6). Replying that addictions can be likened to preferences, and that these are exogenous, is plainly unsatisfactory. As Frank points out with an ironic example cited by Tirole (2002: 636): "A man drinks the used crankcase oil from his car, then writhes in agony and then dies moments later? No problem, if we are free to assume that he really liked crankcase oil".

sufficient instinctive motivation (Loewenstein 1996; Kaufman 1999).[24] However, this explanation is circular in that it does not specify when instinctive motivation should be considered high and *therefore* able to interfere with rationality.

The third problem concerns the policy implications of behavioural economics, which usually suggest that the quantity and quality of information should be enhanced so that rational motivation may prevail. This is implausible, however, if not misleading, for these policies would have to counteract motivation which was unconscious: consequently, there would be nothing to guarantee that the new information would instead stimulate contrasting unconscious motivation of greater power and sophistication.

The short circuit of considering non-rational motivations as consisting solely of instinctive motivations appears to be more a trap than an approximation for inquiry seeking to leave Homo Economicus behind. Ignoring affective motivation – which is based on images – enables the attention to concentrate on the material, tangible and well defined goods constituting the prime objects of both rationality and the instincts. The short circuit, therefore, is between material goods, which rationality is able to manage optimally, and subjective well-being, which the instincts are entitled to represent in that they too are indubitably constitutive of the human personality. Rational motivation therefore has no difficulty in gaining priority over the other forms of motivation.

3. The complementarity between 'affective' motivations and 'rational' motivations

The affective motivations are an important source for behaviour and subjective well-being in so far as that they are developed and consolidated in harmony with the other motivations. They enhance the quantity and quality of images, and therefore of the unconscious knowledge comprised in them, as well as the impetus to action. On the other hand, rationality too has important strengths, like the replicability of complex computations and the dissemination of their results.

This section will show how a large body of studies in psychology, as well as the above-mentioned studies in neurobiology, conclude that the affective motivations are complementary to rational ones, and have synergic effects.

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[24] Kaufman (1999) uses the Wundt inverted U-curve to describe the relation between the intensity of emotions and rational ability. When the intensity is sufficiently high (or when it is particularly low), the emotions interfere with rational ability. In psychology, however, the Wundt curve by now seems obsolete due to poor definition of the variables and a lack of empirical confirmation (Hanoch 2002).

A recently-developed strand of psychological studies maintains that there are essentially two complementary types of human thought: one experiential/affective and the other rational/analytical. The former is intuitive, automatic, natural and based on images; the latter is deliberative and based on reason. The human mind develops through two different modes of apprehending reality, processing information, and behaving (Epstein 1994; Slovic 2002; Kahneman 2003).

A second, more ambitious and radical, strand of studies stresses the importance of affective motivations, showing that they are ever-present in 'cognitive processes', although they may exist without giving rise to the latter (Zajonc 1980; 2000; Forgas 2003). Emphasised in particular is that 'affective appraisals' imply the existence of a self, in that they identify the state of the appraiser in relation to the object appraised. It is finally agreed that 'affect' predominates in social interaction and constitutes the "major currency" of interpersonal relationships (Zajonc 1980: 153).

A third strand of inquiry highlights the synergy of affective motivations with rational ones, studying the effects of positive emotions and feelings on individuals' modes and capacities of choice (Isen 2000). The effects distinguished are numerous, but they can be summarized as follows. Found to increase is the information perceived, interest in problems, problem-solving capacity, expectations of success if involved in an uncertain activity (for example searching for a job), the ability to mediate and to negotiate with others, to intuit the other person's pay-off, to decide more quickly by selecting among the options more rapidly, to respond more creatively. Not increased, instead, are expectations of success in gambles, or interest and skill in boring games.[25]

Damasio (1994) suggests two complementary, and *sequential*, ambits for the affective and rational motivations. The former furnishes, through the selection and somatic characterization of images, the set of information useful for making the choice, as well as the drive to decision-taking and behaviour. The rational motivations instead enable appraisal of the efficiency of an already-selected set of possible action plans.

These considerations do not seem to add a great deal to the classical theory of rational choice. However, the analysis by Damasio (2003) and by various psychological authors, makes it possible to add that the affective motivations may efficaciously prevail over rational ones in two complementary and *parallel* ambits. It has been observed that affective motivation is particularly efficacious when there is little time to take a decision, while it is recognized that rational motivation carries psychic costs (Slovic et al. 2002). However, a more interesting case arises when the quantity and quality of

[25] A fourth strand of studies works in parallel around the hypothesis of 'affect as information' (Clore et al., 1994).

information is considered. The more information is scarce, the more rational appraisal is approximative, and the more the intuitive capacity becomes important.[26] As well known, the theory of rational choice under conditions of uncertainty assumes that the individual is able to process information in Bayesian manner. However, apart from the numerous anomalies where individuals' choices tend not to take account of the laws of probability (see Tversky and Kahneman 1974), neurobiological and psychological studies have discerned a further type of uncertainty. This is the uncertainty due to the future variability of the identity, which is called upon to implement the decision taken, and it may in part be an endogenous uncertainty because it may depend on the decision taken. The typical example is the choice of job: a strong affective motivation may increase the pay-off expected from it. In this case affective motivation may be more efficient. Hence, the affective and rational motivations may operate in complementary and parallel domains when different types and degrees of uncertainty arise. Damasio (1994) talks evocatively of practical reason and pure reason, reserving choices of personal and social character to the former.

However, behavioural economics is particularly interested in the possible *conflict* between rational motivations and the other types of motivation, and consequently in the obstacles against the maximization of well-being predicted by classical choice theory (Loewenstein at al. 2001; Kahneman 2003). Yet this problem can be viewed from a very different perspective if one considers the dynamic of the weakening of the unconscious identity and the affective motivations as discussed above.

When rational motivation seems constrained by the instincts – or, in more impressionistic terms, by the 'visceral factors' – an element vital for these factors to operate is the so-called 'vividness effect' of the stimulus, which overrides choice alternatives of a more abstract kind (Loewenstein 1996; Loewenstein et al. 2001; Gifford 2002). On this basis it seems also possible to explain behaviour contrary to hedonism or which is even self-destructive, like addiction. The presence of the object of the addiction, or the vividness of its mental image, prevails over the prefiguration of the damage caused by the addiction, and also over the memory of the damage that it has caused in the past. But on adopting the hypothesis of the three types of motivation, one may argue that this case results from a weakening of the unconscious identity, and in particular of the self-image *vis-à-vis* the object of addiction. This weakening of the self-image, which is obviously harmful, has two effects: first, it increases the gratifying image of the object of addiction ('vividness effect'); second, it weakens the image of the

[26] Interestingly, also the economic theory of choice formulated by Shackle (1961) assumed that imagination as creative activity was necessary to a certain extent.

damaging consequences.[27] Hence the object of addiction appears erroneously as a stimulus imparted by instinct, whilst intertemporal rational logic appears to counterpose it as a representation which is highly abstract but also the only one that is coherent. Consequently, an action intended to reduce addiction should concentrate less on strengthening the cognitive and rational aspects of its consequences than on seeking to reinforce the addict's unconscious identity – that is, countervail the 'vividness' of the external stimulus with the greater vividness of the internal stimulus.

4. Motivations and subjective well-being

There is a strand in the psychological literature, known as the "self-determination theory" (Deci and Ryan 1985; 1990), which is of particular interest to economists. Besides studying motivations similar to those discussed above and emphasising the importance of the identity, this approach provides a great deal of empirical evidence to show that an inclination for motivations directed towards the acquisition of goods does not maximize subjective well-being.

According to this approach, human behaviour can be explained by two types of motivation: intrinsic and extrinsic.

Intrinsic motivations originate within individuals, and they activate behaviours which yield well-being regardless of a distinct external pay-off. Drawing on Maslow's (1943) pioneering work in clinical psychology, Deci and Ryan maintain that individuals are born with specific psychological needs which account for their motivation to develop their own interests and capacities. In synthesis, there are two such needs: the need for self-fulfilment, and the need to relate to others.[28] Well-being springs from the satisfaction of these needs, from the feeling that one's behaviour is coherent with the outside world (see also Csikszentmihalyi 1997). The self develops through the dialectic between internal motivations and external circumstances which involves both the affective and rational capacity of the individual.

The *extrinsic* motivations originate from outside the individual in that they are able to yield a distinct external pay-off. They typically drive the search for wealth and for personal and financial success. According to Ryan and Deci (2000), the individual may with time internalize extrinsic motivations, especially during his/her education.

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[27] On the basis of several cases, Kahneman regards the problem of 'accessibility' as "the ease with which mental contents come to mind" (Kahneman 2003: 1452) but does not study its dynamic.

[28] Epstein (1994) summarizes a number of previous studies and then adds two further fundamental needs: Freud's pleasure principle, and the need to maintain a coherent conceptual system (Lecky 1961). But he excludes Freud's death instinct.

The intrinsic motivations may be considered similar to the affective ones, while the extrinsic motivations are similar to the rational ones. In the former, well-being depends on the individual's ability to relate to the external world, human and non-human; in the latter, well-being depends on the acquisition of goods and wealth.

The main finding of this strand of studies, obtained with diverse methodologies and for various countries, is the following: individuals who manifest a greater inclination towards intrinsic motivations systematically declare that they enjoy greater well-being when compared to individuals with a greater inclination towards extrinsic motivations (Kasaer 2000; Chan and Joseph 2000; Ryan and Dzirawiec 2001).[29] This finding is a paradox for rational choice theory – what may be called the 'paradox of happiness' – in that it shows that the pursuit of material affluence does not necessarily bring happiness (Bruni 2002; Diener and Biswas-Diener 2001). Rationality seems unable to maximize subjective well-being. Furthermore, this outcome seems to be neither transient nor unimportant; above all it seems to compete with another, apparently more efficacious, motivation.

The conclusions of Section 2 are thus supported and qualified. In fact, once the affective motivations have been weakened, the instinctive and rational motivations appear to oppose and reinforce each other, with the consequence that they fuel the drive to acquire goods and to find the best way to do so.[30]

This last consideration is borne out by political-social studies on a phenomenon typical of the advanced economies: materialism, or the drive to consume material goods (Lane 2000). Production and commercial enterprises greatly contribute to this phenomenon by acting on and strengthening the (apparent) instinctive motivations. The purpose of advertising is to propose a behavioural model in which these motivations are manipulated to appear as preferences. In this way the consumer's maximization and sovereignty appear to have been restored (Lane 1991; Hamilton 2003).

Conversely, people more inclined towards intrinsic motivations exhibit greater vitality and less anxiety and depression, and they are more satisfied with themselves and more helpful to others. This finding offers an important insight: altruism can be explained as an externality of a behaviour anyway oriented towards the altruist's own

[29] Well-being is measured in various ways because mental states like anxiety and depression are also considered.

[30] By developing this topic (see Section 6), one can propose a solution for the happiness paradox and an explanation for the drive to acquire material goods. If an individual's experience of interpersonal relations has been so disappointing as to reduce affective motivation thus favouring acquired instinctive and rational motivation, then, however much material well-being may increase, it does not offset for the loss of well-being due to the weakening of the unconscious identity (Pugno 2004a; 2004b).

well-being.[31] Thus goods may be chosen not just to maximize their acquisition but also to achieve better relationships with others. Viewed in this way, contrary to the conclusions of the classical theory of rational choice, altruism is not an anomaly.

5. The problem of the balanced development of motivations

The literature examined here has made diverse contributions to knowledge on human motivations. But it still evades a basic problem: what is it that explains the balanced development of motivations and of the levels of identity underlying them in a person's life-course? The "motivational approach to the self", as well as various political-social studies, show that this problem is empirically important, because motivations in society are seemingly tipped against intrinsic and affective motivations. The problem does not seem of easy solution from a theoretical point of view. Indeed, contrary to what Becker (1996) assumes, rationality appears unsuited to governing the development of the motivations. The informational basis of affective motivations is largely unconscious,[32] and this tends to favour rational motivations, thereby triggering a cumulative imbalance. On the other hand, solution of the problem might be the point of departure for proposals for corrective action.

Damasio (2003) argues that emotions and feelings have been functional to the development of the human species, although he does not go so far as to conclude that this has given rise to a balance between the two types of motivation. Nor does brain mapping seem to help greatly in finding a satisfactory answer to a problem concerning a dynamic which unfolds throughout a person's lifetime. "We are our synaptic connections", declares LeDoux (2002). But still to be clarified is whether it is the brain that shapes our identity or whether it is our identity that shapes the brain. Moreover, the psychologists cited offer answers to the problem that are almost tautological: balanced human mental development does not occur when there is a "disharmony within the experiential system" (Epstein 1994: 717); positive effects on well-being may be obtained with the internalization of extrinsic motivations (Ryan and Deci 2000).

However, an answer is suggested by empirical evidence from the " self-determination theory" which suggests that the possession of material goods serves as a subsitute for inadequate or unsatisfactory interpersonal relationships (Belk 1985;

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[31] "An action that might be personally beneficial but would harm others is not good because […] eventually harms the individual who causes the harm" (Damasio 2003:172).

[32] For a survey of the limits to introspection, starting with the works of Kahneman and colleagues, see Schooler et al. (2003). As a significant example these authors cite an experiment in which a reasoned choice among different options proved less satisfactory than an immediate choice without the obligation to provide reasons.

Richins 1994; Rindfleisch et al. 1997; Kasser and Ryan 2001; Richins and Dawson 1992). This result matches the finding of recent econometric, sociological as well as psychological studies that the most intimate interpersonal relationships are of paramount importance for subjective well-being (Blanchflower and Oswald 2000; Helliwell 2003; Lane 2000; Baumeister and Leary 1995; Argyle 1987; Myers 1999).[33]

6. The origin and development of motivations

Understanding why the development of motivations and of the identity underlying them may be imbalanced requires exploration of the psychiatric and clinical psychological literature. Once again, as in the case of neurobiology and social and experimental psychology – indeed perhaps even more so – a selection from the literature is necessary, given the existence of diverse schools of thought. Besides status in the scientific community concerned, the criterion used for this selection is congruence with the findings set out in previous sections. The studies that will be considered in particular are by Fagioli and Siegel.

Fagioli's theoretical proposal (1971), which he backs with a large amount of clinical experience, enables an answer to be given to the problem of the origin and development of motivations. It should be noted that Fagioli formulated his theory before the above-discussed findings of neurobiology and psychology on the motivations became available.

The origin of the human identity, argues Fagioli, is the moment of birth, when the inner image is formed.[34] When a baby is born it must cope with a material reality very different from that of the foetal state, for the stimuli to which the baby is subject are new and very intense. The homeostasis of the previous state, where it was certain that the body and vitality would develop in balance with the environment – in particular the amniotic fluid – no longer exists at birth. This change stimulates a twofold reaction in the baby: annulment of the new material reality, and creation of a mental image of the

[33] Blanchflower and Oswald (2000) estimate that in the USA someone who separates from his/her partner should be compensated with $100.000 (in 1990) a year in order to maintain his/her well-being unchanged, while the corresponding sum if s/he became unemployed would be $60.000.

[34] As well known, Freud believed that at birth a baby has instincts alone, and that it only acquires an identity with language – that is, only with acquisition of self-consciousness. A similar view has been put forward in neurobiology by Rolls (2000) and criticised by various colleagues in *Behavioral and Brain Sciences* (2000). Freud's position has been developed by Klein, who maintains that a baby acquires identity by introjection of the mother's image. However, both the neurobiologist Damasio and the motivational-approach psychologists Deci and Ryan, as well as the highly influential child psychologist Kagan (1988), contest the idea that the mind of a newborn child is a *tabula rasa*.

previous reality, i.e. the relationship with the amniotic fluid.[35] In other words, separation from the mother engenders within the baby an inner image of itself in relation to the outside, an ability to intuit the properties of an external object yielding well-being, and an ability to suppress the images of other external objects and stimuli which do not yield well-being. One may say that the primitive identity generates the unconscious identity and its inhibitory and intuitive capacities, and with it the affective motivations.

Because a baby is totally dependent on other human beings, it learns that its drive to obtain well-being – which confirms its capacity to relate with external reality and therefore its identity – can be satisfied by interhuman relationships. In fact, a baby's drive to satisfy its material needs arises jointly with its drive to satisfy "the demand not to have its self destroyed" (Fagioli 1974: 137), as identity in relationship with others. If both these drives are satisfied, the identity is strengthened. But if the latter drive is not satisfied, the baby represses the image of its relationship with external reality and thus has only instinctive motivation to rely upon – with the consequence that its unconscious identity is weakened, its disappointing image of persons is suppressed, and it becomes attached to material reality.

Hence, according to Fagioli, the affective motivations directly or indirectly concern the self in relationship with others. Motivations directed towards material reality, including the material aspect of persons, originate jointly with the affective motivations. If these are disappointed, a cumulative imbalance of the motivations may be triggered.[36]

This explanation of the origin and development of motivations yields further insights. It shows that the weakening of the unconscious identity comes about through an unconscious inhibitory activity which rationality is unable to control. It evinces that an experience may be "assimilated" (Epstein), or that an extrinsic motivation may be internalized (Ryan and Deci) only when an affective motivation is satisfied. And it clarifies how the imbalanced development of motivations may give rise to some form of addiction deliberately intended to weaken the identity, rather than yield immediate material gratification, as behavioural economists instead maintain.[37]

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[35] "The creation of the interior image enables the human person to create within him/herself the image of the lost physical object having perceived its properties through his/her vitality and sexual reality" [my translation] (Fagioli 1974: 136).

[36] Fagioli singles out three fundamental reactions to disappointment in interhuman relations, all of which to some extent harm the individual's unconscious identity: a covetous reaction intended to introject external reality; an envious reaction intended to deny the intuited properties of human reality; an annulling reaction intended to suppress the image of external reality, and in particular of human reality.

[37] It also accounts for the similarity found by Damasio between patients with traumatized prefrontal lobes and sociopaths, both of whom are affected by disorders in social relationships (Tranel et al. 2000). Finally, it explains the difference between the creativity of artists and the purported creativity of

Siegel's (1999) study is interesting because it uses a different approach and considers a large body of literature in various disciplines (psychiatry, clinical psychology, child psychology and neurobiology) to obtain results which in part confirm and in part qualify previous ones.

Siegel takes the theoretical perspective known in child psychology as the 'attachment approach' (Bowlby 1969). By 'attachment' is meant a system innate in the brain which induces the baby to seek to establish communication with the persons closest to it, who are typically the parents. The purpose of attachment – which from an evolutionary point of view gives the baby a better chance of survival – is to help the baby learn from his/her parents the functions that organize the mental processes. Learning has direct effects on the baby's brain, and is particularly able in early infancy to help or hinder the development of the mind by creating and reinforcing synapses or, conversely, by weakening and destroying them.

Although Siegel attributes an important role to innatism,[38] he recognizes that the human mind draws on perceptions to elaborate images as 'prelinguistic representations' comprising various kinds of information. He gives affective and intuitive capacity major priority in mental development, even more so than rational capacity. Siegel also argues that there is no conflict between emotions and rationality in the human mind; there is, on the contrary, 'integration'. Interhuman relationships preside over this integration, and for this reason they also preside over the well-being of infants.

An attachment is 'secure' when the parent responds by participating emotionally in the infant's material and mental needs, thereby establishing syntony of communication. The effects are obvious, because the infant displays a particular ability to intuit the mental images of others, and less insecurity in coping with external reality. Conversely, in 'normalizing' attachment, where the parent seeks to control emotionality, and in 'preoccupied' attachment, where s/he instead exhibits excessive and incoherent emotionality, the infant loses the ability to relate to others and loses reactivity to new stimuli. In the case of 'disorganized' attachment, the parent transmits conflicting signals to the infant which induce severe insecurity. This diversity among types of attachment is matched by diversity in the patterns of the cerebral sites activated in the infant. In 'normalizing' attachment in particular, the part of the brain governing

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schizophrenics, which instead is delirious and due to a severe deficit in unconscious identity and in the ability to relate with human reality.

[38] The debate on the relative importance of innate human characteristics compared to learned ones has only partly been settled by neurobiological studies like those examined in Section 1. However, Damasio (1994) points out the disproportion between inner programming and the human capacity to adapt, remarking that "we have 100,000 genes, but more than 1 billion synapses".

logic and language is activated. Unfortunately, secure attachment is rather uncommon: it seems to appear in only just over half of cases (Siegel 1999: 76).

The way in which an infant is attached to his/her parents may therefore determine his/her ability to develop affective motivations. This finding confers predictive capacity on the attachment approach, in that it shows that the type of attachment and its effects depend on the parents, not on the children (Siegel 2001). It should also be pointed out that, thanks to the plasticity of the brain, there is a possibility that experiences of different interpersonal relationships modify the development of the affective motivations, despite the genetic endowment at birth and the kind of attachment imprinted during infancy.

7. Concluding remarks

In classical choice theory, rationality is a stylization of a human capacity which, in several cases, enables more accurate predictions to be made about people's behaviour. Various commentators have pointed out that this stylization is an ideal detached from reality, though it may be useful from a normative point of view. An attempt to bring analysis closer to human reality has been made by behavioural economics, with its endeavour to extend the classical theory's stylization by adopting hypotheses drawn from psychological research: it is, however, still premature to pass judgement on this attempt. A second attempt has been made by other economists who, following Simon, start from observation of human behaviour in order to infer models of reasoning and behaviour which replicate actual behaviours.

This paper has explored the psychological and neurobiological literature and in doing so has raised a number of serious doubts: it does not seem that human behaviour can be explained by classical rationality (which is an abstraction from individual specificity) without considering the unconscious component of human identity as well; it does not seem that the non-rational drives that apparently constrain rationality can be related to the instincts alone; it does not seem that observable behaviours disclose their underlying conscious motivations, nor that they are able to maximize subjective well-being.

The foregoing interdisciplinary (or perhaps extradisciplinary) exploration has come up with a body of evidence to support the hypothesis that these doubts principally concern so-called affective motivation. On this hypothesis, affective motivations differ from instincts because they are based on feelings and the unconscious identity – or in other words, on mental images, past and present, of the relationship between stimuli and

the ensuing bodily reactions (emotions). Without affective motivations rationality is sterile; with affective motivations it can be enhanced.

However, affective emotions may also be directed at behaviour; and it may be that they are more efficacious when they are not mediated by rationality. This holds not only when time is in short supply but also, it seems, when decision-making concerns an activity to be undertaken, and consequently requires for its performance future abilities pertaining to personal identity. Indeed, the individuals most motivated towards self-fulfilment are also those who enjoy a higher level of subjective well-being.

There is no doubt that this is a difficult inquiry, obstructed as it is by a variety of factors. Firstly, the affective motivations do not concern tangible and measurable objects. This is because they spring from self-images and may engender behaviours intended to change them. The affective motivations are not easily controllable because they are unconscious, and because they change if they are controlled. They may, moreover, be unconsciously inhibited or even annulled. They may arise in disguised form because they are combined with instinctive drives: businesses may encourage this disguising by means of advertising. Nor can the affective motivations be studied on the basis of the laws of human evolution, because they are made to change much more rapidly by culture and individual life-histories.

These difficulties can be overcome to some extent, and progress can be made towards predictive capacity by drawing on disciplines – psychiatry and child psychology – which study the origin and the development, or the weakening to the point of illness, of the affective motivations. One thus finds the explanation that the unconscious identity and the affective motivations originate at birth, and that they develop or weaken according to whether interpersonal relationships are satisfactory or disappointing – with the possible consequence in the latter case of self-destructive behaviour like addiction. This is analysis which starts from relatively observable human behaviour and tracks back to the motivations, which are instead invisible.

Research on affective motivations, therefore, has a dynamic aspect which yields important insights over and above those of behavioural economics. Indeed, the affective motivations have effects which are not confined to decisions and human behaviour alone: they extend – especially in choices concerning self-fulfilment and relationships with others – to change in the unconscious identity, then to return to the affective motivations.

This research hypothesis is rather new in economics, and it is consequently perhaps premature to draw policy implications. Yet one important, though still unstructured, implication already emerges: policies for primary schooling, especially the schooling of infants, should be recast in the light of the importance of education for the

development of the unconscious identity, besides the accumulation of knowledge on material reality. The concept of educational returns should be extended to include that well-being which goes beyond material affluence. Policy intervention is appropriate when it deals with a failure of human action. But if this intervention is to acquire the necessary consensus, it must have a second component: incentives for the study and dissemination of knowledge about the importance of human affective and mental capacities.

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