THE ECONOMICS OF IDENTITY AND CREATIVITY: A CULTURAL SCIENCE APPROACH

BY

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Introduction:

The new paradigm of cultural science

> I disbelieve in specialisation and in experts. By paying too much respect to the specialist, we are destroying the commonwealth of learning, the rationalist tradition, and science itself.
> Karl R. Popper (1982: 8)

The title of this book is a provocation. Many economists will feel cheated after having thrown a glance into its pages. '*Economics of…*' normally refers to the application of core theoretical propositions and empirical methods of economics on a particular field, very often expanding the realm of economics. So, we have an economics of crime or an economics of the family. This book does precisely the opposite: It defines economics of in terms of a non-economic discipline, namely cultural science.

The reason for this audacity lies in my strong belief that there are two topics in the human and social sciences of foundational significance which have not and cannot be treated satisfactorily by economics as it stands. These are the topics of identity and creativity. Correspondingly, the title of the book signals two claims: First, I argue that mainstream economics fails to explain the two phenomena of creativity and identity; and second, therefore we need to shift to a new paradigm of which I give a brief outline here. Yet, in a third twist of the argument, I end up with a surprising conclusion: That is, standard economics continues to hold for a particular cultural artefact, namely markets, and the correlated agent identities. So cultural science transcends economics, clarifies certain foundations, and finally embeds economics as its overarching paradigm. In the end, economists may forget all that and return to their ordinary business, with one difference, however: The '*economics of…*' formula can no longer serve to extend the scope of economics without limits.

The foundations of economics lie outside of economics. What physics is to chemistry, cultural science is to economics.

As regards creativity, the limitations of economic analysis are a well-acknowledged fact in economics. Though the frontiers of the economics of innovation have been pushed as far as possible, there remains an important residue. This is why and how novelty is generated. The cultural science approach to creativity explains creativity as a property of complex networks consisting of individuals and artefacts, and a process that is triggered in the human brain. In both respects, traditional economics is transcended. In the first sense, creativity is seen as an irreducible property of a collective, the network. In the second sense, creativity goes beyond the fundamental model of utility maximisation under constraints. The only strand of thought in economics that comes close to this approach is the work of the so-called old American institutionalists, beginning with Veblen, and culminating in Ayres's focus on culture. This tradition is marginalised in contemporary economics. Serious interest in the topic is only emerging recently in the context of evolutionary economics.

The phenomenon of identity reaches even deeper, as this touches upon the fundamental question what the ultimate elements of economic systems are. Methodological individualism posits that these are individuals. But this leaves open the question what the constituents of individuals are, where the boundaries of individuals are drawn, and how individuals perceive themselves as individuals. Economists normally avoid these questions, which results from a very cautious and deliberate attempt to free economics from any kind of psychologism, with the point of analytical perfection reached in the model of revealed preferences. But even in this case a particular view of the individual is taken for granted, which is the individual in terms of its organism who is the reference point of those preferences. Viewed from the outside, this is by no means a necessary assumption, which therefore needs justification. After all, even economists have introduced the notion of community indifference curves. These observations raise the problem of

identity. The issue of identity is not a psychological one, as we shall see. It is an ontological one that needs an elementary philosophical treatment.
That being said, classifying this book as a philosophical treatise might be a characterisation that prepares the reader well for the things to come. Yet, my main aim is to develop a framework for cultural science by clarifying some foundational issues in economics. Cultural science is a new discipline that was christened at a meeting of researchers from different disciplines in March 2008 at Queensland University of Technology (see http://cultural-science.org). There is a convergence of viewpoints of its essential features. Yet, my exposition clearly shows the marks of my individual identity.

To begin with, cultural science is radically different from cultural studies, though it shares some themes.

The first and obvious difference is that cultural science avoids political value statements and adopts an analytical and descriptive attitude towards culture. Of course, I am well aware that there is no value-free science, but there is a difference between the explicit statement of particular values and their use in cultural criticism, and a research program that tries to define the demarcation between positive and normative analysis as neat as possible, and stating explicitely that where values come in, these are not scientific statements, but religious, ethical or other statements. In most cultural studies, the exposition of those value statements is driven by explicit value statements on their own.

The second difference is that cultural science adopts a naturalistic perspective on meaning. There is a connection to the cultural studies distinction between tacit and objective knowledge here, and the cultural studies claim to critically examine the social reality of power relations behind cultural constructions of society, but there is also clear line of demarcation. This line runs along the claims of the autonomy and fundamental arbitrariness of meanings. Cultural science recognises the creativity of cultural activity, but at the same time understands that it is rooted in a biological capacity for culture, thus also obeying certain constraints and regularities which result from this fact. I call this naturalism. Naturalism is fundamental for cultural science in two respects.

First, naturalism implies that all human activities stay in a continuity with human biology, and second, naturalism means that we can use methods and models of the natural sciences in order to understand and explain cultural phenomena. For example, models of complexity borrowed from physics can help to understand the diffusion of cultural artefacts in human societies.

The methodological consequence of naturalism as a philosphical position is to adopt evolutionary theory as a general framework for cultural analysis, again, in the two senses highlighted previously. This does not imply to adopt Darwinian reductionism, however, in the sense of an evolutionary esthetics and related approaches. Quite the other way round, cultural sciences argues that the capacity for culture has evolved according to the Darwinian logic, but resulted into the emergence of culture as an independent domain, precisely because this independence was functional in an evolutionary context. This capacity for culture is a part of the more general capacity for language. Thus, cultural science is closely affiliated with the analysis of language, in all senses reaching from the philosophy of language to linguistics. That is, cultural science reflects the naturalistic turn in linguistics that happened in the past two decades. At the same time, cultural science adopts a co-evolutionary model, in which the evolution of culture is explained by the same kind of models and mechanisms which are used in biology to explain the evolution of forms of life.

It is important to emphasise that this fundamental homology does not result from the transfer of Neodarwinian models into social and economic analysis, but builds on important alternatives to Neodarwinism within Darwinism, especially with regard to development. Cultural evolution is a process involving individual development, and precisely this is the place where the notions of identity and creativity can be put into context.

Finally, cultural science shares the interest of cultural studies in knowledge. But again, knowledge is seen in the light of naturalism. This means that knowledge is conceived as a conjunction of structures of matterenergy, i.e. physical things, and meanings. In other words, cultural science rejects the

mentalist approach to knowledge which has dominated Western thinking since Descartes. This is the deepest reason why cultural science is possible in the naturalistic sense: There is no fundamental ontological break between knowledge in the sense of biological information and knowledge in the sense of mental content, as the latter can be reduced to regularities in the causal relations between individuals and the world. This is the externalist position in the theory of mind. Externalism implies that human mind is not limited to the brain, but precisely emerges from the interaction between the brain and its environment. In the philosophical parlance, mind does not supervene on the brain alone (which is the majority opinion), but supervenes on brains and external things, including other brains and artefacts. In particular, the circle of cultural science reasoning is closed if it is recognised that language analysis is an integral part of the externalist approach to mind, as it is language which is the main causal chain linking up human brains.

Now, externalism is the precondition for reconciling standard economics with cultural science, thus ending up with a peculiar version of evolutionary economics, which is the natural companion of cultural science in economics. However, cultural science can overcome the dissent among mainstream economics and evolutionary economics because following its premises, economic rationality can be conceived as a particular aspect of human mind that supervenes on particular systems of brains and their environment, in this case, markets. These markets, however, are not the abstract systems economists normally have in mind, but the concrete markets of the real world. In the economic realm, individual brains interact with things, such as the technological infrastructure of modern stock exchanges, and other people relying on these artefacts. A forex trader is not simply an individual, but a complex structure of a brain, a screen, a computer and other brains which together enact what economists analyze as a forex market. For this system, abstraction can be a useful analytical tool, and so standard approaches of economics are finally vindicated.

Looking for related approaches, cultural science is very receptive to the ideas of actor-network theory. In economics, networks have risen to a certain

prominence recently, for example, in the context of social capital analysis. However, this conception of networks follows the uses in social network analysis, which takes networks as stable relations between individuals. Actor-network theory concentrates on the emergence of agents (actants) from the interactions, thus presents a dynamic picture of the very identities of the nodes that make up the network in social network analysis. Further, this includes not only individuals, but also artefacts such as technological devices. Therefore, ANT fits into the general externalist approach adopted in this book.

This observation allows us to present a definition of culture, as we concentrated on the distinction between *science* and *studies* so far. In the beginning decades of modern anthropology, the definition of culture hovered between the emphasis on mental phenomena and the focus on artefacts. Cultural science presents a naturalistic definition of culture, which is based on the notion of mind supervening on brain-artefact interactions. Cultural science investigates into the causes and mechanisms of the generation and the diffusion of knowledge embodied in collectives of individuals and artefacts, describes and classifies the patterns that emerge in the evolution of those collectives, and builds on a generalised co-evolutionary interpretation of Darwinism. I claim that this approach completes the Darwinian revolution in the sense that cultural science removes the notion of intelligent design from its final and seemingly invincible retreat; that is, the human mind. This move has been announced by Darwinian philosophers, in particular Daniel Dennett, in the context of the analysis of consciousness, but is so far left incomplete because the consequences for understanding human societies have not yet been fully elucidated.

As I have emphasised previously, this approach includes the analysis of cultural meaning in the traditional understanding of the term. But cultural science approaches cultural meaning as an emergent property of interactions in the material world. In an evolutionary framework, the classical distinction between meaning and function can be overcome. This is the main reason why cultural science is deeply related to economics, thus staying in a long

tradition of thinkers who argued that there is a relation between cultural phenomena and material aspects of human life, which, after all, face the basic facts of limited resources and a scramble for their control. This was precisely the idea that Darwin borrowed from Malthus. But in the same way as this observation does not imply that biological evolution can be reduced to economics, we cannot conclude that culture can be reduced to economics. Creative evolution overcomes given material constraints in nature, thus ending up with a exuberant variety of forms of life, though it can never overcome the ultimate barrier of limited resources. Cultural evolution as the growth of collective human knowledge does the same, in principle.
For the analysis of culture, identity and creativity are foundational categories. They also underly specific approaches and research issues in cultural science. This book is a contribution to a series (UQP Creative Economy + Innovation Culture) which concentrates on creative industries, elaborating on the theoretical foundations. The main proposition is that creative industries can be best analyzed within a cultural science framework, and that standard economics fails to understand some of their driving forces and also possible consequences.

Against the background of my theoretical approach, creative industries are an emerging sector in modern economies which are an epiphenomenon of a fundamental cultural change. This cultural change takes place in the institutional framework of cultural production, which was dominated by state and religious actors in the past, with an intermediate sector of sponsorship and patron-client relations between independent cultural producers and social elites. The notion of cultural production refers to the generation and dissemination of collectively embodied knowledge by human agents, either organised in particular institutions (such as monasteries in the European medieval times or institutions of higher edication today) or embedded in elite networks (such as private buyers and sponsors of artists). The notion of knowledge encompasses all kinds of explicit and tacit knowledge, and includes the playful generation of knowledge. Thus, there is no basic line of distinction between science and the arts, apart from institutionalised differences in the immanent definition of kinds of knowledge. Insofar as an

artist wishes to communicate a message to the (possibly only imagined) audience, and the audience develops a common understanding of this message, this is a part of collective knowledge as it is Newton's law of gravity.

In the past, the production of collective knowledge was mainly embedded into institutionalised structures of social and political power. The rise of the creative industries shifts the locus of control to complex self-organising systems of modern markets, thus individualising cultural production and consumption, which in fact implies that in many respects consumption and production are merged into one process. On first sight, this suggests that the creative industries become a natural object of economics, whereas in the past cultural production was a legitimate object of sociology and political science, or, in fact cultural studies. But this leaves out of sight two observations. First, the rise of creative industries is accompanied by a process of institutional creativity in the production and processing of knowledge, and there is widespread agreement among economists that knowledge is a very special good that is difficult to fit into the standard conceptions of markets. Second, the creative industries, and more general, cultural production, directly affect the identities of the agents who operate on markets. That is, once cultural production becomes marketised, the market includes a self-referential structure, through which the market process triggers a change of its conditions.

In this book, I will not push analysis forward to this specific case of creative industries. I claim that only cultural science can deal with the intricate relations between identity, creativity and market dynamics in the creative industries. The argument in this book runs as follows. As a general remark, I wish to add the this is an exercice in bricolage, matching the theory of creativity that I propose. I pull many theories together, reaching from analytical philosophy over biology to economics and sociology. Given the limits of size in this book, I cannot go into the details, and I hasten to add that I my knowledge is limited in all these fields. I once read a review report about one of my papers where I stated the same, and the reviewer just

commented, given that admission, how can we trust into the quality of the exposition? On this kind of criticism I can only reply with Popper's words quoted at the beginning of this introduction.

In the first part of the book I strike several chords of the systematic approach that I develop in the second part, which is the core of the book. I present some basic ideas, in particular on the role of language in the naturalistic approach of cultural science, and how this relates with a methodological need to introduce a medium-level conceptual structure in between the common micro- and macro- approaches of economics. Another major concern in the ground-clearing exercise is to define a general understanding of the concept of knowledge, starting out from limits of economics in dealing with this phenomenon. A naturalistic approach to knowledge is based on two ideas. First, the notion of bimodality; that is, all knowledge correlates with physical structures. Second,, externalism; which means that there is no such thing as mental content that is only accessible via introspection. That means, I propose a non-Cartesian approach to knowledge as a cornerstone of cultural science. On this level of generality, we can already specify the cultural science approach in some more detail, introducing the theory of memes as a special adaptation of Darwinian theory to the context of cultural analysis. Part I concludes with the implications for the theory of creative industries, with reference to a recent definition based on the concept of social network markets. I argue that this is just a special case of the more general phenomenon of signal selection in evolution, thus completing a first round of building homologies across different domains of evolution.

Part two offers a systematic approach to creativity and identity from the naturalistic point of view. The first building block is a theory of creativity that receives the theory of conceptual blending in cognitive sciences, which I relate to the memetic approach developed in Part I. I interpret creativity as ontological creativity, in the sense of bringing new things into the world. In an externalist theory of mind, this includes ideas that are always physically embodied, with language being the ultimate layer. This approach can be directly related to different apploications, such as the theory of performativity

that has been proposed by theorists in the ANT tradition, and Darwinian theories about technological change.

The second building block is the theory of identity. I take this as an ontological term, so that I take foundational theories in analytical philosophy as a point of departure, which I relate to empirical problems of fixing the boundaries of the individual, both in biological evolutionary theory and the brain sciences. I pull those threads together in presenting a model of the individual for cultural science. Based on this, I continue with an outline of the theory of identity, which takes current economic approaches as a point of departure, especially with reference to the distinction between social and personal identity. Identity emerges as a cultural category, which is a necessary reflection of externalism in the theory of mind. This implies in particular, that identities are embedded into an institutional context.

PART I. The Creative Economy and the Naturalistic Turn in the Study of Culture and the Economy

Bridging foundational analysis with the emerging theory of the creative economy

The central methodological claim of this book is that an economic approach to creativity and novelty is only possible within the framework of cultural science. In order to explain the fundamental driving forces of economic progress, but also economic failure and desaster, we need to embed economic theorising into the overarching paradigm of cultural science. In the first part of the book, I wish to clarify the meaning of this sweeping statement.

In recent decades the definition of economics has become increasingly blurred, thus corroborating the famous dictum that economics is what economists do (Davis, 2006). The definition that was valid for several decades, namely that economics is "the science which studies human behaviour as a relationship between ends and scarce means which have alternative uses" (Robbins, 1932/45: 16) does no longer encompass the wide range of what economists investigate into today, and how they do it, although this definition still inheres the notion of optimisation. Nowadays economics includes as broad an area as reaching from the theory of institutional change and politics on the one hand and neuroeconomics on the other hand, and includes methods such as laboratory experiments or evolutionary game theory. It is difficult to discern a clear boundary between economics and the other social sciences and increasingly even parts of the sciences, given the many uses of economics in biology (see e.g. Noe et al., 2001).

Economics is no longer defined as the science of scarcity, but mainly via the particular methodological standards of mathematical modelling and quantitative testing.

This growing interdependence is no longer driven by the classical "economic imperialism", as that was built on the notions of methodological individualism, optimisation and equilibrium, and the belief that these concepts might be extended far beyond economics (see e.g. the programmatic volume Radnitzky and Bernholz, 1987). Today, economics is becoming more diversified as methods and models are imported from other disciplines, in the

same way as the original concepts of neoclassical economics were crafted along the lines of physical science. Thus, for some observers economics is today defined by certain methods, that is, a high degree of formalisation and a strong reliance on quantitative testing, and there is a less constrained view of its conceptual essence.

Chapter 1.

Language and Creative Economy

1.1. Language: The missing link in economic theorising

This being said, we also need to notice that there is one central question that is still difficult to deal with in the context of economics. This is novelty and the corresponding uncertainty, i.e. the fact of the openness of the future, and the question of the roots of human inventiveness and creativity. The creative dimension of the economy continues to be largely neglected by mainstream economics, mostly reduced to the question of how to set proper incentives for innovativeness. In fact, the treatment of novelty and creativity includes questions such as:

- What is the driving force of innovation in the human economy, including both the application of technologies, and the emergence of new, institutionally embedded forms of life?
- How can we account for entrepreneurship in economic theories, both in terms of causes and consequences? How does it result in the creation of entirely new markets?
- If novelty is ubiquitious, and if it is by definition unknown beforehand, how can we think of human action facing the challenges of fundamental uncertainty?

Economics fails in explaining creativity and novelty. Yet, many dissenting streams of thought continue to struggle for conceptual supremacy, without success.

These questions have concerned leading economic thinkers for many decades, and they have given rise to many alternative approaches in economics, such as Austrian economics (e.g. Kirzner 1997 on entrepreneurship), different variants of Keynesianism focusing on radical uncertainty (Shackle 1972) and the many followers of Schumpeter's approach to economic dynamics (for a valuable survey, see Fagerberg, 2003). None of these could finally challenge so-called 'mainstream' thinking.

In recent times, efforts to deal with the aforementioned questions concentrate on evolutionary models and metaphors, mostly in the context of what is explicitely called "evolutionary economics" (for surveys, see Nelson 1995 or

Witt, 2008). Although it is extremely difficult to synthesise all the competing evolutionary approaches in a few sentences, I think that major items include:

- the explicit treatment of the heterogeneity of agents (on this and the next point see e.g. Metcalfe, 1998),
- the adoption of population thinking, including modelling approaches of population dynamics, and, already more contentious
- the explicit use of Darwinian models of selection (e.g.Knudsen, 2002),
- the recognition of ontological multiplicity and levels of selection (Hodgson and Knudsen, 2006).

Currently, evolutionary economics is the dominant alternative paradigm, building on notions borrowed from evolutionary biology, such as the population approach and selection.

For example, whereas many standard economic analyses operate with the assumption of a representative firm, evolutionary approaches focus on populations of heterogenous firms, and they take the firm as a possible unit of analysis which consists of sets of routines, and not simply as a "nexus of contracts between individuals", thus being partly irreducible to the individuals. Beyond these basic understandings, evolutionary approaches differ in terms of explicitely applying particular Darwinian explanatory schemes (such as the genotype / phenotype model), or in specific methodologies, such as Complex Adaptive Systems modelling. The latter is also an example of moving and fuzzy boundaries to other approaches, which nevertheless share a common epistemic interest, such as complexity theory (Markose, 2005).

However, most of these approaches still do not tackle the question of creativity and novelty in a direct way (Potts, ????). This is because novelty is neutralised in the notion of the random variety of elements of a population, and because it is only seen as accumulating gradually through their competitive selection and retention. That is, there is no treatment of the question why and how particular innovations happen in the economy. This might come as a surprise, but simply means that evolutionary economics shares the interest of economics in the formal structure of the processes, and does not bother for the results in terms of particular products, technologies and so forth. Industry studies mainly serve as empirical stuff to test for abstract hypotheses about the innovation process.

Interestingly, this differs substantially from the original interests of evolutionary theory in biology, where precisely the manifold of living entities was and is the main research interest (for a programmatic emphasis, see Mayr 1982: ???). Darwinism builds on the work of the naturalist, which is mainly taxonomic and descriptive. However, this characterisation hides the crucial role of intermediate theoretical concepts which link up empirical knowledge in biology with the purely formal analysis of evolutionary processes. These intermediate concepts relate to foundational issues in biology, such as the question, what is a biological individual and what is the unit of evolution, or, intriguingly, because this seems to coincide with the same question in economics, can the emergence of entirely new designs in living systems be explained by the standard gradualist model of adaptation and selection? The work of the naturalist obtains deep theoretical significance in current biological debates over macroevolution and the emergence of new biological structures (Gould, 2002). Leading thinkers in biology reject the notion that true novelty can be explained by the gradualist Neo-Darwinian population process.

So far, conceptual transfers from biology neglect the central role intermediate concepts in biological taxonomy, which lie at the heart of the ongoing debate about the possible failure of gradualist selection models to explain genuine novelty.

This role of intermediate theoretical concepts is almost completely missing in modern economics, and very rarely invoked even by evolutionary economists (for a notable exception, see Dopfer, Foster and Potts, 2004). Quite a few evolutionary economists have recently argued that evolutionary economics should adopt a naturalistic methodology (e.g. Witt 2003). In such a naturalistic turn, intermediate theoretical concepts would appear to be only one, however important, building block in a fundamental reconstruction of the ontology that underlies economic theories. In a different ontology, conceptual transfers from biology will also take another shape.

Evolutionary economics heralds a naturalistic turn in its ontological premises, which will also assign a different methodological position to intermediate theoretical concepts.

Naturalism does not simply mean that economists start to collect items such as different variants of chemical technologies or institutional variants of banking systems, which, however, might be interesting research issues (e.g. Aoki 2001). For example, recently some economists started to analyse industrial taxonomy based on the biological method of cladism, thus ending up with a system of classifying different technologies in car manufacturing

(McCarthy, 2000, 2005; Andersen, 2002). Naturalism goes beyond this mere analogical transfer of biological methods to economics. In a more hands-on way, it refers to what Witt (2008) calls the "ontological continuity hypothesis":

The assumption of ontological continuity states that there is no principled rupture between human phenomena and other phenomena in nature. Yet, it still allows for the belief that the world of human beings manifests some unique features that are related to their capacity for culture and technology, which do not seem to be directly reducible to any kind of underlying biological mechanism, as it was proposed by early sociobiology. Naturalism goes beyond that, because, as a clearly defined philosophical position it claims, among other propositions, that the world is a physical unity, so that all events are embedded into closed loops of inner-worldly cause and effect, and that all things are things in the world, and in particular, a cause always relates to an existing thing (for a survey of naturalism, see Papineau 2007).

Naturalism posits that the world is a physical unity, and that all phenomena supervene on physical causes and effects.

This is by no means an innocuous position, because it implies two insights for economics.

- First, naturalism eschews any kind of multiplying substances, in particular, the dualism of mind and matter, which runs deeply through the Western tradition of Cartesianism (for a classical statement on this, see Dennett 1991). Clearly, the economic notion of rationality builds on this dualism, in the sense that it is accepted that rationality can be defined axiomatically and hence independent from empirical data about how the brain works. The very notion of the rational individual, endowed with a coherent and abstract utility function, replicates the Cartesian concept of the mind governing the body. Naturalism definitively rejects brain/mind-dualism, both in the sense of understanding the internal workings of the brain/mind and in the sense of the causal interactions between the outside world and the brain/mind.
- Second, and following from that, a naturalistic economics would inquire into the relevance of the material world for economic

Naturalism eschews Cartesian brain/mind dualism and conceives knowledge and ideas as physical phenomena with emergent properties.

> processes, and in particular, it would ask for the meaning of knowledge in material terms. This does not imply naive materialism, because it also means that any kind of cause that we relate, for example, to social structure, cultural ideas etc., also has to be regarded as a part of the one and closed world (compare Bhaskar 1989). Contrary to Popper's (1972) conception of the three worlds of things, mental objects and the creations of the human mind, naturalism regards ideas as a part of the world, i.e. states that the ontological notion of existence can only refer to matterenergy structures in the one world. This unified naturalistic ontology does not preclude the possibility of emergence. Emergence refers to the endogenous creativity of the world in the sense that processes that happen with matterenergy structures can give rise to new properties, thus enriching the possible state space of the world continuously (Bunge 1977). There is a general agreement today that this process can be most generally described as ‚evolution' (Chaisson 2001).

This is a highly abstract argument, but it has immediate implications for the analysis of creativity and novelty in economics. In order to understand the process of creativity, we need to look at the actual working of the human brain and body, and we need to understand how this interacts with the world of things that are causally connected to them.

As I will develop in much more detail in the subsequent pages, a central phenomenon in this interaction between brain and world is language. From the naturalistic point of view, language is also a part of the one world, hence deeply enmeshed with its causal networks (Millikan, 2005). But this does not mean that language cannot manifest emergent properties, which relate to the specific functionings that become possible via language. In particular, language enriches the one world ontology with possible worlds, which can have causal effects in the sense of causing human action, which happens in the real world. Language has the emergent property of meaning, which in turn becomes a causal force in the one world. So, one pressing task for economics is to include language into its analysis of the creative economy.

In a naturalistic approach to economics, language will assume a central position, because language is the main causal mediator between brain and world. However, language is a phenomenon totally neglected in economics.

But surprisingly, the towering role of language analysis in most modern social science notwithstanding, language is so far a neglected notion and object of research in economics; only popping up in very special contexts (e.g. Rubinstein 2000). This observation strongly suggests the conclusion that the difficulties of economics with the notions of novelty and creativity might reflect just this blind spot in ist systematics, namely the neglect of language.

If we approach the problem of language from the internal perspective of mainstream economics, we can relate this to the tension between the behaviorism in the theory of choice on the one hand and the notion of knowledge on the other hand. As we shall see in some more detail soon, the recent upsurge of neuroscientific research in economics has met with considerable criticism by many economists who argued that this kind of research is totally irrelevant to economics (Gul and Pesendorfer 2008). This statement is based on the peculiar methodological status of the notion of preferences in modern economics: The utility function is just a mathematical description of observed choices, and it has no implications whatsoever about the internal workings of the human mind. In this sense, economics follows the precepts of pure behaviorism, which would mean that it even does not embrace Cartesian dualism, just being "mindless", as Gul and Pesendorfer have it. However, this methodological position goes hand in hand with the straightforward treatment of knowledge as mental content, in the sense of knowledge as a set of propositions of the kind "*x* knows that *p*", most prominently in game theory (Samuelson 2004). Clearly, this understanding of knowledge contradicts the behaviorist approach in utility theory. So, the relation between the analysis of knowledge and the theory of choice in economics seems to be akin to the tension between behaviorism and cognitive sciences, which was resolved in favour of the latter already in the 1960ies, especially also with relation to language (Chomsky, ????; ????). Adopting a naturalistic ontology is the only way to resolve this tension.

In economics, the present tension between the behaviorist theory of choice and the mentalist theory of knowledge corresponds to the tension between behaviorism and cognitive sciences in the 1950s and 1960s.

My argument has arrived at a surprising twist: Precisely by adopting a naturalistic ontology, language emerges as a central analytical concern, which has been the domain of the humanities, i.e. the *Geisteswissenschaften*, for long. I think that this move has tremendous potential for economics. A main

task of our endeavours in this book is to investigate into the relation between language and economics, and to explore the potential of a naturalistic approach to language, based on a new approach to knowledge in economics. Both steps are highly specific, even though foundational. This is because language analysis is not normally based on a naturalistic framework, but treats language as a mental phenomenon, so that with regard to established research on language I adopt a minority position, and at the same time the introduction of this position into economics adds oddity to oddity. Again, this mirrors the development of the cognitive sciences, which in the more recent times had to be reconciled with the brain sciences, after staying aloof from their results for a long time (????). Let us see where we go from this starting point. My central claim will be that the analysis of language and knowledge will lead us towards the identification of an intermediate level of theoretical concepts that are necessary to build an evolutionary theory of novelty and creativity.

1.2. The rise of the Creative Economy and the need for corresponding intermediate theoretical concepts

Before I explore this line of thought further, let me relate it to the ongoing discussion about creative industries, thus seemingly mixing up two topics of a very different degree of abstraction. The question arises whether the ongoing expansion of the creative industries exerts a transformative force on the economic system. This means, observers wonder whether the innovative process that flows out of the creative industries in the end exerts a transformative force on the entire economic system, sometimes dubbed 'the Creative Economy' (Howkins, 2001).

Now, this is precisely the kind of question that makes sense within a naturalistic economics, but is meaningless in the framework of the standard approach. This is because the standard approach focuses on an abstraction of real-world economies, namely, formal models of markets that equilibrate demand and supply, and where production is described via the concept of a production function, which allows to concentrate on certain formal aspects of the output alone, such as, for example, product differentiation in terms of

Established economic theories are lacking intermediate theoretical concepts to analyze phenomena such as the Creative

diverse consumer preferences in models of monopolistic competition. That means, material aspects of production and output do not matter for the theoretical analysis of markets. This leap of abstraction was always regarded as a major methodological advancement of economics, and it is precisely the same methodological step as the construction of a mindless theory of choice that we met in the previous section. The established theory of markets is a non-naturalistic one, even though it claims empirical validity with great success.

This implies that intermediate concepts have been abolished, such that economics either adopts the microeconomic, i.e. completely disaggregate analysis, or a highly aggregate analysis, i.e. macroeconomics. The historical turning point in this movement was the defeat of historism in the methodological battles of the late 19th century. This micro/macro approach does not allow for the analysis of pattern formation that emerges from specific features of real-world economic systems, such as particular features of technologies or particular features of political institutions. More exactly, if standard economics deals with the diversity of real-world economic systems, it does never consider determinants which are specific to time and space, as this is fundamental for biological taxonomy, but strives at analyzing supposedly universal determinants of a distribution of real-world systems along very few dimensions of properties, such as the ownership regime or the degree of state intervention (for a programmatic statement, see Djankov et al., 2003). Compare this with a hypothetical approach in biology which would try to explain the distribution of species across a space that is just defined by the features of having wings and lungs, and would totally abstract from phylogeny!

It seems appropriate to distinguish between the creative economy as a universal phenomenon and the Creative Economy engendered by the contemporary rise of the creative industries.

The quest for a proper analysis of the transformative role of creative industries can only gain ground by adopting a naturalistic approach to economics. The position developed in this book is that the creative economy is a universal feature of humanity, and that creative industries are just a special expression under particular historical circumstances, so that it is appropriate to distinguish between the creative economy as a universal

phenomenon and the Creative Economy in which we live today. There is a tendency to assume that innovation has only become a defining feature of human economies with the onset of industrialisation. To my mind, this reflects only the high speed of innovation, but not innovation as such. Path-breaking economic innovations in agriculture stood at the center of the rise of human civilisation, after all. In particular, beyond technological innovation all human societies have seen innovation of life forms, symbolic expressions in the arts and poertry, and mystery, to name but a few areas. Certainly, it makes a difference whether a society explicitly values and supports innovation, as in our modern times, or whether it hails adherence to the established norms and ways of life. But this does not change the fundamental observation that creativity and innovation are a defining feature of humanity.

Yet, this observation does not imply that there are no unique features of creative industries, which will even affect the entire economy, as the reach and depth of creative industries innovations, processes and products penetrate the entire economy. In the current approaches to the creative industries, standard economics stands out with the presumption that there is nothing special about it, matching its previously sketched methodological stance (for a survey of competing approaches, see Potts and Cunningham, 2008). That is, there is a neat separation between the technology and the economic system in terms of institutional settings of the market, in this case intellectual property rights. In the naturalistic approach, this independence is no more a workable assumption. This converges with approaches in evolutionary economics which analyze so-called “long waves” and related phenomena, that is, move on to intermediate theoretical notions that classify and systematise particular patterns of technologies and institutions which evolve in historical time, and which are clearly separated into different classes of systems (e.g. Freeman and Louçã 2001). Thus, for example, the notorious category of ‚Fordism’ might be regarded as an incipiently naturalistic designation for a 20th century type of economic system that manifests a particular interaction between certain technologies of mass production, the spread of mass consumption and the diffusion of Western-style democratic political institutions. Such a

Theories of long waves in economics and related approaches to structural evolution in the economy fit into a naturalistic paradigm for analyzing the creative economy.

concept clearly does not make sense in the standard economic approach, but is widely used by heterodox economists for long.

Against the background of the naturalistic turn in economics, the significance of creative industries lies in the following, without implication an order of significance with the sequence of the argument.

- Most observers of the creative industries agree that certain technological advancements lie at the heart of the new developments. These innovations fundamentally affect the causal workings of the economy, because entirely new network patterns of communication, consumption and production are made possible. For example, new technologies blur the distinction between the roles of producers and users or consumers, which also implies that the innovative process on the production side might increasingly include consumers (Bruns, 2008).
- Corresponding to this development, there are new ways to discover, create and diffuse knowledge in the economy, which build on new material correlates of knowledge. This is akin to the role of the invention of printing for the emergence of modern economies, but introduces an entirely new form of collective processes in knowledge creation, which, again, are mediated via the new technologies (Hartley, 2008).
- This causes strong interactions with the institutional framework of the economy, hence changing the social structures underlying economic processes. In particular, there are strong forces that undermine the workings of the traditional system of property rights, triggering the emergence of a much more diversified institutional structure (Boldrin and Levine 2008). From the naturalistic perspective, this will result into substantial changes of the infrastructure of modern economies, comparable to the emergence of capitalism during the transition from medieval to modern times.
- Finally, these changes affect life forms of individuals, and hence affect their identities and network embeddedness. From the naturalistic perspective, economic systems correspond to life forms,

Technological innovations trigger the emergence of new forms of the generation and diffusion of knowledge, embedded into institutional innovations and accompanied by evolving new forms of life.

which refers to material patterns of consumption, organisation of work, or patterns of demographic reproduction. This is what we mainly refer to as “cultural evolution”. From the naturalistic perspective, life forms strongly determine the proximate adaptive functionings of the economy, especially in terms of ecological sustainability.

As this brief exposition shows, a naturalistic approach to economics puts the creative industries and the Creative Economy into the perspective of the *longue durée*. This opens up new vistas on the changes that we experience today. The emergence of the modern world economy was deeply interconnecting real world causal processes, in particular the life forms in the stratified societies of Europe, the Islamic world and Asia, which drove the long-tem structuring of entire societies and their ecologies, such as, for example, the establishment and continuity of Latin American plantage agriculture and the related patrimonial social structures (for a magnificent view on all these patterns, see Findlay and O’Rourke 2007). There was an intimate interaction between brutally physical facts of war and domination on the one hand, and the emerging global division of labour between the worlds’ regions, that was driven by technological changes in communication, transport and weapons. There is no sensible way to reduce that complex story to the workings of a highly abstract economic model that puts optimisation and resource endowments together, and ends up with an equilibrium solution, even though the international arbitrage process and the workings of entrepreneurship constantly create forces that tend towards equilibria. But those are constantly evolving equilibria, in turn.

Thus, the analysis of the creative industries has to be a historical analysis which distinguishes between the creative economy and the *Creative Economy*, with the latter referring to a possibly emerging new type of economic system, and which stands in an unbroken evolutionary sequence of preceding systems and their transformations. The former term refers to the capacity of all economic systems to generate novelty, this also includes the rise of the creative industries as an example.

The category of knowledge is central for the analysis of the creative economy.

Now, if we wish to define a methodology for naturalistic economics that also allows for this kind of historical analysis of the sequences of economic systems, what is our central theoretical category? I propose that this is the concept of ‚knowledge'. I wish to relate the notions of knowledge, language and identity in order to set up a methodological framework for the analysis of economic systems that builds on a set of intermediate theoretical concepts.

This is the task defined.

Chapter 2.

Darwinising Knowledge

When discussing novelty and creativity, most economists have technological innovation in mind, on first sight. At the same time, they tend to understand technology as a set of ideas, that is, in a disembodied form. This is true both for mainstream and evolutionary theorists (Jones 2002; Mokyr 2000). Interestingly, this approach mixes a mentalist and a reified notion of knowledge in the sense that first, knowledge is seen as a set of ideas, which is a mentalist conception, but this is then regarded as a 'stock' which is put into action by human users, i.e. in a reified sense. Comparing this economic approach with familiar definitions and uses of the term of 'technology' outside economics (e.g. Knorr Cetina????), we realise immediately that the economic use leaves many relations in the triangle 'ideas – artefacts – users' unspecified. In particular, it is not clear how the 'ideas' are separate from the knowledge how to activate and use the ideas, which refers to the relation between the user and the presumed knowledge stock, and the relation between the knowledge stock and the artefacts seems to be open-ended, even though the notion of embodied knowledge is common in the theory of the production function. In other words, and viewed from the naturalistic perspective, is knowledge a separate part of the economic ontology, or is it somehow related to the entire triangle 'ideas – artefacts – users'?

Or, should we discard the mentalist part altogether, and treat knowledge as an aspect of the interaction between user and artefact? It is this option on which I want to place my bets, because the treatment of ideas as a stock implies an ontological dualism, akin to Popper's 'three world' paradigm.

So far, economics mixes a mentalist approach to knowledge with a notion of knowledge as a stock, hence an external phenomenon. The interaction between user, ideas and artefacts is not explored in detail.

If we look at more detailed analyses of knowledge in evolutionary and related field of economics, it is straightforward to realise that knowledge is not simply treated as a stock. It appears to be a very complex phenomenon in which, in particular, codified and non-codified (tacit) forms of knowledge

appear and in which knowledge is seen as being embedded into systems of creating, processing and applying knowledge, such as the so-called innovation systems (see e.g. Foray 2004). From this perspective, knowledge is a complex process that is linked up with a manifold of structural determinants which reach from cognitive features of the human mind (as in the notion of tacit knowledge and the distinction between knowing how and knowing that) over organisation characteristics of the division of labor (such as organisational routines) to the institutions governing knowledge production in research, to name but a few. So, knowledge does not appear to be a clearly identifiable entity, but seems to come close to be an aspect of other elements that make up a system. So, knowledge appears to be a systems property, but not a set of single knowledge items.

Interestingly, this problem of fixing knowledge ontologically is very much the same as in fixing the relation between genotype and phenotype and its environment. In biology, the common notion that the gene is a carrier of biological information (i.e. knowledge in our parlance) is a hottly contested issue (Griffiths 2001). This reveals that in fact we are dealing with the old controversy over atomism versus holism, which is also prominent in cognitive science (Wilson, 2004). One perspective is to reduce knowledge to a certain set of units carrying the knowlegde, such as the genes as codified rules governing the ontogeny of the phenotype. This is formally homologous to assuming that there is a set of ideas governing the use of technology, with the latter just emerging as an epiphenomenon of the underlying knowledge. The other perspective is that the genes as such do not carry knowledge at all, but are a part of the much more complex machinery of creating knowledge in the continuous interaction between the different parts of the reproductive systems, which includes, in particular, even the environment of a living system (Oyama 2001). That is, for example, the process of transmitting and evolving knowledge does not only include the level of the genes, but partly takes place on the level of the environment, too. This systemic view may adopt different degrees of radicalism, such as limiting itself to the smaller-scale unit of the cell as the basic knowledge processing unit, but these differences do not matter for our discussion. The real point at stake is the

The precise meaning of the concept of knowledge hinges on on the fundamental difference between atomistic and holistic approaches, with atomism implying the reducibility of knowledge to knowledge-carrying units, and holism interpreting knowledge as an emerging process property.

fundamental opposition between atomistic and holistic approaches to knowledge, with both positions assuming different specific shapes and arguments in different disciplines and discourses.

I adopt the holistic perspective. In the context of our topic, this means that I treat knowledge as an emergent property of the interaction between brains and their environment, which includes other brains, artefacts, or institutions. Let me present one systematic argument why we cannot reduce knowledge to a set of ideas in economics, and why we need to introduce a non-mentalist concept of knowledge. This is what I call Darwinising knowledge.

2.1. Ignorance and the impossibility of optimising knowledge

My approach regards technological innovation to be an epiphenomenon of the underlying creative processes which take place on the social-structural and cultural level. However, these creative processes take place as a part of technological change: Technology scaffolds creativity and works as an enabler and potential. In this sense, we can adopt two perspectives on technological evolution, which in fact are just two sides of the same systemic phenomenon. One is to view technological evolution as a history of human ideas, hence of people and inventions, and the other is to view it as an unfolding of technologies as ontologically autonomous structures in the world.

The second viewpoint results from two observations.

First, there is the question why the immense technological dynamics of the modern world did only originate at certain places, which were not the ones which were predestined for that, given the initial level of technological development. In the millennium before the industrialisation process erupted in Europe, China and the Islamic World were more advanced in technological development and levels of civilisation. The dispute about the reasons is raging on, however I think that most explanations relate to social structural or cultural factors (e.g. Landes, 2006). In other words, the mere potential of technological improvements, even if evident, does not materialise but in a

Technology is a holistic phenomenon, because its evolution is embedded into the evolution of institutions and cultures, and because it always involves the interaction between producers and users in the diffusion process.

certain social and cultural setting, and it seems that innovations in these fields seem to run ahead of innovations in the technological realm. However, at the same time it is relatively straightforward to identify material conditions for the emergence of particular technologies, such as the fit between the emerging role of coal as a source of energy with steam engines, and the peculiar geographical distribution of coal deposits in England, which differs radically from that in China, for example (Pommeranz 2001: ???). In the light of these facts, it seems that technological potential evolves endogenously in structural patterns of the material world, and is just triggered by human action. There would be no way to identify a prime mover or, in the case of the debate over the uniqueness of the European industrial revolution, no main culprit of why it did not materialise in China. The different viewpoints about 'prime movers' fail to recognise that technology is a holistic phenomenon.

Second, many economic views on innovation are producer-biased and do not take the users of technologies into consideration. As is very well known from many studies about agricultural extension schemes, even the most obvious improvements in agricultural production may fail to disseminate in rural communities if social structural and cultural factors stay against that (e.g. Bandiera and Rasul 2006). This applies for all technological changes, and in this regard even for the producer side. The economic definition of innovation is clearly different from the notion of invention, that is, it includes the diffusion of an invention. An invention is an innovation only after it has been adopted in a community of users. This also holds for new production technologies. So, a technology is in fact a pattern of techniques, artefacts, pathways of diffusion and structural configurations of users, and cannot be simply reduced to a set of ideas as technological knowledge underlying a highly aggregate production function. Clearly, this is nothing new to sociologists of technology, but is still only fully recognised in parts of evolutionary economics (e.g. Cimoli and Dosi 1995).

But why is this so? Given our predilection to atomistic explanations in science (cf. Wilson, 1998; von Baeyer, 2003), I think we need to present an argument why knowledge, even if we seem to be able to provide an atomistic

description (such as a single law in physics) cannot be conceived of as an ‚atom' in our real world and unified ontology.

Looking at human technology, the main reason is that all innovations take place under radical uncertainty, or, under a state of ignorance. If we abstract from the notion of physical technology, what counts is the emergence of new knowledge. But how can people really know whether a new information is also new knowledge? They operate in a complete darkness, and there are so many stories about the misperception of technological potential even by experts, which sound funny today, but simply demonstrate the very high degree of ignorance that correlates with the evolution of knowledge (just think of the early warnings in the development of railroads that speeds beyond 30 miles per hour might by deadly dangerous because they might suffocate human breath). The same thing, of course, happens today, when we talk about hypes and depressions over newly emerging technological wonders. So, the fundamental research issue in the analysis of the creative economy is how ignorance and creativity relate to each other. Our ignorance is overwhelming, and this precisely results from our human capability of imagination. Which of the possible worlds that we can imagine is the true one?

The fundamental issue in knowledge evolution is the uncertainty resulting from our ignorance about the future value and significance of novelty in the present.

I think that the problem of ignorance is the central one in separating standard approaches in economics from the approach that I am going to present. The limits of economics are the points where we transgress the boundary between the known and the unknown.

The classical argument on this has been presented by Arrow (???) in the context of discussing the role of the market and the government in generating new knowledge. Arrow argued that there are fundamental limits of markets because it is not possible to optimise over the unknown. Although the argument is weak with regard to justifying government intervention, it is strong in our context. More specifically, can we optimise over the search for new knowledge, which is uncertain today in the radical sense that we even do not know the set of future possible states of the world, so that we cannot define a workable definition of risk? We cannot, because we would need to

Arrow presented the principled argument against the possibility to apply standard economic models on knowledge, implying the limits of markets in the process of generating new knowledge.

measure our opportunity costs for continuing our search. Lost opportunities are unknown, by definition, in this setting. So we cannot apply optimisation calculus. The same argument applies for market exchange over knowledge: Many items of knowledge have the property, that once they are made accessible at all, they are public goods. So, if I wish to buy knowledge that I do not know, how can I fix my reservation price? But if I get the necessary information, I already know it, so why should I pay?

Arrow's argument is certainly not relevant for the markets vs. governments dichotomy in the crudest meaning, because governments have no special access to knowledge either that is not already available in society, and hence, also in markets. But the argument clearly implies that standard economic models cannot deal with new knowledge, in principle. This further implies that standard economic theorising about innovation necessarily fails to include what are possibly the most important determinants in knowledge evolution.

I propose that culture and social structure is all about dealing with uncertainty and ignorance, and that exactly for this reason knowledge cannot be reduced to single atoms of the known (North 2005, also emphasises the role of uncertainty). In other words, knowledge always is a double-sided coin, pointing towards the known and the unknown at the same time, and therefore can only be viewed properly if we do not only analyze actions and consequences resulting from the known, but also from the unknown. That means, the role of culture and social structure is to fix our expectations about the future, and therefore to make our reasonable action possible at all. Again, that might sound like commonsense, just saying that we all stand on the shoulders of giants (which, at a closer look, appear to be myriads of ants with human shapes, making up a Gilgamesh).

The economic theory of knowledge builds on the fundamental impossibility theorem stating that it is impossible to define a measure of scarcity across a state space of unknown states, and therefore it is impossible to define optimal paths of searching for new knowledge.

I would assign Arrow's insight to the status of one of the fundamental impossibility theorems in economics: It is impossible to define scarcity and hence, prices, over a state space with possibly infinite unkown states, and it is

hence impossible to define an optimisation procedure over the the search for new knowledge.

This impossibility theorem lies at the heart of my attempt to embed economics into cultural science.

2.2. The externalist approach to knowledge

Now, if we adopt the naturalistic perspective this statement turns into a much more radical idea. We have to adopt the externalist approach to knowledge evolution, which represents a radical rupture with the Cartesian tradition in economics. The externalist approach is not new, but largely forgotten in economics, as it has been developed for the first time in the work of the American institutional economist Clarence Ayres (1944). As we shall see in some detail later, externalism in economics just follows externalism in epistemology and cognitive science, where it is a contested, yet common proposition (for a survey, see Schantz 2004). This means, that we assume that knowledge is a physical structure that extends far beyond the brains of individuals in the sense that it relates matterenergy structures and ideational structures, following the fundamental principle of bimodality (see Dopfer, ???; Herrmann-Pillath, 2001). Physical structures are not only liveless material things, but include, in particular, structures of networks of human interaction.

Externalism posits that knowledge supervenes on matterenergy structures of brains and external items.

Again, this bold abstract statement is much less outraging as it seems. In the naturalistic framework, there is no knowledge that somehow hovers far above structures of matterenergy. The principle of bimodality just asserts that all matterenergy structures can be viewed either as such, or as knowledge. In its current shape, most applications of this principle refer to “information”, but this is only a matter of defining both terms, and without going into the details here, I prefer knowledge in the economic context. This is because in economics, knowledge is a stock and information is a flow, and if we talk about new knowledge, we think of adding to the stock. That process is information. So knowledge is the more general term. Without using the term, this view can be based on more recent approaches in physics which view the

universe as a structure of information, and which view cosmic evolution as an accumulation of information, hence knowledge in our terminology (Chaisson 2001; Lloyd 2006).

The ontological principle of bimodality asserts that all entities can be seen as matter-energy structures or ideational structures.

Accordingly, there is no fundamental difference between knowledge accumulating in human beings and knowledge accumulating in the world. Both takes place in tandem with the evolution of structures of matterenergy. That means, for example, if we wish to understand the evolution of human knowledge, we have to ask for the interaction between the brain as a matterenergy structure and external structures of matterenergy, which relate to human action. Take a bicycle, for instance: Riding a bike implies that my brain operates in a complex way to coordinate all the necessary actions to keep the balance and get the bike running. This knowledge is only partly accessible to consciousness and hence, rational deliberation. It mainly resides in complex parallel processes in many parts of the brain. However, the bike as a structure of matterenergy also contains a part of the knowledge necessary to run a bike. This is because the peculiar construction of the bike is the result of an accumulation of trials and errors, as well as explicit engineering, that ended up in a design that corresponds most efficiently with the inner organismic mechanisms. The two systems, the brain and the artefact, are deeply related with each other, because the artefact triggers actions that in turn feeds back on the working of the artefact.

Eschewing the Cartesian concept of mind and knowlegde results in the completion of the Darwinian revolution.

From that perspective, human knowledge is something very different from knowledge in the Cartesian sense. This is what I call the completion of the Darwinian revolution: De-centering knowledge, just as the Copernican revolution de-centered the world, and Darwin de-centered nature by means of demolishing the idea of rational design. Now, the same holds true for human knowledge. In the naturalistic approach to knowledge, knowledge is no longer something that is related to an epistemic subject, viz. the Cartesian mind, but knowledge is process that is embodied in evolving matterenergy structures, following the principle of bimodality. I have proposed to call this ‘non-referential knowledge’ and our standard conception of knowledge ‘referential knowledge’, with the former actually being the more general,

encompassing term (Herrmann-Pillath, 2002). Referential knowledge inheres relations between an epistemic subject and an object, and is accessible to reflective knowledge, that is, I know what I know when I ride a bicycle. Of course, this differs a lot from 'I know that I know how to ride a bicycle', and includes the possibility of 'I do not know what I know if I know how to ride a bicycle', and even includes 'I do not know that I know how to ride a bicycle'. In the naturalistic approach to knowledge, the latter statement is seen as covering by far the largest share of knowledge that is relevant to human action.

In the naturalistic approach, referential knowledge is only a subset of the much larger set of non-referential knowledge.

To my mind, it is absolutely necessary to follow the philosophical discussion here, even if we eventually wish to make statements about real-world economic systems and the creative industries as an empirical phenomenon. Of course, we cannot go into the details here, but suffice to notice that the question may be the most central in a Darwinian turn in knowledge analysis, whether we accept or reject the thesis that a person who knows that *p* also knows that she knows that *p*. This thesis was almost never doubted in Western epistemologies, and certainly underlies the notion of knowledge in most of economic analysis, apart from a minority position mainly related with Hayek.

If we adopt a naturalistic and, more specifically, an externalist approach to knowledge, then we submit that the normal case is that a person who knows that *p* does not know that she knows that *p*, and that knowledge about knowledge is a very special case of referential knowledge which itself needs to be explained within the externalist paradigm (for a survey, see Schantz 2004a).

Knowledge that *p* does not imply knowing to know that *p*.

To put it very simply, the externalist account of knowledge states that knowledge is a about a regularity in a causal interaction between two different processes which are linked up in a system with a proper functioning. There are two possible venues how such kind of a system can come into place, one is design, the other is evolution. In the first case, it is straightforward to think of knowledge in terms of functions. If somebody sets

up a machine with some regulatory device, this device can be seen as embodying knowledge about the environment in the case of proper functioning, such as a device to measure temperature (Dretske 1981: ??). This corresponds to conceptual distinctions in information theory, where a distinction is made between information that carries semantic content, first, without an informed subject in the sense of the receiver of a communication process, and even second, without an informed producer or sender of this information, and which can be related to Bateson's (1973) famous definition of information as a 'difference that makes a difference' (for a survey, see Floridi 2003a, 2007). It is straightforward to see that Bateson's definition does not refer to mental content or propositional knowledge at all, but only relates to a systematic interdependence between changes of states of the world, if we look at a difference in terms of a process in time.

Correspondingly, we can see knowledge as an aspect of systems, but not as a mental state.

Knowledge is a property of proper systems functioning, emerging from an evolutionary process.

In the externalist approach, there is no principled difference between the human brain and a machine designed for a special purpose. Mental content emerges as an epiphenomenon of proper functioning of brains. Proper functioning, however, is not defined in terms of design, but in terms of evolution (Dretske, 2005: ???). This makes the fundamental difference to earlier versions of materialism in Western philosophy, because we move on to another ontological level. It is impossible to assign a functioning to a brain without taking the entire evolutionary process into consideration that ended up into its current workings. Knowledge is an aspect of a particular state of that process, but not of the brain as such. This conceptual difference has been highlighted in many earlier clarifications of the notion of biological information. The information presumably stored in the genotype cannot be interpreted semantically unless we reconstruct the entire sequence of systemic interactions that ended up into the peculiar matterenergy structure that we observe now, at a particular point of time and space (Küppers 1986: ??).

As long as we talk about biological aspects of human existence, this radical viewpoint may be even acceptable today, given our increasing understanding of the evolutionary foundations of many human behaviors and attitudes, which at least partly can also be described as a sort of knowledge. But many people will still reject the thesis that even what we can access introspectively as mental content, that is, our ideas, thought and beliefs, actually has to be analyzed on externalist terms. That would mean:

- first, that mental content is just a special aspect of more general causal interactions between brains and their environment, and, hence, cannot be reduced to states of the brain alone,
- second, that the meaning that we relate with mental content is a reflection of the proper functioning of the system in which the brain is embedded, and
- third, that this proper functioning includes the special cognitive mechanism of reflexivity, which is made possible by the evolutionary emergence of language.

Mental content is an aspect of proper functioning in physical brain-environment interactions.

I submit that the externalist approach to human knowledge boils down to the cultural science paradigm when we leave the most abstract level of epistemology and turn to the more mundane level of the empirical analysis of the systems in which human beings are embedded, foremostly the economy. Cultural science explains human knowledge in terms of externalism, and therefore applies an evolutionary paradigm to understand the generation, diffusion and maintainance of human knowledge.

Cultural science is a specification of externalism in the analysis of evolving human knowledge.

Chapter 3.

Cultural Science and Identity

Having outlined an evolutionary approach to knowledge, we have now sketched a definition of what is cultural science. In the naturalistic approach to economics, cultural science investigates into structures and mechanisms of evolving human knowledge. This understanding has profound implications. As a point of entry, let me emphasise that this approach has been presaged in many respects by Friedrich August von Hayek (1952; 1979). In particular, Hayek founded his approach to knowledge on his theory of the human mind, which builds on a connectionist theory of the brain, and he emphasised the scaffolding function of culture for individual knowledge, which therefore is only a partial aspect of the entire process of knowledge evolution, which takes place on different levels, in particular the biological and the cultural.

3.1. Endogenous agency

To begin with a surprising step, externalism implies that we can even revive more traditional notions of economics. This is because we clearly distinguish between human action and human knowledge, and therefore make the scaffolds visible on which human action is based. In other words, we may define economics as the science that deals with referential knowledge in settings of goal-oriented behavior under scarcity, thus reinstating Robbin's definition. This is just what economics was all about until more recent times, and is enshrined in the methodological guideposts of rational choice and methodological individualism. But we do not claim that this suffices to explain human action and its outcomes, because the very notion of 'rationality' has to include the scaffolds, i.e. an explicit analysis of knowledge. This is the task of cultural science.

In an externalist approach, traditional economics can be vindicated. The standard notion of rationality is seen as an emergent property of particular knowledge structures that evolve in particular contexts.

More specifically, the embeddedness of economic explanations into a cultural science framework means that rationality cannot be reduced to mere formal principles but always has to be seen as embedded rationality. There have

been different approaches to this, such as the contextualisation of rationality, and, in particular, even within economics, the increasing importance of 'frames' as a conceptual correlate to rational choice (Gintis, 2006: ??; Rubinstein and Slalant, 2008). However, cultural science radicalises these approaches in the sense that it adopts an externalist approach to rationality, such that it denies the very possibility to separate analytically between a 'within brain/mind' rationality and the embedding structures. Interestingly, this includes the possibility that what economics regards as rationality so far might be the actual pattern that emerges from knowledge evolution in certain domains.

This approach boils down to the essential category in this book, which is identity. There is no rational agent without an identity, and identity reflects the complex workings of the interactions between human individuals and their environment, coalescing into structures of knowledge. This is the point where cultural science directly implies a foundational change in economics, and I would even say, this is the only change that is sufficient to define the relation between cultural science and economics. This is because other hypotheses and propositions of economics can be maintained, as long as they deal with a special kind of human artefacts, namely, for instance, money, stockmarkets or prices. From that perspective, economics is about economic systems, and these are themselves cultural artefacts. It is perfectly possible to analyze an economic system independently from the individual, in the same way as it is possible to analyze the functioning of a car without analyzing the driver. However, the real economy and its workings is like the traffic, which includes both drivers and cars. So, a fully autonomous economic explanation is an explanation concentrating on economic systems and individuals with the identity of a rational economic agent (for a related argument, see Ross 2004). This identity is only one aspect of the real individual, under most circumstances.

In the analysis of economic action, cultural science treats the category of identity as fundamental. The identity reflects structures of knowledge in individual / system interactions.

An identity is a structure that emerges from the interactions between brains and environments, which includes both artefacts and other human beings, making up complex networks of communication, perception and interaction.

There is no way to regard the individual as an external anchor of economic explanations, such as it is maintained in consumer theories built on stable preference functions or in social contract theories starting out from the autonomous individual. An identity is a crossing point of complex interactions both synchronically and diachronically, and it defines the individual as an agent.

The notion of identity includes two important ideas: One is the uniqueness of the identity, because the complexity of interactions necessarily implies the singularity of these crossing points. The other is the role of similarities, that is, shared identities in the sense that all individuals are different, but also similar in certain respects. These similarities correlate with structures, in particular social structures bimodally related with matterenergy structures. That is, cultural science posits that all existing approaches to structures and patterns in societies, such as "classes" or "groups" can be reduced to the fundamental category of identity.

There are two dimensions of identity: The uniqueness of the individual and the similarities with other individuals.

In current social theorising, the position that comes closest to this is actor-network theory in sociology (see Latour 2005). The conceptual link between the notion of identity and ANT is the concept of the actant in the latter. In standard economics, the agent is an individual that can mobilise a certain set of referential knowledge items to choose among actions. The economic approach that makes this most explicit is Becker's (1996) human capital approach to consumption that we will scrutinise in Part II. Intriguingly, this notion of human capital already raises fundamental questions about whether human capital can analytically separate the individual from their social environment (Davis 2003: ???). But standard economics simply assumes that the only ontological correlate of the agent can be the human individual. In contrast, ANT posits that the agent, the actant, is the result of a confluence of dynamic network relations, with 'networks' understood as fluid associations, but not as fixed structures.

In social theory, actor-network theory is congenial to cultural science, as it posits that agency is a dynamic property of network interactions which include individuals and things.

To add more detail, in structural approaches to networks, as in social network theory, networks are seen as configurations of agents and their relations, such

that the links as such do not have any causal force in the sense of being a locus of actions. ANT distinguishes between ‚intermediators' and ‚mediators'. An intermediator is just a physical linkage between network loci that does not change anything in their relation beyond simply making the connection technologically possible. For example, if I copy a letter and give that to another person, the copying machine is an intermediator. However, ANT states that in the vast majority of network relations the media of the connections are mediators, which means that they play an active role in changing also the quality of the actions that flow out of the associations. This is most obvious, of course, in the case that human beings act as mediators, such as when reporting about the conversation of others. But ANT also states that artefacts can be mediators. Just remember the previous argument about the bicycle. The bicycle, by its very physical structure, imposes a certain pattern of actions on me, if I want to avoid falling down. In this sense, my action to ride a bicycle is not simply my action, in the sense of being reducible to my own skills, but also reflects certain properties of the bicycle. From that perspective, the bicycle appears to be a mediator.

ANT therefore deviates radically from social network theory as it includes artefacts into network analysis, in particular technology, which is important for our topic of the creative economy. This approach boils down to an externalist approach to agency, which converges with my treatment of identity. That means, there is no more any separation between structure and agency, but a systemic interaction between the two in the emergence of actants. An actant is a theoretical term that is put behind the phenomenologically accessible, which is the flow of actions and associations. Acting is as much active as it is passive, in the sense of being the object of something else ‚making do' somebody (Latour 2005: 212ff.). This means, even the supposed innermost of the individual is the result of a process, in which mediators operate that subjectify an entity.

To summarise, cultural science posits that agency cannot be constituted as an exogenous precondition of systems functioning but emerges endogenously, as a crystallisation of complex interactions between different parts of systems

into the identity of the human individual. Therefore, identity is also interpreted on externalist terms, corresponding to the general approach to knowledge. Therefore, even the standard notion of the economic agent can be vindicated, given certain systems interactions.

3.2. A holistic approach to the Darwinian analysis of culture

We can now clarify an important definitional point. This is the relation between cultural science and other approaches and even disciplines that deal with culture. The first and foundational point is that cultural science adopts the naturalistic viewpoint. This means that culture is not perceived as the realm of human ideas, values and other mental phenomena. Instead, culture refers to the empirical phenomenon of an evolving stock of knowledge enabling human action, for which the principle of bimodality holds, that is, culture can be analyzed in both the ideational and the matterenergy mode. This fits into a long, but currently somewhat obsolete tradition of including artefacts into the notion of culture, and indeed, cultural science includes the study of human artefacts as an important research issue, such as, for example, human technology. So, we might speculate that ANT also delivers important insights in this area.

Interestingly, in the anthropological study of culture the conflict between atomism and holism looms large. This topic is extremely important in our context, because it can be related to most recent attempts at formulating a Darwinian approach to culture, memetics.

Originally, the tension between atomistic and holistic approaches to culture found its clear expression in early anthropology in the pragmatic problem of how to organise museums, when Franz Boas discussed alternative arrangements of artefacts (Ingold 1986: ??). There are different options. One is to arrange single artefacts and emphasise their similarities across different ethnic groups, thus seeing them as a part of the general evolution of human culture in the singular (so, similar to the notion of civilisation in German or French), the other is to downplay the role of single artefacts and instead to emphasise their systemic interdependence in specific cultures, localised in

In the history of anthropology, the conflict between atomistic and holistic approaches to culture has driven many debates even in practical matters such as the design of museum exhibitions.

time and space. The first approach would imply the possibility to make lists of artefacts and their functions, and, for example, to investigate into their diffusion across populations, independent from their context. The second approach would state that single items are meaningless, unless they are seen in the context of an entire cultural system.

Evidently, the two perspectives repeat some abstract conceptual configurations that we are now already familiar with in the context of knowledge in general. Now, the surprising twist of my argument is that I will relate the second viewpoint to the naturalisation project, whereas normally the first viewpoint is seen as the point of reference. This is particularly true if we ask for the possible paradigmatic relevance of Darwinism. This is easy to see if we consider the Neo-Darwinian orthodoxy, which is atomistic in essence. That is, evolution is seen as a process in which traits emerge and evolve which are analytically separate from each other, and which correspond to genetically stored information. The traits define the functionality of the living system in terms of adaptiveness, and genetic inheritance provides the medium for the accumulation of the pertinent knowledge. This approach seems to be close to the atomistic view on cultural artefacts and items, and thus, as it happened, Darwinian theories of culture mostly follow population-genetic modelling that emerges out of the formalisation of the Darwinian paradigm.

Neo-Darwinism adopts the atomistic stance, building on the idea of separable traits that express information transmitted via genetic evolution.

This way of thinking is severely criticised by anthropologists who see culture as a correlate to meaning. An authoritative statement on this has been presented by Tim Ingold (1986), who argues that the Darwinian approach is missing two essential elements that make up the notion of human culture, namely personhood and history (for a related criticism, see Hallpike 1986). In both dimensions, there is a unity of meaning that encompasses the single constituents of the pertinent processes.

However, I think that this argument fails to realise that there is a tertium datur [third possible choice] to the original opposition between atomism and holism in cultural analysis. Tylor's holism referred to culture as a unified

aspect of human civilisation, whereas Boas's atomism referred to the individual mix of traits in particular populations. The tertium evidently lies in treating the latter as meaningful units beyond the mere fact of mixing of traits. This corresponds to the notion of higher-level individuals in biology, which might include even the species or higher taxa (Gould 2002: ????). In a naturalistic framework, this viewpoint corresponds to those notions in biology which accept the possibility of downward causation in hierarchically structured biological systems, such that emergent structures operate as an autonomous causal force on further evolutionary processes (Campbell 1974). So, our discussion focuses on the question whether Darwinism is necessarily atomistic. If Darwinism can be holistic, its application on the concept of culture is far less problematic than it seems. We can develop an entirely different perspective if we adopt a holistic interpretation of Darwinism (in a similar vein, Corning, 2005). But why should we regard Darwinism as a unifying theory also for the study of culture at all? This is because only Darwinism can explain the emergence of novelty in any kind of system, as well as its maintainance through time, in the sense of structural sustainability.

My claim is based on both possible interpretations of Darwinism. One is the reduced form, which boils down to the principle of variation and selective retention, and therefore is mainly based the claim of the universality of Darwinism in the classic Campbell (1960) argument on knowledge evolution; the other is the extended form, understanding Darwinism as an historically evolved, complex conceptual system in biology, that includes, for example, biological taxonomy (Mayr 1982: ???). These two understandings partly define the cleavages between Neo-Darwinism, mainly in the shape of theoretical population genetics, and other strands of thought in biology (???).

In the context of the analysis of culture, both positions can be meaningfully considered:

- The conceptual structure of variation, selection and retention defines the minimum properties of any kind of system with emerging novelties. As has been emphasised many times in the literature (e.g.

The emergence of novelty in any kind of domain can only be explained in the framework of the V(ariation)S(election) R(etention) model.

Jablonka and Lamb 2005: 11), for the extension of the Darwinian scheme it is only necessary

- to identify a mechanism of multiplying entities via reproduction (which, for example, can be imitation in the cultural context),
- to allow for variation, i.e. heterogeneity of the entities (this correlates with a population approach to culture, which precludes reified concepts of culture such as 'Chinese culture')
- to manifest the phenomenon of heredity, which means that there are similarities between entities which are connected through time via the causal process of reproduction (which is what most people have in mind anyway when they talk about culture in terms of traditions),
- to have a competitive environment, such that the variations in the population of entities somehow affect the differential reproduction through time (which precisely points towards the role of economic constraints in cultural evolution).

- Now, even within that framework, a proper formalisation of the notion of selection (following Price's equation, see Price 1972, Frank 1995) implies the notion of levels of selection, insofar as groups of traits can be organised into higher-level traits which in turn are objects of selection. Once we have the notion of levels of selection, we can introduce notions such as
  - Downward causation from higher levels to lower levels, which also includes
  - Internal selection of developmental pathways as compared to external selection at the interface with the environment, i.e. the evolution of evolution,
  - The emergence of new mechanisms of the storage and transmission of knowledge,
  - The multidimensionality of fitness criteria, and their endogeneity in evolution.

Price's equation allows for the consistent formulation of the notion of levels of selection.

Thus, the holistic interpretation of Darwinism allows for the treatment of culture as a holistic phenomenon. However, this is by no means sufficient for conducting cultural analysis. The main reason why the majority of people would believe that culture cannot be the object of Darwinism is because they argue that culture is the result of a special human capability to create meanings.

So, can we apply Darwinism to meanings?

3.3. Memetics and the naturalisation of meanings

This is a highly intricate question, as it is related with most recent developments in philosophy, in particular teleosemantics (MacDonald and Papineau 2006). To make things as simple as possible, let me just state that the application of Darwinism is possible if we establish a clear relation between meaning and function. In comparison with earlier materialistic accounts of culture, this equation is only seen to be valid because it is assumed to be the result of an evolutionary process in which certain kinds of phenomena are assigned to have a function because they have been selected for. So, the notion of function is inextricably related to the notion of selection. This would immediately imply biological reductionism if we adhered to the atomistic view on Darwinism. However, now we have another choice.

A naturalistic approach to culture builds on the naturalisation of Wittgenstein's theory of meaning.

I think that the most straightforward way to convince the skeptic of this approach is to argue that this is simply a naturalistic approach to Wittgenstein's theory of meaning. This is easy to see, because Wittgenstein rejected the idea of a referential meaning in the sense of mental content in favour of the idea of pragmatic embeddedness of symbolic actions in a community of language users. Meaning emerges from complex feedback loops between the use of a sign and the reactions of others on the use of the sign. There is no such thing as an inherent 'meaning' in the sense of traditional ideas of reference and content. The meaning is the use. But this is equivalent to say that the meaning is a function.

From that perspective, the real issue about meanings is, what is the function of our obvious capability to perceive functions as meanings in the traditional sense? That is, we are able to think that we think that this is a table. This clearly establishes a meaning of the word ‘table’. However, from the Wittgenstein point of view this meaning is not directly relevant for grasping the meaning of the word in a community of language users. Here, the meaning is what people do when the utter the word and react on an utterance. Actually, this approach is absolutely necessary to explain the fact of linguistic creativity: If meanings were somehow fixed in terms of references, how could we use words to designate new things? For example, on a trip I can say ‘Let us use this as a table’, pointing towards the hood of the car. Everybody will catch my meaning, although the meaning of ‘hood’ and ‘table’ are certainly different. So we have to ask what is the function of perceiving a ‘meaning’ differently from what it is, namely a function? As we shall see, this is concomitant to the functional need for having an identity. We can add a long list of other examples, where language is not used simply to describe reality but to guide human interaction: Language is always driven by metaphors and implicatures which are heavily dependent on context, and where the function is very often a far cry from the lexicographic ‘meaning’. After all, mastery of a foreign language precisely resides in the proper handling of implicit meanings, and mistakes often happen when relying on the literal meaning as given in the lexicon.

The Wittgensteinian theory of meaning is the necessary condition for the possibility of creativity. Creativity results in new functionings for meanings.

However, this kind of creativity can only work if different individuals are able to share the new use of words in the context of new functionings. As we shall see in the in more detail in Part II, this relies on the uniquely human capability to imagine what other people intend to do. From this follows, that the function of meanings lies precisely in enabling human individuals to develop shared intentionality. The referential nature of meaning results from this reflexivity which is mediated via the other.

The function of meaning is enabling shared intentionality among human individuals.

In the current context, the important result of this discussion is that the straightforward way to darwinise culture is the naturalistic view of Wittgenstein’s theory of meaning. Actually, I would claim that

Wittgenstein's theory is naturalistic precisely because it refers to the life forms of a community of language users. However, if we compare this with the approach by ANT, what seems to be missing is a theory of mediators in the sense of what actually enables the community of users to interact with language. ANT gives the important idea that this might include artefacts. After all, language is an artefact, as it is a physical process that relies on heavily constrained acoustic signals, which do have direct implications for the specific way how to transmit information. For example, language is a flow through physical time which prohibits the simultaneous transmission of different items of information, which is the reason why real-world language is accompanied by communication through other channels such as body language. So, the only thing that we need to add to our naturalistic view on Wittgenstein's theory of meaning is that the actual use of the sign is not a mental operation but a physical process that links up brains. This concurs Aunger's (2002) interpretation of memetics.

The completion of a naturalistic approach to meaning has to recognize that language is a physical process.

However, on first sight memetics, as it stands so far, is an approach to culture that is problematic in two respects. First, it is atomistic, and second, it is mentalist. So in both regards it seems to contradict the approach chosen in this book. However, I would like to propose a new approach to memetics that closely follows Aunger's restatement of the theory originally proposed by Dawkins (1989).

The problem with the previous approaches to memetics is that Dawkins produced this equation between atomism and mentalism in the sense that he proposed to view memes as ideas, tunes, symbols, whatsoever, that spread across human minds. This is an atomistic approach because memes indeed follow the genetic paradigm in the sense that the single meme is seen as an information-carrying unit such as the gene. Clearly, this kind of thinking even contradicts Dawkin's neo-darwinist view on the gene, which he interprets as an information that controls ontogeny, in his comparison, a recipe but not a trait as such. If a meme were a tune, that would be the same as to identify a gene for a particular kind of nose. In other words, Dawkin's memetics confuses the levels of the phenotype and the genotype. But even a separation

The original Dawkins concept of a meme adopts a misplaced combination of atomism and mentalism in treating ideas, artefacts etc. as units of culture.

were possible, there seems to be a fundamental difference between the economy of genes, building on a simple chemical alphabet, und the limitless number of memes corrsponding to the myriad of single cultural items. This is even stranger because if we think of memes as tunes or symbols, we directly take them to be mental phenomena, so we do not consider their material substrate, which we do in the case of genes. So something is seriously wrong with this approach, which might explain the slow acceptance in the scientific community (for informed criticism, see e.g. Richerson and Boyd 2005: ???).

However, if we start out from a naturalistic and holistic approach, the gene / meme analogy seems to be much more plausible. If we do not consider the gene but the system of gene expression as the carrier of information, viz. knowledge, we can immediately see that a meme must be something similar with reference to the cultural item under discussion. So, the analogue to culture is not directly the gene, but the phenotype, which refers to a systematic combination of traits, which is singular for every biological individual. From the viewpoint of cultural analysis, the idea of cultural atomism is indeed impossible to accept because the meaning of the single item depends on the semantic embeddedness into the relations with all other items. But this is also true for the phenotype, which is a biological individual. The system of genes and gene expressions corresponds to this, so that the meme must be something similar, only with reference to culture.

Culture in the commonsense understanding corresponds to the phenotype, especially in the sense of its coherent individuality and systemicity.

The search for this corresponding entity can be successful if we reject the mentalist interpretation of the meme. The question is whether we can identify something as a meme that controls the process of creating the cultural item as a part of a cultural whole, and which has a material substrate. That is, it is absolutely misleading to identify a meme as mental content, such as an idea. A meme must be something very different from that, in the same way as a gene is never a nose.

Aunger proposes that a meme is a stable structural unit in dynamic neuronal processes. This proposal fits into the approach of neuronal Darwinism that we scrutinise in some more detail in Part II. This unit has the property to be

able to replicate itself in the neuronal network of the brain. However, it does not have a meaning (Aunger 2002: 221), so does not have any relation to what we perceice to be a cultural unit. Yet, the replication of such neuronal structures underlies the fact that, for example, we can hum a tune repeatedly, and recover it from the memory and so forth. Obviously, there is a clear distinction between ordinary neuronal mechanisms and a meme, because, let us say, the processing of a noise in the brain does not necessarily give rise to a replicative structure. Aunger's neuromeme is a hypothesis on the same level as early theories about the gene until the specific mechanisms of gene expression etc. had been discovered. That means, it is a highly theoretical, yet plausible account.

A meme is a recurrent pattern of neural action in a Darwinian process of neuronal selection.

So, one physical element in a naturalistic approach to culture are recurrent patterns of neuronal action that can be reproduced in a Darwinian process of neuronal selection. However, our traditional notion of culture does certainly imply that those patterns are shared across the individuals of a population. In fact, in his early exposition of the theory of neuronal selection Edelman (1988:????) had already argued that the stabilisation of neuronal patterns itself is only possibly via the interaction between individuals of a population. This is because only this can provide selective constraints on the otherwise chaotic firing of neurons in a solipsistic brain, as it seems to happen in our dreams.

How does the stabilisation take place? In most approaches to memetics, imitation is emphasised (Blackmore 2000). The role of imitation has been even more accentuated in most recent neuroscientific models of learning (Hurley 2008). That means, stabilisation of neuromemes presupposes as process of imitation which is governed by feedbacks on different levels of complexity. That is, there is an intricate relation between the formation of neuromemes and reward mechanisms in the brain. The brain learns certain regular actions by staying in interaction with other individuals who perform that action, and it is the success of some coordination between those actions which ultimately ends up with the internalisation of the underlying mechanisms. This means, in particular, that in the primordial stages of

Imitation is the central process resulting into the stabilisation of neuromemes, which fits into the externalist approach.

memetic evolution there is no boundary between the brain and its environment, or the self and the others: To the contrary, the very notion of the self is an emergent property of this more encompassing system. The elements of the system are summarised in fig. 3-1. The central ingredient is a special neuronal structure that enables the brain to mirror actions of others in the sense of recognising similarities between own actions and others actions, in particular physical aspects, including objects and artefacts. The afferent and efferent neuronal processes are interlinked in feedback loops which are grounded in evolutionary rooted value functions. This system evolves into a system of classifications of own and others' actions, which in turn imposes increasing regularity on the internal linkages between inputs and outputs. Neuromemes play a central role because they represent these regularities.

Neuromemes emerge out of an ongoing process of mapping sensory inputs and motor outputs into each other, centering around own actions.

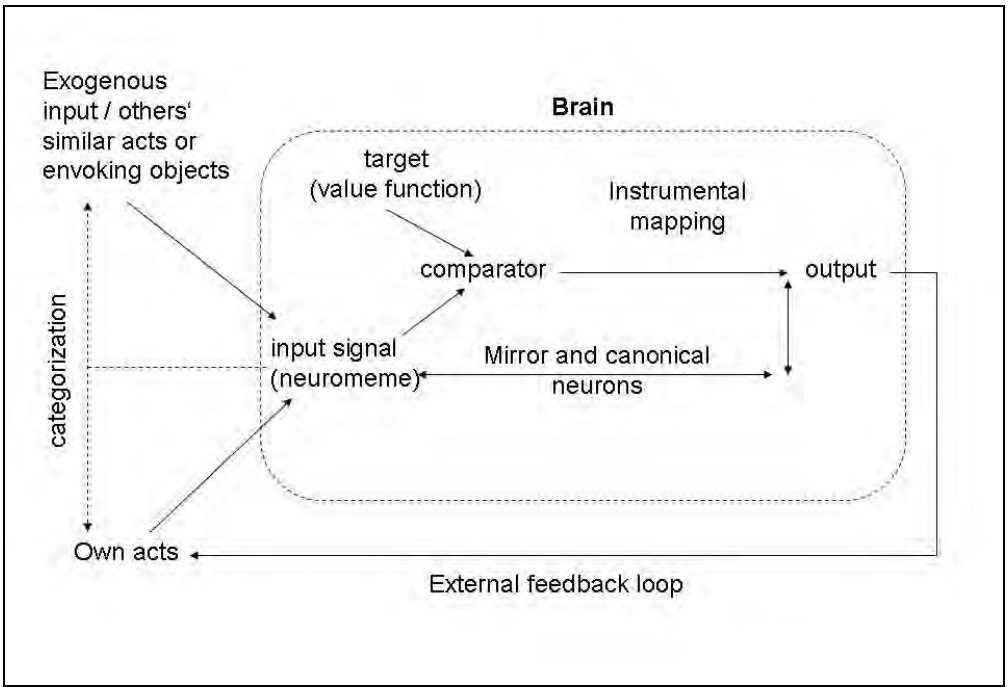

Figure 3-1: Basic structure of neurometeme stabilisation (modified after Hurley 2008)

The process of structural stabilisation of complex neuronal structures can be formalised by means of a model that is of fundamental relevance for the analysis of genetic evolution, those further supporting the naturalistic convergence of models of explanation across biology and cultural science. This is possible because the model is central to the explanation of the

emergence of life, which we can see as a special knowledge structure. This is the model of the hypercycle (see Küppers 1986: 202ff.; Brooks and Wiley 1988: 76ff.). In the most abstract form, the hypercycle is a process of replication that simultanously produces catalysts that support other replicative processes, which are connected in a closed-loop chain. In the original case of a chemical hypercycle, the replicative processes are fed by a solution of constituents and the external input of energy (see fig. 3-2) and are supported by an autocatalytic dynamics which lowers the energetic thresholds for the reactions. As a result, a hypercycle maintains evolutionary stability because of higher fitness resulting from an advantage in energy processing as compared to competing molecules.

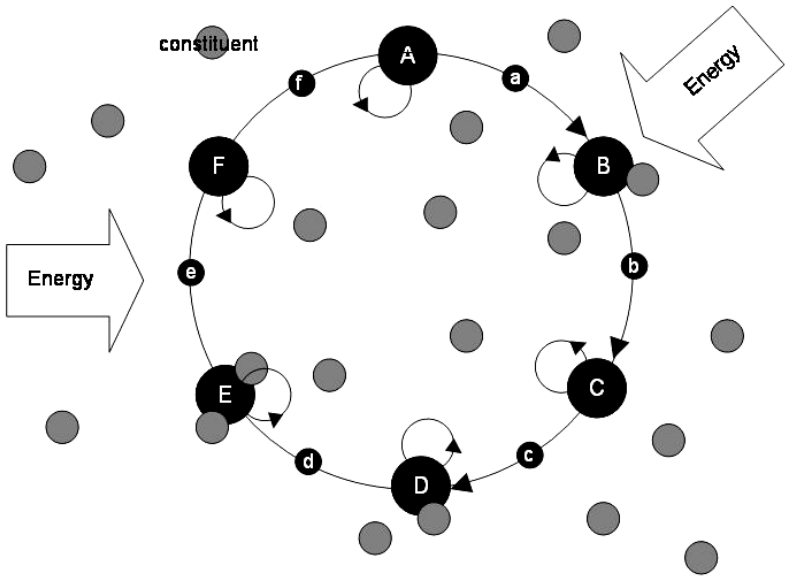

Fig. 3-2: The hypercycle

The hypercycle is a general model for the explanation of complex hierarchical systems, such as ecosystems (Maynard Smith and Szathmáry 1995: 51ff.) or economic systems (Padgett 1997; Padgett et al., 2003). It can be directly adapted to the externalist analysis of the brain, as Aunger (2002: ???) also has pointed out. Memetic evolution results into the emergence of hypercycloc connectedness among brains.

The hypercycle is a universal formal structure in the analysis of knowledge evolution. Memetic evolution results into the hypercyclic interconnectedness of brains.

A most simple model can be depicted in the following way. Hurley's (2008) conception can be enriched by the notion of a Darwinian selection of neuronal structures in the brain. The reproduction of neuronal structures happens in a very complex system of exchanging signals and neurotransmitters in the brain, which implies that neuronal structures compete for these resources, and that they can mutually support their reproduction via joint firings. As we shall specify further in Part II, this is the model of neuronal group selection, for which the formal pattern of the hypercycle can already apply. However, memetic evolution includes the additional feature of an external connectedness between those neuronal processes. In this case, it is straightforward to hypothesise that the artefacts that connect human brains, such as the physical soundwaves of language, operate as the catalysts in the process of neuronal reproduction. This means that the reproduction of a neuromeme simultaneously results in some motor output that might include the handling of artefacts, which is an input into neuronal reproduction of another brain, in which the reproduction of corresponding neuromemes is catalyzed. Clearly, these neuromemes are not necessarily the same structures as in the originating brain, but they are convergent in the sense of Hurley's model of imitation. That means, physical artefacts obtain a central role in continuously updating these convergent patterns.

In hypercyclic brain interconnectedness, artefacts are the catalysts connecting distinct processes of neuromeme reproduction within brains.

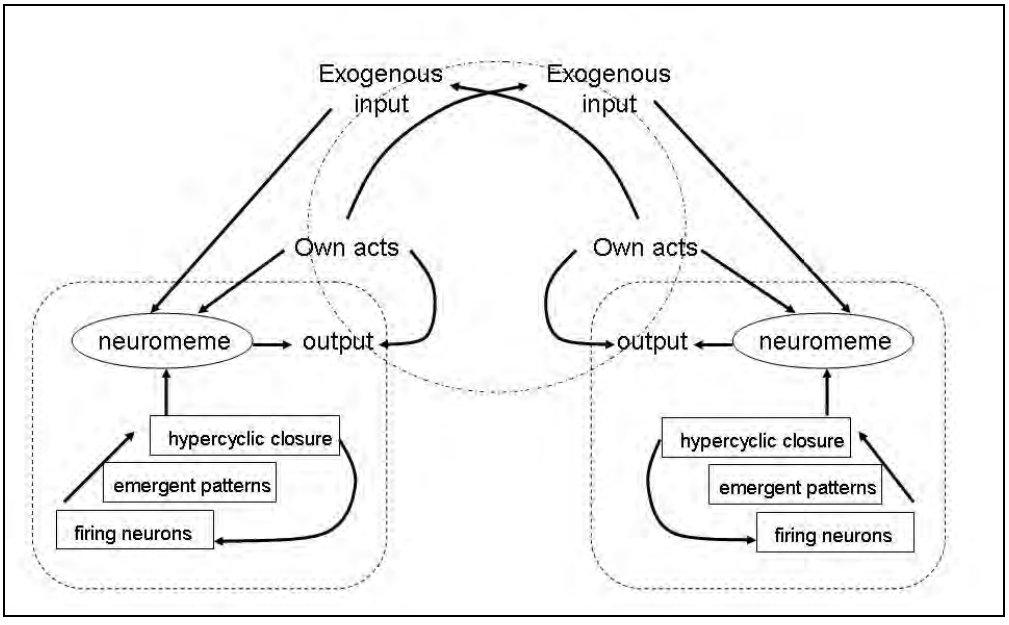

Fig. 3-3: Hypercyclic reproduction of neuromemes across brains

I summarise this in figure 3-3 which puts together the two elements of the two previous figures. The crucial point is that the reproduction of a particular neuromemetic input pattern is not only supported by the feedback loop between efferential motor output and input, but further via the fact that this motor output simultanously is an exogenous input to a similar process happening in another brain. This exogenous input is a physical patterns produced by the motor output, such as a soundwave. In the hypercyclic model, it operates as a catalyst to the internal reproduction of the neurometeme. Neurometeme reproduction results into hypercyclic closure of the internal states, in the sense of a downward causation of the respective structures. Thus, we can state that not only the neuromemes as such emerge in a hypercyclic dynamics, but the coordination of neuromemes across brains is hypercyclic, such that also the internal reproduction cannot be independent from this external dynamics. This hypothesis offers a neuroscience foundation for cognitive externalism.

This clearly shows that the internal workings of the brain are inextricably enmeshed with the occurrence of regular patterns of action in the environment. This undergirds the externalist point of view with strong empirical grounds. In particular, we can state that the core phenomenon of internalist accounts of mental content, that is, the internal representation of thoughts and the self in consciousness, is just the result of the emergence of a ‚theory of mind' in the external interaction. That is, in the process of interaction the brain projects an intentional stance on other brains, and once this idea has emerged, it is projected back on the brain. That is, the self is an externalist construction, but not an internal given.

The theory of memetic evolution provides a naturalistic justification of externalism.

The other element of the naturalistic approach to memes is the role of artefacts. As I have already emphasised, language itself is an artefact in the sense of being related with particular acoustic or visual patterns. However, this is by no means the only artefact that is involved in the process of

imitative transfer of neuromemes across brains. The point is that possibly any kind of regularity in the environment can give rise to such kind of a coordination of neuromemes if the reproduction of the latter is interlinked with those regularities, This leads precisely back to the teleosemantic approach to knowledge. To take the notorious example of the rings of a tree: The rings carry information about the age of the tree, without any sender or receiver involved. Yet, from the naturalistic perspective this does not mean that they do not contain this information, being an indicator for age which is based on certain causal regularities in the growth of the tree. At the same time, however, this information can also be retrieved by human brains, which implies that the functioning which underlies the growth of the rings becomes causally interconnected with functionings of the brain. Clearly, the intermediate variable is a meme in the sense that there must be an underlying recurrent neuronal pattern which is coordinated with the use of language in a community of individuals who are able to exchange information about the age of the tree. So, the rings of the tree obtain the role of an artefact in meme transmission and diffusion.

To sum up, we can envisage a Darwinian approach to culture in terms of a naturalistic theory of language in which meaning is identical to evolved function in a population of language users. There is no independent mental content here. At the same time, there is no independent meaning to single memes that undergird meaning in terms of bimodality, because it relates to the system of language in a particular community. This resolves the apparent conflict between the Tylorian and the Boasian conception of culture.

Chapter 4.
Social Network Markets and Creative Industries

In concluding this exposition of basic ideas, let us throw a brief glance at the existing approaches to cultural industries and the creative economy. Again, we face the co-existence of approaches that emphasise the technology side or the ideational side. The latter approach is mainly exemplified with the cultural studies paradigm (as far as there might be one). The crucial difference between cultural science and cultural studies is that the latter focus on the interpretive potential of the human mind, in the sense that in principle, anything that we can imagine can be realised insofar as human action follows interpretation. That is why, from a cultural studies perspective, a category such as gender might be eventually deconstructed into arbitrary elements that can be reshuffled at interpretive will, and which then might become the object of queer theory. This almost limitless interpretive potential of the human mind also underlies the creative process in the Creative Economy, in the sense that production is no longer perceived as a material process, but primarily as a process of creating signs as vehicles of an ongoing interpretive process in communities of users of those signs.

As we have seen, such a deconstructionist approach to culture does not contradict the Darwinian approach precisely because the latter implies a non-essentialist conception of culture. From this point of view, the interpretive approach just grasps the creativity of cultural action, which we will explore in Part II. The main difference between the cultural studies and the cultural science approach is to cast this interpretive activity into the analytical framework of Darwinism, and to adopt a naturalistic approach. Take gender as an example, again. The point is that gender as a meaningful aspect of human interaction is inextricably enmeshed with physical processes, such

Cultural studies highlight the creative dimension of culture, and cultural science adopts a naturalistic view on creative agency and the creative process.

that, for example, biological sex is not simply a determinant of gender, but a necessary physical correlate of any cultural manipulation of gender. Even the most arbitrary deconstruction and reassembly of gender categories has to rely on aspects of the physical category of sex.

The creative industries is the place where such a manipulation is done in a systematic way. I cannot delve into the details of the academic discussion about the creative industries, but only wish to select one most recent attempt to set up an analytical framework which is the closest to my Darwinian approach to cultural science. This has been provided by Potts et al. (2008) and defines cultural industries in terms of social network markets. The idea is simple. If you look at the products of creative industries as conceived in the traditional sense, such as fashion, movies or novels, all of them seem to be directed at certain mental states of individuals, so could be seen as having the same relation with the individual as when buying and eating an apple, which changes the physiological state of an individual. However, a second look reveals that there is a fundamental difference. In typical products of creative industries, my consumption of a product also depends on what others do. In fact, very often I cannot assess the utility of a product unless I know what others think about it. Or, the utility of the good precisely resides in the fact that others use it, too. There are simple as well as more complex versions of this argument, such as, that the current preferences for a particular product are the result of past decisions which follow the same pattern, that is, the formation of the preferences itself is a process manifesting the same dynamics, such that preferences and consumption co-evolve.

Creative industries are a special case of social network markets, in which preferences evolve with a social network dynamics, in which the individual decisions are interdependent.

This description might be true for any cultural item, so that the only point that we need to add to arrive at a definition of creative industries is that this is a business, which means that the production takes place within organisations that pursue a profit motive, and which operate on markets. In our context, the central argument, however, seems to be that those markets are embedded into social networks, in which the coordination of preferences and actions take place. Social networks produce a particular kind of dynamics, which is typical for the empirical patterns in creative industries, that is, we observe

highly frequency-dependent effects, resulting, for example, into power-law distributions of revenue across movies.

On the one hand, I strongly support this approach, but on the other hand I do not think that it delivers in the sense originally intended by the authors. This is because I argue that all economic activities are embedded into social networks, and that therefore all economic activities reveal the pattern highlighted by this analysis, so that in the end it cannot really distinguish what we regard today as 'creative industries' from other industries. However, this negative result simply means that creativity is a ubiquitous phenomenon in the economy, and that, therefore, the definition of ‚creative industries' in the narrow sense is just a historical one which emerges to fulfil certain functions in economic organisation.

However, all consumption is also consumption of the signs that the goods constitute, thus always activating the neuromemetic hypercycle that interconnects brains.

My argument rests upon our previous theoretical considerations. We only need to recognise that all human action, apart from neuronal shortcuts such as instinctive behavior, is at the same time symbolic action: The consumption of goods is always also the consumption of signs of the goods. That is, in the sense of the basic hypercyclic structure of fig 3-3, all consumption is also an input into the neuromemetic structures of the brain that hook up brains on other brains. But if this is the case, the argument on embeddedness always applies, for any kind of good. In other words, goods are physical correlates of neuromemes in the sense previously discussed. In other words, all consumption of goods is a cultural activity, which supports the very actions that, on surface, may seem to satisfy some autonomous and internal needs of the individual.

I think that this is easy to accept if we consider the most basic goods in the Maslowian hierarchy of needs, as for the high level needs the argument does not seem to be disputed. The notion of cultural industry (being one alternative possible designation of creative industries) seems to suggest that 'culture' is something that only applies for goods on a certain level of civilisational achievement. But this is obviously false. If we move to the lowest Maslovian level, we easily recognise that all fundamental adaptive functions of human

beings are culturally shaped, such as the need for food or the need for thermoregulation by means of dressing. All food use is also consumption of signs in the sense that particular items of food also have a meaning, such as a supposed function, a history, or serve as a signal. Indeed, our conscious choices are not fully informed about the organismic functions of food, and precisely because the evolution of the human species increased phenotypic flexibility. But this flexibility creates a fundamental problem of ignorance, which is solved by the cultural embeddedness of food consumption. From the evolutionary point of view, the classical debate over cultural materialism among Harris (1979) and Sahlins (1976) does not really matter, if we treat this from the knowledge perspective.

The most straightforward way to grasp this point is to approach it in the emics and etics paradigm, which emerged from that classical debate (Headland et al. 1990). From the etic viewpoint, an analysis of food rests upon ecological and physiological analysis. From the emic viewpoint, food is a cultural construct that exclusively is based on meanings in terms of mental content. If I want do understand food habits in the etic perspective, I adopt the position of the external scientist, without any need to communicate with the food users. If I want to understand them in emic terms, I need to talk to the people and to adopt the position of an internal, participant observer. Now, the Darwinian approach offers a tertium, again. This starts out from the observation that the etics of food might not be accessible to anybody, as scientific knowledge was not available during most of the time during human evolution, and is still incomplete today. So, food use operates under fundamental uncertainty and ignorance. So it is scaffolded on a process of Darwinian cultural evolution, in which the pattern of food use emerge from the physical processes related with it. That is, the meaning of a food item is related with its functioning, but not in the sense of some external (etic) knowledge about this food use, but an evolved functioning in a community of food users. This functioning inheres the meaning of the food item in terms of the community of language users.

The distinction between emics and etics falls apart in a unified Darwinian paradigm, because the emics turns out to be the etics under fundamental uncertainty, that is, culture scaffolds the evolution of functional knowledge.

The interesting point is that this does not imply that the meaning in terms of mental content actually reflects the functioning in terms of etic analysis. This meaning can be arbitrary, as long as it works in maintaining the actual practice of food use. Even more, we can even state that functionings themselves can show a complex pattern in different dimensions. This is that evolutionary processes working on functions in terms of etics and those working on meanings in terms of emics do not necessarily converge, because the endogenous, frequency-dependent mechanism of the diffusion of signs allows for many non-functional phenomena. One has to be very careful here on the conceptual level: The argument turns out to be even more foundational if we relate is to the role of signals in evolution in general.

The arbitrariness of cultural meaning is a special case of signal selection in evolution, which introduces the possibility of non-functional dynamics of meanings in the context of the functionings of coordination among different individuals.

Zahavi and Zahavi (1998) have introduced the special conception of signal selection to deal with the ubiquity of frequency-dependent selection that results from the fact that all living systems are coordinated via the exchange of signs, that is, the confluence of meaning and function is an universal evolutionary phenomenon (for a related interpretation in the case of bacteria, see Ben-Jacob et al., 2005, 2006). However, this also implies that there is a two-fold meaning of function which is fused in the criterion of differential reproductive success. That is, any kind of organismic trait can serve both a adaptive function with relation to the physical environment and a signalling function with relation to other living systems. In other words, the divergence between meaning and function emerges from the fact that life is a system of distributed information processing. The standard example for this divergence is markers in sexual competition which can show prowess and health precisely because they hamper adaptive function in other respects. This is the handicap principle (Dawkins 1989:???).

It is straightforward to see that this is exactly the same argument as with culture: Culture does not need to match adaptive functions because it involves signs. But that does not mean that it has no function at all, or that it can systematically disturb all other adaptive functionings. Signal selection as a purely Darwinian mechanism involves the possibility of a manifold of co-evolutionary patterns.

What has been described as a specificity of creative industries is in fact a universal phenomenon of all signal selection. And signal selection is permeating all other aspects of economic activity.

The theory of signal selection underlies the theory of social network markets, which implies that the latter is only a special case of a most general evolutionary phenomenon. Potts et al. argue that the problem of the possibly ubiquity of creative processes can be dealt with by distinguishing between two parts of the production process, that is the non-creative and the creative one, with the latter being identified with creative services. Again, this actually refers to a particular historical phenomenon which, cleary, deserves due emphasis, but cannot really refute my position. For example, the production and consumption of an apple might be separated from the consumption of the sign of an apple in the sense that the latter becomes the object of an advertisement campaign that gives a special meaning to the consumption of an apple. This is certainly the hallmark of the modern creative economy, but this does not imply that in earlier times there was no simultaneous consumption of the apple and the sign. So, what really counts in the definition of the creative industries is the fact of the institutional emergence of a market, but not the very nature of those activities. So, creative industries are, generally speaking, an outcome of the growth of the complexity of the social production of meaning, as well as the specific result of the ongoing marketisation of society. In other words, creative industries are themselves a result of the creative economy.

The specificity of the creative industries lies in their embeddedness into markets, so they are a result of the creative economy, and not their prime mover.

So, we end up with a vindication of our previous conclusion: Cultural science approaches the creative industries as a special historical expression of the creative economy, possibly coalescing into a distinct cultural pattern of the Creative economy.

Conclusion to Part I.

Pulling the threads of Part I together, we can state that cultural science is grounded on a few foundational concepts which amount to the naturalisation of culture, while at the same time eschewing reductionism in the sense of sociobiology and related approaches. In principle, this avoidance of crude reductionism is the outcome the internal discussion in biology about Darwinism, which confronts the Neo-Darwinian mainstream with an increasing number of non-reductionist alternatives within the Darwinian paradigm. These alternatives are holistic in the sense that they treat biological information as a property of a dynamic process of gene-environment interaction, and that evolution ends up in the emergence of complex hierarchical structures with downward causation.

Holistic Darwinism reshapes also our thinking about culture, in two senses. The first is that holistic Darwinism assumes that evolution is multidimensional, including the fundamental fact of the evolution of evolutionary mechanisms. This means that culture stays in continuity with the general evolutionary process, as an evolved capacity for culture, but also as an additional dimension of the evolutionary creation and reproduction of knowledge, bimodally reflected in structures of matterenergy. This insight can be reached from two directions. One is the refinement and enhancement of Darwinian theory, the other is to reflect about the notion of knowledge. The second direction follows the principles of externalism: Once we recognise that all knowledge is a physical structure of physical causes and effects in evolved systems with a proper functioning, the continuity across the biology – culture divide becomes evident.

The second sense in which Darwinism changes our thinking about culture is that we recognise how Darwinian theoretical precepts can explain the dynamics and the evolution of culture in the narrow sense. In our context, this builds the bridge to include even very specific questions such as the creative industries topic into our paradigm. As we have seen, one of the theoretical

frameworks to understand creative industries is the social network market model, which directly corresponds to the general notion of signal selection in Darwinian theory. This implies that many of the tools that are useful in the analysis of the latter are also useful for an analysis of the former, such as the network dynamics of the diffusion of traits.

Thus, the naturalistic turn in the study of culture means that we regard culture as a part of human nature, and that we approach culture with the explanatory claims of the natural sciences. As we shall see in the next section, the very fact of creativity implies that the latter does not invalidate research tools that are specific to the study of culture, in the sense of the Kulturwissenschaften or Geisteswissenschaften. This is most evident if we consider the role of language understanding in cultural research. However, the methodology involved here is not distinct in principle from the methodology in the sciences, that is, Verstehen becomes a special part of the empirical work of the cultural scientist, which aims at explaining a reality that is itself a cultural one.

We arrive at the following picture of the relation between the different sciences that are of interest in the current context.

I. The most fundamental is naturalism as a particular ontological position. Naturalism posits that all phenomena supervene on physical causality.
II. The next, also foundational, is the theory of knowledge. This is based on externalism, which is the special expression of naturalism in the theory of mind. This means to end the Cartesian tradition in Western thinking. All knowledge is physical, and brains are just a special case.
III. Externalism can only be the foundation for the theory of knowledge if it is enriched by evolutionary theory, mainly understood along the lines of Darwinism. Evolutionary theory consists of different elements, in particular the VSR mechanism, a taxonomic system, and the notion of downward causation in systems with emergent hierarchical organisation (including sets of specific models such as the hypercycle).
IV. Cultural science is a special branch of evolutionary theory that deals with the evolution of collectknowledge in networks of human brains,

mediated by artefacts, in particular language. Cultural science pulls together elements of the neurosciences, cognitive sciences and the humanities, while staying within the formal framework of evolutionary theory.

V. Economics is the science of a particular kind of human artefacts, that is, economic systems. Economic systems build on institutions that emerge out of cultural evolution.

As we shall see in Part II, the relation between cultural science and economics is constituted via two bridging concepts, creativity and identity. Creativity drives economic evolution, and agency in economic systems is one of its emergent properties, in terms of peculiar identities of agents, which are seen in the light of externalism. Thus, the sequence of theoretical specialisations is closed-loop, leading back to the most fundamental proposition of naturalism.

PART II.

An externalist theory of identity and creativity in economics

In Part I I identified a number of strands of thought that might be interwoven to end up with a cultural science approach to innovation, novelty and creativity. The unifying theoretical framework is the externalist approach to knowledge. I have argued that new knowledge can only be seen as an aspect of evolution, understood in Darwinian terms. In this framework, culture appears to be the central category to understand the peculiar phenomenon of evolving human knowledge. Now I wish to put more flesh on the bones of this argument. In the analysis of culture, creativity and identity play a pivotal role. Creativity is an essential aspect of cultural evolution, in the sense that the latter continously generates new knowledge. Following the externalist argument presented above, this means that creativity is not simply a property of individuals. However, individuals are an essential part in the evolutionary process, and therefore creativity directly involves changing identities. As we shall see, creativity and identity are deeply connected concepts, because creativity constantly changes the conditions of identity, but new knowledge crystallises in identities. The process of human culture is the interplay between the two forces of creating new identities and stabilising identities.

Part II proceeds in the following steps. I start with a brief exposition of the role of identity in understanding economic and business dynamics and explain how only the emergence of new identities can fix new knowledge. This clears the ground for the theoretical discussion, which begins with an exposition of the notion of creativity. I introduce the cognitive science theory of conceptual blending, ending up in the idea of a creative process that unfolds through time via sequences of conceptual blends that are stabilised via the interaction between brains and their material environment. The medium of this interaction is language, in the first place, but also technology,

in the second place. This links up the theory of conceptual blending with memetics as outlined above. As an implication, we can put the theory of blending into the framework of general Darwinism, for which a brain science correlate can be defined, which is Neural Darwinism. This discussion end up with the notion of ontological creativity: from the externalist point of view, creating a new word is tantamount to inventing a new technology, as both are elements in a chain of causal effects in the physical world.

Having clarified the notion of creativity, I continue with the notion of identity. This is central to establish the conceptual bridge between the general theory of evolving knowledge and economics. Identity is the most basic concept for defining the individual. I discuss the philosophical and biological meaning of that term and continue with the economic analysis of identity as it stands. I show that both perspectives can be merged into a new economic approach to the individual and its identity. From that follows a cultural science approach to the individual as the basic unit in economic theorising. The economic theory of identity fits into the framework of signal selection that I outlined earlier, and therefore can be straightforwardly integrated with the theory of creativity.

The final section of Part II extends the theory to include institutions as a part of individual identities. I show that the theory of conceptual blending can be also used to extend the notion of ontological creativity to institutions, following Searle’s approach, which is also based on language analysis..

Chapter 5.

Foundations of Ontological Creativity

There are two different views on creativity. Sometimes we think of creativity as a purely mental phenomenon, that is, the human capacity to create and discover new ideas, as in mathematics or in poetry. However, most people would say that there is an additional component here which relates to the significance of the idea in solving problems; that is, the idea must stand in some relation with facts in the environment, including a potential recognition of the idea by others. This shows that creativity cannot simply consist of a mental activity, even if we were to accept that notion (which I do not). Intuitively, we would reject the vision of a solipsistic creativity.

The other meaning of creativity is that we create something new in the outer world. This in fact concurs with the notion that creativity must be related to the environment, for example, as a solution to a universally recognised problem. To create something does not primarily refer to mental content but to creating a thing. I will argue that this understanding of creativity is the fundamental one, which easily flows out from the adoption of an externalist point of view. In an externalist use of the concept of an idea, ideas are things that emerge at tne interfaces between brains and their world, which includes other brains. Let me start to work on this by analyzing the case of new businesses created by entrepreneurial action.

5.1. Forms: The emergence of new identities through the creative business process

What is the relation between identity and creativity? Identity poses a problem for the analysis of creativity, because identity implies that there is no room for change, on first sight. A creative act means that something new emerges, but if there something new, identities are affected. This happens in a twofold way. One is that a novelty changes the properties of an entity, thus affecting its identity. The other is that the emergence of this new property also changes

Creativity is a cultural phenomenon, because all creative acts affect the identities of all related entities,

the state space, i.e. the entire set of possible properties an entity can have. This second aspect of novelty means that a new individual property always changes the identities of all other entities, in the sense that the ways how to demarcate their identity necessarily changes, too. This is the straightforward formal reason why identity is a holistic phenomenon (see Part I, above). This is a general property of all evolutionary systems (see Ayala 1974). Creativity is a cultural phenomenon by necessity, because all creative acts change the identities of other entities beyond the carriers of that act.

You believe that this is a mere quasi-philosophical sophistery, akin to Zeno's paradox about the impossibility of movement? Consider the dynamics of marketing and product innovation.

In automotives, the recent decades saw the emergence of new types of cars, which define the space of potential properties of cars anew, in which product development takes place. Thus, people have some ideas about the identities of sedans, coupés and pick-ups. Once the SUV was created, it took the markets with tremendous dynamics, adding a new identity to the product space, merging features of a sedan and a pick-up. From now on, everybody might ask, whether a car is an SUV or belongs to another category, and almost all big car manufacturers moved into this new product niche. Recently, BMW launched a new crossover between an SUV and a coupé, which raised eyebrows about the identity of SUVs. Similarly, when Porsche started to build an SUV, that raised many questions about the identity of Porsche as a producer of sports cars etc. So we see, the dynamics of markets is very much driven by the discovery of new properties in the product space, and these properties make up an interdependent whole, in the sense that the properties of a single product, such as a sedan, also depend on the structure of the space of all other possible properties cars can have. Further, the individual act of creating a new combination of existing properties cannot simply be defined as the original putting together. We only treat its result as a novelty when there is some recognition on the marketplace. If a business idea fails, it is also an act of failed creativity, in the sense of something that did not come into being.

As we see, the purely theoretical question of how creativity and identity are related is of immense practical relevance in business and society. Industries, companies and products are defined according to their identities. Identities are projected into a conceptual space, which emerges as the final repository of identities. So, business success very much depends on whether the identity of a SUV is accepted by the customers, and the new launch of a scymera might fail, if it remains just this, an oddity that defies accepted conceptual schemes and their possible new arrangements. So, a product identity is not simply a static fact of the world, but it plays a central role in coordinating the flow of actions of many people involved on both the sides of production and consumption.

In business, the creation of new products means the emergence of a new product identity in a complex space of possible properties of products. Product identities coordinate producers and consumers actions.

Thus, identities on the marketplace manifest the same merger of meaning and function that we have already analyzed in the context of a naturalistic interpretation of language. The identity of a product emerges from being meaningful for different groups of producers and user of the product, and at the same time this makes the proper functioning of the product possible, which does not only include the actual use of the product, but, in our context, its functioning in the coordination of the complex processes of production and consumption. It is precisely in this sense that a product is a mediator in the ANT sense, that is, an artefact involved in the self-organisation of network relations. Compare this with the role of the product in standard economics: It is exclusively defined in terms of the utility generated for the consumer, which is totally independent from the network relations in which the consumption process is embedded. So, the product does not play an independent role in the evolution of those networks.

In contrast, our analysis reveals that products mediate network interactions. This is also the reason why every market process manifests the properties of signal selection, as we have outlined in Part I. As a mediator, a product is enmeshed in the complex dynamics of forming identities, thus revealing its two sides of being a signal, i.e. an idea, a concept, and generally, a linguistic item, and a thing that impacts on physical states of the consumer, i.e.

generating utility in the standard understanding of economics. That is, the general notion of bimodality applies for the economic notion of a product with full force. Both standard economics and sociological or cultural studies approaches to the product fail to see the other side of the coin: Economics exclusively concentrates on products as physical causes, and sociology only focuses on its nature of a sign (for an early approach, see Baudrillard ???; for more recent arguments related to the creative industries, see Priddat ????).

A product is a mediator in networks of producers and consumers, thus being a sign in a conceptual space and a physical cause of changing states of entities at the same time.

The general theoretical approach to identity in the context of business analysis has been developed by organisational ecology theorists. Organisational ecology is one specific way to turn evolutionary approaches into the exact modelling of businesses and industries (Carroll and Hannan 2000). Real world business consists of millions of organisations which can be classified into industries, regional affiliation, target markets etc. If a new kind of business emerges, there is a need to classify the related organisations. For example, when Amazon was created, it was not at all clear whether this is a company that could compare with other dot.com companies or just as a book-seller (Ehrig and Kauffman 2007). This alternative classification exerted a tremendous impact on the predictions of future profitability. Since then, Amazon's business model has evolved continously, thereby also changing the nature of the organisation. So we can say that in the beginning the identity of Amazon was not fixed, and finally it was put into a group of high-tech internet companies, which are now observed as a class of its own. Clearly, this identity, and including the identity of its products of services, played a crucial role in shaping all network relations between Amazon and all other agents in the marketplace, such as security analysts and potential chareholders. Where does this identity of a new business come from?

Organisation theorists often believed that it is rooted in perceptions and attitudes of the members of an organisation, such as in the notion of corporate culture. But this might only define the individual organisation, not its class. This depends on the perceptions prevailing in the environment, the 'audience' in the context of business (on the following, see Hsu and Hannan 2005). The audience is a group of individuals and institutions which are concerned about

Organisational identities are defined by organisational forms which structure the communication between organisations

the fate of the organisation, being, for example, customers or shareholders. Organisational identities emerge at the interface between the audience and the entrepreneurial activity, and they relate to a complex process of perception and communication which is mediated via language.

In the interaction between the emerging business and the audience, sets of rules and norms emerge which define the form of an organisation. The form is a central theoretical category also in general evolutionary analysis, as we shall see. In business analysis, the form is an abstract notion which can be contained, for example, in legal prescriptions, in the business literature, or in internal rules for credit allocation by banks. Sometimes the form is given labels, such as in the assignment of ‘stars’ to hotels, with clear effects for the expectations of the clients, the level of room rates etc. Organisational forms are ways to categorise a complex reality, and at the same time they shape this reality. We talk of investment banks stop to exist at Wall Street in the sense that the financial crisis changed their identity in a seemingly irreversible way. Identities can be simple or more complex, depending on the number of dimensions in which the form is determined. For example, as long as there was a clear distinction between retail and investment banks on Wall Street, there were relatively clear identities. In Germany, banks such as the Deutsche Bank had to struggle with the more complex identity that resulted from the fusion of retail and investment banking in the continental European banks. These struggles resulted into palpable consequences for business. With the collapse of investment banking, the entire industry has to redefine its identities. In fact, this touches almost every aspect of banking, in particular also the identities of the bankers.

The form is a linguistic phenomenon that emerges in the communicative networks among the different groups that have stakes in the emerging new type of organisation, products and markets. The main indicator of the existence of an organisational form is the devaluation of an organisation if it does not fit into the form. Or, as long as there is no form, an organisation has to struggle for recognition, and once the form is established, evaluation improves almost discontinuously. That means, the form clearly defines

boundaries between identities, which result into real-world consequences. Once a form is settled, it mainly operates as a default category, in the sense that an increasing number of its defining properties is a part of the tacit knowledge dispersed across the agents on the marketplace. Forms become explicit when there is perceived deviance, which mostly takes the form of creative acts in business. This triggers a new round in reflecting, discussing and fixing forms.

5.2. Forms as intermediate concepts in evolutionary analysis

The causal linkage between the emergence of identities and evaluation allows for applying the Darwinian paradigm of variation, selection and retention here (compare Aldrich 1999: ???). A new business idea is a variation in ongoing network processes in the economy. Whether it will further evolve and become a property of populations of firms and customers, depends on valuations in complex environments, i.e. the capacity to generate profits and to raise capital. This determines the speed and direction of reproduction of the established pattern of business. This selective process increasingly manifests the workings of the mechanism of retention. Retention is related to the emergence of a form. The form is something that inheres the matterenergy structures of the business process in the sense of bimodality, that is, it represents the generic knowledge embodied in the related companies. Once the form is established, this knowledge becomes regularised, as a causal regularity in the functioning of the economy. That means, that the form can be reproduced independent from the original structure of matterenergy, such that the form can be adapted to entirely different places and times. This is possible because the form is a linguistic phenomenon.

Organisational forms mark differences in valuation on the marketplace, thus directly affecting the evolution of business. Thus, they can be put into the setting of a Darwinian mechanism of variation, selection and retention.

However, as has been argued by Elitzur (2008) recently, this role of form as an organising force independent from time and space applies for living systems in general, that is, the notion of form appears to be a universal category in evolutionary theory. Elitzur proposed a new definition of life: Life is a process by which forms become increasingly liberated from their material medium, thereby appearing in a multitude of places and times,

Forms are a universal conceptual category in evolutionary theory. They reflect the results of knowledge accumulation.

thereby interacting not only with the local, random aspects of the environment, but, increasingly, with the invariant spatio-temporal regularities underlying Nature, namely physical laws themselves.

This definition is an externalist one, esssentially, and it relates forms to the accumulation of knowledge, in the sense of being regularities that are interconnected with regularities in the world. The property of independence from local conditions reflects the inherent stability of the forms under varying selective pressures, i.e. relates with the concept of identity.

In economics, the evolutionary concept of form comes very close to the approach recently proposed by Dopfer (???) and Dopfer and Potts (2008). The only difference is that these authors concentrate on the notion of rule. The bridge is straightforward to build, as we can say that the definition of a form is the rule determining ist manifestations in particular contexts, precisely in the same way as we have defined a meaning of a word in terms of its functionings in a context, that is, in the sense of the naturalisation of Wittgenstein's theory of meaning.

In the Dopfer and Potts approach, rules originate on the micro-level and are bimodally related with carriers, such as incipient business models and firms. This is the micro-level. Individual rules are part of a pool of variants of rules in a population of carriers, which manifests a diffusion dynamics that is modelled along the lines of the VSR model. That means, depending on differential reproductive success, some rules will tend to diffuse across the population of carriers. Through this process, a rule is transformed into generic knowledge. Its ultimate functioning is determined on the macro-level, which manifests a multitude of populations with different generic rules. The latter transition is similar to the transition from an empirical population approach in biology to the taxonomic notion of a species which is seen in the context of taxonomy. A species may exist in different populations, which nevertheless reflect the formal unity of the species concept, in the sense of Elitzur. Thus, on the macrolevel structural properties emerge that reflect the fact of the retention of rules. So, we have a similar approach as the approach

notion of rule in the Dopfer and Potts account of micro-, meso- and macro-evolution.

to form in organisational ecology. The crucial point is the transition from a mere diffusion process to a structurally stable pattern, the generic rule or the form.

Dopfer (2005a) adds the notion that the three levels of micro, meso and macro can show ontologically separate evolutionary dynamics, i.e. independent trajectories of change, such as, for example, interpreting individual learning as an evolutionary processes following the VSR mechanism on the micro-level, or selectionist approachses to structural patterns on the macro-level. This interaction between levels is also relevant when considering identities and forms, because the dynamics of industrial change also involves firm-level learning processes in adopting an identity, which might interact with patterns of regional cluster-formation (meso level) and finally the emergence of forms on the macrolevel, i.e. rule-governed conceptions of industry identities.

The Neo-Darwinian view on the VSR mechanism only applies for the diffusion process, but not for the retention. Retention is the emergence of a new ontological fact, i.e. the form.

It is absolutely necessary to emphasise that there is a fundamental difference between a Neo-Darwinian use of the VSR paradigm and the use in my argument, in Elitzur's and Dopfer and Potts'. This lies in the notion of emergence and hence, a different understanding of the role of the functioning of retention. The Neo-Darwinian dynamics underlies the selection and hence, the diffusion process. But once a form has been established, this implies the emergence of a new ontological fact, which is an organisational form as a linguistic fact in the context of business analysis, or a species in the context of biological evolution. This fact exerts a causal force on its own, which goes beyond the mechanics of the diffusion process. This argument is similar to the argument presented by biologists who argue that a new form becomes a force of internal selection, thus distinguishing between the ecological and the genealogical hierarchy, with the latter being conceived as an evolving structure of constraints carrying biological information (e.g. Eldredge 1985, Brooks and Wiley 1988). The unifying concept behind these different theories is the notion of identity, that is, the role played by identities in shaping the evolutionary dynamics.

In biology, the crucial role of forms is evident in the debate between scholars who emphasize adaptation as the crucial force in evolution and those who emphasize phylogenetic inertia.

In the context of biology, this discussion has been conducted under the heading of ‘adaptationism’ (for a survey, see Orzack and Sober, 2001). The underlying general question is whether an identity defined through a form is a constraint on adaptation, thus showing up in phylogenetic inertia. In the purely adaptationist approach pf population genetics, all observable traits of an organism must reflect current adaptive forces in equilibrium. That is, the process of evolution is seen as being non-ergodic, such that initial condition lose any constraining force for the final equilibrium. This differs fundamentally from taxonomic approaches which assume that once a certain structural pattern has emerged, this pattern continues to constrain the space of possible adaptations in equilibrium, such that the evolutionary process becomes path-dependent.

In other words, and as we shall discuss in much detail soon, there is an a-historical interpretation of evolution which dominates population genetics, and a historical one which prevails in macro-evolutionary and taxonomic thinking. The crucial point in this discussion for our analysis is one which matches precisely Dopfer’s argument on the interaction between the levels of evolution. This the biological debate over the relation between the evolutionary and the developmental trajectories. Within one paradigmatic position, evolution is reflected in ontogeny in the role of developmental constraints which manifest themselves on the level of individual ontogeny (Amundson 2001). In a developmental constraint, phylogenetic structures become directly relevant for the present functioning of an organism.

Phylogenetic constraints operate via forms which constrain the development of an organism during ontogeny.

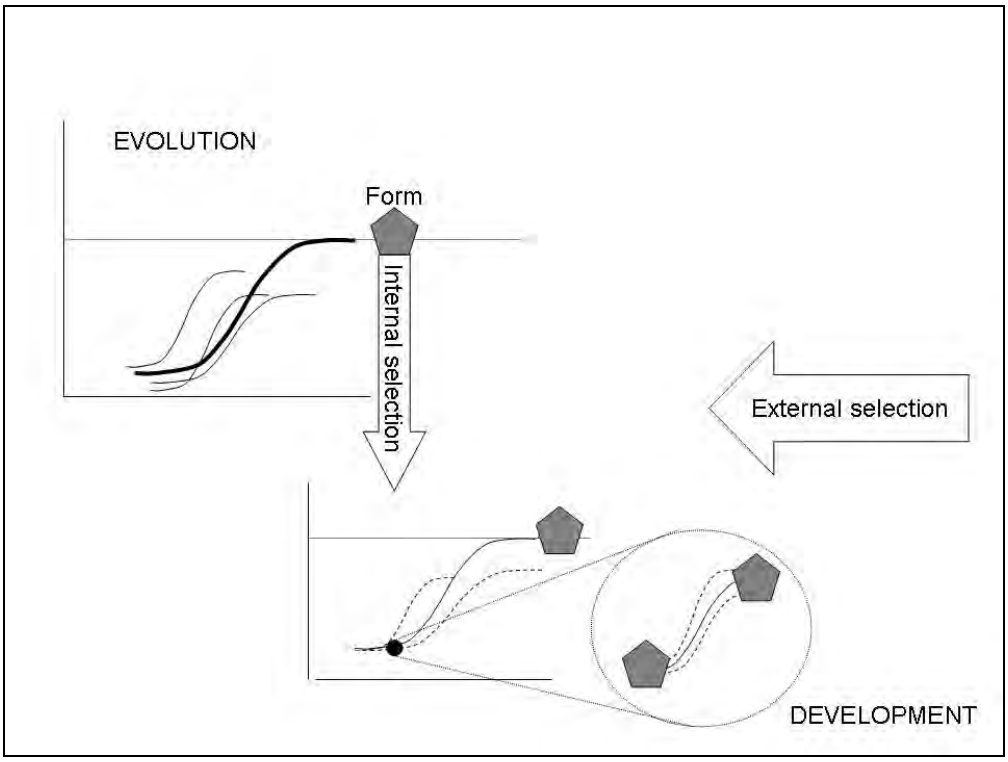

Fig. 5.1. Evolution and individuality

I propose that such constraints may be equated with the notion of identity that I am going to develop step by step. In the concept of identity, evolution in the long run and individual development in the short run coalesce into historically rooted individuality. I summarise this fundamental point in figure 5.1., which is generic in the sense of applying across biological evolution and organisational ecology, as they have been briefly compared in this section.

Once a form has emerged, it becomes a constraint on the diversity of possible diffusion patterns in a selective setting which is both independent from random variation and changing selective forces.

We start with the standard diffusion model in the VSR paradigm, which envisages a number of logistic curves for different variants of a rule / form which compete under the impact of external selection, such as market competition in business. Finally, one form prevails as an emergent property of the population, which henceforth operates as a force of internal selection in the subsequent populations. The main difference between the upper and the bottom diffusion diagram is that in the bottom the range of possible forms is curtailed, in this case to only one possible form which maintains its structural stability in spite of continuing forces of random variation, and in spite of changing external selective pressures. Its diffusion still shows the logistic pattern for single populations featuring the form, as, for example, the

carrying capacity of a niche in markets and nature is limited. However, the fundamental difference is that now the form that has been evolutionary established operates as a constraint on the development of the individuals of the population. This developmental constraint underlies the evolutionary constraint, shown in figure 2.1 in the enhanced part of the lower diagram. On the individual level, we can also apply the evolutionary approach, as we shall see soon, as there are, for example, many different alternatives for developing individual traits. However, these possibilities converge to an area which is delimited by the form that has been established by the evolutionary process.

From this follows, that our first step towards a concept of identity is to see identity as a form that emerges evolutionary and operates as a developmental constraint. This immediately shows that identity is a constraint on creativity, too, in the sense of the capacity of evolutionary processes to generate novelty. Forms fix identities, and identities structure the space of possible evolutions, which is less open than all properties of the state space. Hence, the concept of identity reveals that, contra Dennett (1995:???), evolution cannot possibly achieve all states in the state space, if only the time span were long enough.

The apparent tension between identity and creativity can be resolved in the notion of neutral variations within the scope of a stable form, such that chains of neutral variations might accumulate into the possibility of a Gestalt switch of form.

In biology, the approach to development proposed by Fontana (2003) is very close to this picture. It simultaneously opens up a perspective on how to reconcile identity with the possibility of creativity (for more on this, see Fontana and Buss, 1996, and Stadler et al. 2001). Fontana distinguishes between genotypic evolvability and phenotypic accessibility, which are mediated through the process of development. On the molecular level, development refers to the essential stage of the folding of macromolecules, which adopt a particular shape that determines their functionings. Shapes correspond to forms in our general conceptual scheme. The important point is that from the mathematically available combinations, only particular shapes are stable for energetic reasons, such that the space of possible shapes is much more constrained. If the macromolecule is interpreted as a network of bondings, there is the possibility of neutral changes of atomic positions which do not affect the stability of the shape. Many changes will destroy the stability of the molecule. However, a series of neutral changes can

accumulate through time, ending in a state where the change of a single position can suddenly alter the shape of the molecule radically, thus implying a Gestalt switch of form. Thus, the possibility of neutral changes explains the possibility of rapid innovations on the phenotypical level.

For our discussion, the important insight reaped from Fontana is that on the molecular level, the shape of the molecule imposes constraints on the evolutionary process in the same way as the form and its identity do. At the same time, however, it is precisely this stability which allows for the power of evolution in creating even new possible states in the state space, because the very stability of the shape also allows for a large range of accumulating variations. In other words, identities allow for variations on the genotypic level which are protected against their own deleterious effects in a selective setting, which is highly probable precisely in the case of an adaptationist equilibrium. The latter might not be a global optimum, but certainly a local one, which means that variations will be deleterious with a high probability. Let us explore this linkage between identity and creativity further.

5.3. Externalism in the analysis of meaning and the possibility of ontological creativity

Amongst other observations, the previous analysis has shown that the introduction of the notion of identity in economic analysis leads to the need to enriching economics with methods of language analysis. This is the analysis of forms and the rules governing their use. Following an Wittgensteinian understanding of rules, these rules are not an exogenous force governing the behavior of agents, but inhere their interactions in the sense of emergent regularities. If we extract the rules, this is just a special analytical step that transforms the knowledge embodied in the economic process into referential knowledge of the external observer. We cannot proceed in another way, but we have to recognise that this step is just an artifical one that does by no means allow us to retransfer it into the ontological realm, which is precisely the fundamental flaw of all Cartesian epistemologies. There is no direct correspondence between what we

A fundamental flaw of Cartesian ontologies is the assumption that the reconstruction of knowledge in referential terms implies that this corresponds to an ontological entity, i.e. mental content.

reconstruct as referential knowledge and the actual knowledge in the process that we analyze.

This variant of a naturalistic fallacy has left a deep impact on many fields of science. One particularly misleading idea is the assumption that a formal distinction between rules and content can be made, such that knowledge and the human mind can be analyzed as a computer that neatly separates between the syntax and the semantics of the symbols.

This point has been made in the most provocative way by John Searle's 'Chinese room' thought experiment (for an extensive survey, see Cole 2008). Consider a man sitting in a box. He does not know any Chinese, but he is equipped with a set of rules that govern his selection of a Chinese character as an output if a Chinese character is entered as an input, such that the input is perceived as being correct Chinese by other people watching the box. So, the man in the box passes the question and answer Turing test of intelligence. According to the computer metaphor of the mind, we would assert that this man knows Chinese. Our commonsense says, he does not know, because we would say that if at all, he knows the syntax, but he does not know the meaning of the characters. This is precisely Searle's argument against the possibility of artificial intelligence: There is no way to derive semantics from syntax. Interestingly, this argument easily applies for the notion of creativity: We would certainly tend to deny that this man is creative in pulling the strings.

In the immensely sophisticated discussion of this Gedanken experiment, some strands of thought emerged that fit our context. This is the argument that Searle got two things wrong in his account of the artificial situation. One thing is that the meaning cannot reside in the man, but it resides in the system, which, after all, also includes the designer of the rules. In this sense, the interpretation of the Chinese room argument depends on the principled position about cognition, internalist or externalist. Externalists would reject Searle's point, internalists would agree. So, the question is whether we equate meaning with the possibility of introspective access to mental content, which

Searle's Chinese room argument against AI does not take into account the possibility that meanings supervene on interactions between the system operating according to language rules and its environment, such that rule evolve.

is obviously not the case, indeed. But this does not invalidate an externalist account of meaning. From this follows the second point, what happens if we consider of such kind of a situation without an external rule-giver? In this case, we would talk about a system of emerging rules, which presupposes a more extensive setting of causal feedback mechanisms between the man in the box and external events (for example, the box would be imagined to be a robot acting in the real world). This replicates the systems view, but puts it into an evolutionary context. Against this background, one can deny the possibility of introspective access to meaning and can at the same time claim that the man knows the meaning, in precisely the Wittgensteinian sense of meaning inhering a set of evolved rules in a pragmatic setting.

The Chinese room argument is very important in our context of understanding creativity and novelty. There are two fundamental facts about human language. One is that the syntax of language allows for a limitless combination of elements. Clearly, this is one source of novelty in the sense that I can produce combinations of words which have never occured before: There is an infinite set of sentences unspoken in any language. However, this view presupposes a meaning of the elements that is independent from their arrangement, i.e. it is an antomistic argument in the sense that we discusssed in Part I. From this, two other questions emerge, which converge into an inquiry of the second fundamental fact of language. This is the emergence of new elements, and hence, meanings. This latter process is akin to our previous analysis of identity. We can say that the meaning of a word is its identity. But how can we then understand the fact that those meanings are not fixed? Meanings of words shift in a community of users, and very often new words are created out of old words etc. As the linguistic record shows, the capacity of language to generate new meanings is also limitless.

Language is the archetypical case of limitless creativity: First, we can generate infinite sequences of new sentences, and meanings can shift freely.

Now, in fact both ways of generating novelty relate to each other. This is because there is an old controversy in linguistics whether the meaning of a sentence is a unified whole or a composite of its elements. This is not the place to discuss this question, but only insofar it is related to the issue of identity and creativity. The important insight is that the meaning of a

sentence very often is not simply resulting from the combination of words, but is strongly influenced by the function that the sentence has in the ongoing communication. For example, if I say ‘the apple is on the table’, that seems to suggest a combination between two things, hence the meaning of the sentence seems to be a composite. But on the other hand, considering the meaning of the composites, it seems very difficult to assign a particular meaning especially to the preposition, which has so many different uses. In fact, the meaning of the preposition also emerges from the particular context of application. So, the composite is in fact a process that ends up with the construction of a certain situation in the real world, which cannot be simply deconstructed. Learning a language just by using grammar and a dictionary does not end up in full language competence.

This is most obvious from the fact that all words can be defined by means of propositions which describe events and states of the world. So, it seems to be a misperception of the underlying structure if we distinguish between an ‘apple’ and the proposition ‘an apple is on the table’. There is simply no word for the latter, which is a mere fact of the historical evolution of language. For some reason, this type of event has not been given a name, i.e. has never been baptised by a word. The lexicon of natural languages is replete with words that reflect similar events. For example, a ride refers to someone sitting on a horse and riding, so there is no principled reason why there shouldn’t be a word such as abble* designating an apple on a table, and then to say make an abble*, meaning the event that you put an apple on the table.

This observation would imply that both the syntactical and the semantical novelty share something in common which is actually emergent meaning as a holistic phenomenon. It is this line of transition which also caused the debates over the Chinese room argument. In order to understand the relation between identity and creativity, we need to analyze the emergence of new meanings in more detail.

Both syntactic and semantic novelty converge in the notion of emergent new meanings. This phenomenon has been analyzed in the theory of conceptual blending.

The tension between identity and creativity lies at the heart of an approach to cognitive science that has been developed by Fauconnier and Turner (2002).

In this approach, identity is seen as the most complex ingredient of thinking, which is taken absolutely for granted in all formalistic approaches to thought, which dominate as diverse disciplines such as linguistics, economics or artificial intelligence. This is, as we shall see in the next section, because introducing identities allows us to neutralise the semantics in formal analysis, which, however, lies at the heart of all potential troubles with setting up exact foundations for any kind of formalism.

Fauconnier and Turner argue that identity is the result of a creative process that operates via continuous conceptual blending, that is, the transference of meanings across existing concepts, ending up with new concepts and the transformation of meanings with old concepts. The crucial significance of this for human creativity is most obvious from language, which is a repository of cristallisations of conceptual blends. In language, the role of blending comes out from the working of metaphors in the process of semantic evolution (Pinker 2007: Chapter 5). If we consider our repertoire of words, all words once emerged from metaphorical uses, which can be made explicit by etymological research. For example, a ride can mean driving a car today, or more specially, the opportunity to join up with another driver on his drive. This does not mean that we are constantly actively involved in applying those metaphors (so, we do not think of horses when referring to a ride on a car), but at the same time this remains a potential for further linguistic creativity. This operates in the same fashion as Fontana's model: Uses of words can accumulate many neutral variations in particular contexts, which finally might end up in the opportunity to use a word in an entirely new context, such that a shift of meaning occurs.

There is a tension between the metaphor and the reference of a word, which is fundamentally related to the fact of linguistic creativity. There has been an immensily complex debate about the notion of meaning in linguistics and philosophy. Interestingly, one of the most complex issues turned out to be what had seemed to be the most simple one; a proper name. One of influential solutions to that problem is deeply related to evolutionary thinking, this is Kripkes (1971) notion of a baptising event (cf. Tugendhat 1978: ???)).

Kripke's theory of rigid designators fits into an evolutionary approach to meaning in which creativity results from the possibility of infinite sets of creative counterfactuals which preserve the identities of linguistic forms.

Kripke had argued that the only way to define a name can be to point out an unbroken history of uses that ultimately lead back to a baptising event. It is this event, which is deictic in character, that is the meaning of the name, ending up in a so-called rigid designation. This has to be compared to the most influential alternative, that of Russell's definite descriptions (Lycan 1999: Chpts. 2-4). In our context, a definite description is the same as a statement in terms of referential knowledge that makes the rules explicit that fix the meaning of the name. However, this poses logical difficulties that proved to be unsolvable, especially in the context of counterfactuals. As we shall see, this is an extremely important observation for the analysis of creativity: Proper names have the unique property to maintain their reference and meaning in all possible worlds that we can imagine, thus fixing an anchor for imagination: We can imagine that President Obama whom we define as the first black president of the United States was not elected as a president, which is an outright contradiction, yet we would be able to give an account of a complex counterfactual story resulting from that imagined non-election.

The alternative corresponds to our use of non-referential knowledge, that is, in Kripke's sense, we fix the meaning in terms of an evolutionary sequence of uses that ultimately go back to the 'founder event'. That means, we cannot really give an explicit account of the meaning unless we would be able to reconstruct the entire evolutionary sequence. This understanding perfectly fits into the theory of organisational forms, where the founder event is the primordial entrepreneurial act in imagining the new form. Kripke's theory of baptising corresponds to the emergence of a form from evolutionary sequences of variation and selection, with the extreme case of the individual, which we will discuss in the next section. Beyond proper names, this kind of baptising also applies for all natural kinds, thus extending the Kripke principle to a much larger number of words, such as 'water' or 'horse'. We can further extend this idea to the still larger number of phenomena that human beings are capable to merge in their cognitive system. As had been shown by classical arguments proposed by Putnam, this amounts to an externalist view of meaning. That is to say, our central linguistic capabilities

In the externalist approach to meaning, meanings turn out to be things at the brain / world interface. This implies that language is ontologically creative.

to identify individuals and entities are inextricably enmeshed with the outside world. In other words, things and words coalesce into linguistic things.

This is the most fundamental way how ontological creativity operates. It relates to an evolutionary rooted capacity to impose patterns on the world in terms of unified conceptual items that do not directly reflect the world as it appears to be in our scientific knowledge (Pinker 2007). For example, we do not refer to time in terms of physical time, but in terms of a structured pattern, which includes 'events', 'periods' etc., which we can give names in turn. So, 9/11 has become a word related to a baptising event, in the same way as we talk about the Middle Ages. In other words, our approach to reality is based on a natural ontology that inheres the pure structure of the brain and its external embedding, which is mediated via language as a physical phenomenon, with meanings as things.

So, Kripke's theory of meaning is actually closely related to the naturalistic interpretation of Wittgenstein's theory of meaning and the corresponding evolutionary approach to language, that I proposed in Chapter 1. That is, we can further submit that names and natural kinds correlate with memes, in the sense that they play a central role in organising our cognitive mechanisms, especially in terms of providing a stability of functionings through time. This does not mean that I resurrect the old Sapir Whorf theory about the dependence of thought on language, but I state that language plays a central role in organising our thought in its externalist embeddedness. In other words, once an externalist approach to mind is accepted, language obtains a central role in understanding the underlying memetic evolution. But this does not mean that language encompasses the entire realm of thought, as we have seen in our discussion of memetics. Language is a repositiry of physical triggers of neuromemetic evolution. It is a cause of structured and reproducible processes, but it is not identical to these processes. This is precisely the reason why meanings appear to be so fluid and open to continuous reinterpretation.

Thus, names and natural kinds as physical entities are triggers of neuromemetic evolution.

Chapter 6.

The Stuff of Novelty: Blends, Metaphors and Creativity

Based on this approach to meaning, we can now move on analyze the major source of novelty, which goes beyond the primordial act of baptising a certain structure of reality. This is the metaphorical use of meanings. If we say that almost all words in language have emerged from metaphors, that is true in etymological terms, but does not really imply that they operate as such today. Yet, this observation shows that metaphors grasp an essential aspect of the evolution of meanings insofar as they are novelties in the semantic space of language. We have met the basic idea already in a previous section with the example of the SUV. What happens is a conceptual blend in which the starting point is a metaphor, a shift of meaning, such as thinking of a sedan as a pick-up, ending up with the blend of a SUV. This role of metaphors is central to the human cognitive and epistemic system, it underlies fundamental notions in everyday life, such as treating time as a spatial phenomenon, ending up with science, such as the metaphorical use of the notion of capital, which has been blended with other concepts such as learning in human capital or transactions in social capital. The fundamental process is always the same, as in the example of the SUV.

6.1. Blends

Fauconnier and Turner (2002) have proposed a fully-fledged theory of conceptual blending that we do not need to elaborate on in detail here. The core idea is that human thought operates in conceptual networks, which exactly fits the network models of the brain in neurosciences, so the theory harmonises with our approach to memetics outlined above. In those networks, conceptual blends play the central operative role, both in the sense of regular operations and as sources of novelty. As is shown in figure 6.1, a blend is a fundamental operation that projects an input space into another input space, involving a generic space in which the two inputs can be related, such that

Blends operate via mappings of different input spaces into generic spaces, and they can operate as generic spaces for further blends, thus resulting in complex networks of blends.

they can be fused into the blend. Blended spaces and generic spaces belong to the same theoretical category, so that the conclusion directly follows that a blended space can in turn serve as a generic space for another blend. So a conceptual integration network can build on complex chains and embedded patterns of blends, which are afterwards possibly compressed into simple concepts again, as it happens when we forget the metaphorical use of new words as unearthed in etymology, and just use the word in Kripke's sense as a rigid designator.

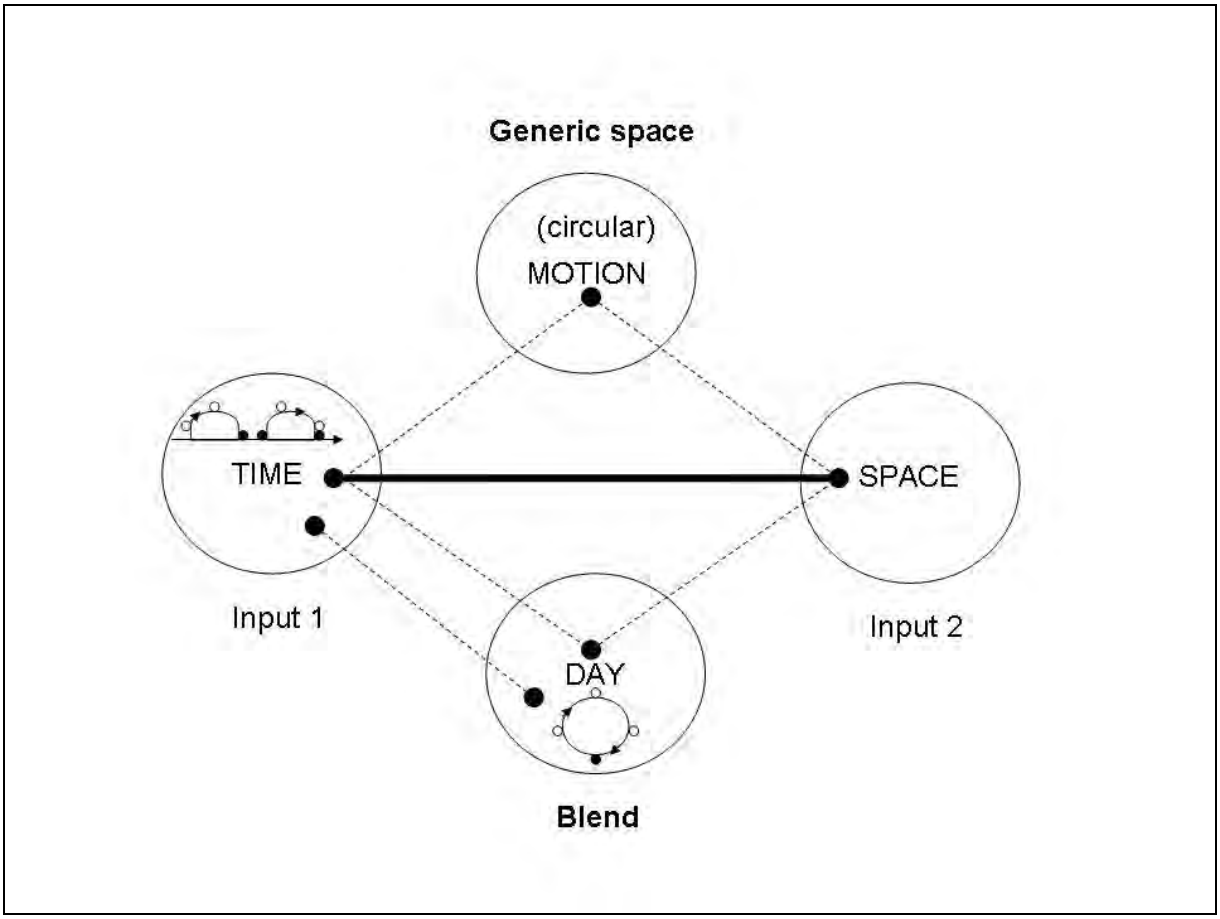

Figure 6.1: Basic structure of conceptual blending

For example, a fundamental feature of human world perception is to view time as space, in the sense that we treat time as similar to motions in space, so that, for example, we can say that time went by (for more detail, see Fauconnier and Turner 2008). The spatial perception of time is in fact an immensily complex blend, if we consider the evolution of the concept in human history. For example, what we today regard as perfectly natural, dividing time into units of a day which have exactly the same length, is by no

means natural, but was a cultural innovation. This innovation presupposed a conceptual blend that projects the sequence of days on a circle, implying that we return to the same point of time every day. This is particular kind of motion, which suggests that we can divide it into smaller units. Once the idea emerged that these units can be measured in the same way as we can measure length in space, if we have a fixed standard of comparison, the notion of a clock emerged. A clock unifies the idea of cyclic motion in space and time in a technical artefact. Once this artefact was existent, new blends could be created, depending on the social context. Once industrialisation started to spread in Western Europe, time became an important aspect of coordinating work in an environment with other artefacts, i.e. machines. Thus, the artefact of a clock assumed the role of an intermediator in an ANT sense: Building on the conceptual blend of time as space, an artefact was created that evenually shaped patterns of human interaction in a way that was not familiar to human cultures in which that artefact was never used.

In the case of time, the blend activates the metaphor of space, eventually enabling the creation of artefacts measuring time that became mediators in human networks of human work.

This example clearly shows how conceptual blending is a creative act, which relates both aspects of creativity; that is, new ideas and new things. It is important to notice that most blends are minimally creative in the sense that they manifest structures that did not exist in the original input spaces. For example, time cannot run backwards, but I can walk back to my starting position. That is, blends are creative in the sense of enabling human beings to imagine new aspects of reality, which might in turn prove to be functional in real action. This capacity is leveraged by Gestalt psychological principles: Very often blends are fragmentary and incomplete, yet our brain operates in a way to complete these blends into more elaborate and complete patterns, which may introduce entirely new aspects as compared to the original input spaces. As we shall see, Gestalt psychological regularities also play an important role in stabilising behavioral patterns that are related with the emerging new concepts (from the viewpoint of economics, see Schlicht 1998).

Blends are leveraged by Gestalt psychological mechanisms.

By far the most important kind of blend is the counterfactual. As has been shown in the recent philosophical debate about causality, counterfactuals seem to lie in the heart of the human capacity to recognise and analyze

The most important kind of blend is the counterfactual, which also underlies the most fundamental form of human learning, i.e. imitation, which presupposes a blend between Ego and Alter.

causality. This is because in order to identify the cause of an effect, it is necessary to construct a counterfactual world which differs from the real world only in one respect, namely the existence of the cause (Woodward 2003: ???). So, counterfactuals are central to the specifically human process of accumulating knowledge about the world, in terms of the capability to handle relations of cause and effect. This is especially true for the most fundamental human form of learning, imitation, which we discussed already in tPart I. Imitation is based on the counterfactual "If you were I" and vice versa. That is, the most elementary precondition of human learning, the capacity to mentalise, is nothing but a conceptual blend that establishes counterfactual identities across human individuals. Precisely because it is a complex blend, it is not easy to achieve for human infants after a long period of learning more simple blends (Tomasello et al. 2005).

At the same time, counterfactuals are the defining feature of creativity in the sense of imagining the possible, yet not existing. They are crucial for the human capacity of planning. For example, if I wish to go to Australia next week, I have a certain idea about the necessary and sufficient conditions to achieve that goal. These are defined according to counterfactuals in the sense that I analyse the causes that lead towards that effect, and that I decide to concentrate on those causes that end up with my goal. So, the counterfactual operates into two directions. First, setting up the goal is a counterfactual in so far I assume a state of the world that does not exist. In order to bring it into existence, I take it as a given in counterfactual terms, and then try to understand the states of the world which lead and which do not lead towards this effect. This requires many blending operations, especially if I have no experience at all with that activity.

As Fauconnier and Turner discuss in much detail, blends can operate with different levels of complexity, which at the same time is normally hidden beyond consciousness. That is, the continouus process of blending results into the construction of conceptual integration networks which provide the scaffold for new blends, without the need to make all elements of the involved frames and operations explicit. One way to make them explicit is

one realm of human creativity, namely the arts, poetry or jokes, which make us aware of hitherto unthought relations between words and correlated thoughts.

Blends which stabilise through time and within the context of a community of users result into ontological creativity in the sense that they create a new aspect of reality. This fact has been recently recognised in sociological studies on economics, which use a term from the philosophy of language to describe the fact that economics is not simply a description of reality, but also contributes to economic things coming into being. This is the notion of performativity (Callon 2007), which I simply regard to be ontological creativity. Let us consider an examnple first.

Modern financial products such as forex futures emerged as a conceptual blend that was made possible because the frame of reference was shifted from notions of gambling to the science-based notions of equilibrium markets.

In the past four decades, innovation in the financial sector was driven by conceptual blends, in which the scientific contribution played the role of unifying the conceptual framework underlying the blends. The most intriguing example was the crucial step of introducing forex futures at the Chicago exchange in the early 1970s wgich was followed by the introduction of other kinds of index-based securities and options, finally engendering the modern financial system that collapsed at the end of 2008 (MacKenzie 2006: ???; Millo 2007). Previously, futures did only exist for agricultural products, which implied that at the time when the future becomes valid, actual delivery of goods take place. There was the general presumption that the similar activity in purely financial items such as stocks would be gambling. Especially, substituting delivery by cash payments was prohibited.. So, the blend from agricultural to financial products did not work. This blend was created by Leo Melamed of the Chicago Mercantile Exchange, who argued that foreign exchange can be treated similarly to agricultural goods, because delivery is involved in balancing the claims. In case of currencies, delivery and cash payment are the same processes, so that cash payment can be interpreted as delivery, thus suspending the original conclusion that cash payments imply gambling, as no delivery tales place. Once this blend was created and accepted, it became possible to extend it to other financial assets. Scientific research contributed to this development in an essential way, as it

showed that the ‘market’ in the sense of neoclassical economic theory can be a universal frame for all these blends, thus actually transforming the blend into a very simple kind of blend, the so-called mirror network, which projects inputs into each other against the background of the same generic space, the market.

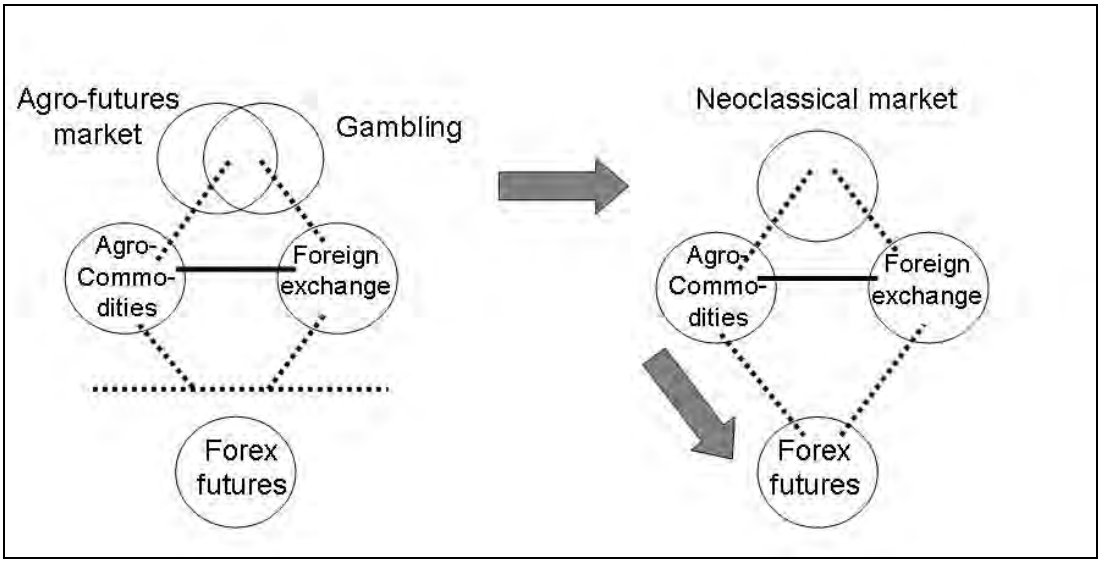

Fig. 6.2: Blending and the creation of modern financial markets

So, as we see in figure 6.2., the blend was not possible in the initial stage because there was an oscillation between two frames, those of gambling and those of agro-futures markets with physical delivery. The creative act was twofold: One was the shifting of frames, i.e. setting up a new generic space, and the other was creating the blend in terms of imagining a forex futures exchange.

This discussion shows that the blend was by no means a necessary one. On a higher level of complexity, there could have been two other forms of blend, namely the single-scope network or the double-scope network. Actually, in comparison to the economists, the public achieved a single-scope integration. Whereas the economists just assumed that all markets are the same, the public started out from the assumption that agricultural markets and financial markets are different, and ended up with using the frame of agricultural markets to understand the financial market. The reason is that in the public

discussion, the notion of delivery was central, whereas in the economists discussion the abstract notion of a neoclassical market was dominant.
As we see, the process of blending relies heavily on language. This is why we can also say that the act of creating the futures market was a performative act, in the sense of speech act theory (Callon 2007). This grasps the fact that the switch to the neoclassical market as the generic space for the blend is not simply the move towards another way to describe reality. After all, the oscillation between the theory and the notion of gambling is still active even in the minds of professional traders, and in the wake of the financial crisis of 2008 many people would believe that the frame of gambling might better fit the reality of financial markets than the 'market of efficient markets' frame. The blend actually creates a market, not only in the sense of creating a new concept, but also enabling the involved individuals to establish a market that follows the ideas of a neoclassical market, as, for example, in regulation.
So, cognitive blends also transform reality, in the sense of being enmeshed into real world actions and processes. In order to relate the theory of blends to our naturalistic approach to cognitive externalism, we only have to provide a bimodal view on the same processes. One part of this bimodality of blends is precisely given in the fact of ontological creativity: After all, forex futures relate to things, however abstract. The other part is to interpret blending in terms of neurophysiological processes.

The principle of bimodality applies for conceptual blending, both in the sense of blends being enmeshed with external things, and blends supervening on neurophysiological mechanisms.

A fascinating example for this, also related to financial markets, is the potential double-scope integration network with reference to risk. Double scope integration network does not only blend inputs, but also frames in the sense that the blended space contains elements of the different frames of the inputs (Turner 2008). We have already met an example, which was the notion of time as space. In fact, this does not mean that all properties of spatial motion also apply for time. Time is space, but not the same. Turner (2008) analyzes risk as a double-scope integration network, which can be directly related to neurophysiological patterns recently identified by neuroeconomic research (for a survey, see McCabe ???). Risk can be seen as a blend of chance and harm, as the frame of risk manifests properties of both. Chance refers to the mere possibility of different event alternatives. Now, recent

neuroeconomic research has shown that patterns of neuronal activity in the brain reflect the different dimensions of this conceptual blend, thus revealing the internal complexity of the concept of risk. Thus, loss aversion has been shown to have a neuronal correlate, which means that losses are more strongly weighted than gains in the corresponding generic space, with the resulting emphasis on harm. Further, the two dimensions of risk, i.e. expected value and uncertainty in terms of variance, also produce distinct patterns of neuronal activity.

Thus, we can conclude that the theory of conceptual blending can be interpreted against the background of bimodality, in the sense that blends ultimately go back on brain activities in the physical sense. This leads us to the next step in our argument, that is, the naturalisation of the theory of conceptual blends.

6.2. Blending Naturalised: Neural Darwinism

How can we reconcile the theory of conceptual blending with the evolutionary paradigm? The crucial step is to interpret blending in terms of the VSR process (which, by the way, is a blend). If we succeed in doing this, it will be easy to relate the theory of blending with the most recent attempts at approaching technological evolution by a general Darwinian model. This is possible if we relate the blending theory with Gary Edelman's (1988, 2005) theory of neuronal selection (for a related approach, see Calvin 1996, 1998). Edelman's theory is a centre piece of our transdisciplinary integration, because it directly relates with Hayek's early theorising about the brain, who proposed an evolutionary and connectionist approch to conceptual categorisation (Hayek 1952). The latter theory underlies Hayek's evolutionary approach in economics, so that the paradigmatic closure is straightforward to achieve.

Hayek already proposed a selectionist model of conceptual categorisation, which can provide a unifying transdisciplinary framework for the analysis of human cognition and the economy..

It is necessary to emphasise that the theory is not fully validated empirically, but gets support by many results of the brain sciences as well as by the related AI projects in robot design. The general conceptual framework is that a theory of learning in the brain can be modelled as a VSR mechanism (see

Hull et al. 2001). The underlying selective mechanisms cannot yet be identified empirically, only the resulting patterns, for which, however, competing explanations exist. There are exact modelling approaches which have demonstrated that a VSR process can work in principle, given the current knowledge about neuroanatomy and neurophysiology (see e.g. Fernando et al. 2008).

The basic structure of Edelman's theory is as follows. (Edelman and Tonioni 1995 offer a good summary, see also the assessment by Sacks 1995). The basic idea is that the brain operates as a group selectionist system, in which groups of neurons compete against each other in mobilising resources (e.g. neurotrophines) for neuronal growth and activity. There are three fundamental stages in neuronal evolution. The first is developmental selection before birth, which features a highly disordered growth of neuronal connections which end up in an individually unique basic structure of the brain that reflects genetic constraints. For example, this process presumably ends up in establishing the neuronal capacities for primary emotions, which have emerged from phylogenesis and shape further brain development in terms of a set of basic evaluative mechanisms, related to survival and reproduction (e.g. primary emotions such as rage or lust, see Toronchuk and Ellis ????). The next stage is experiential selection through which connections between neurons are strengthened according to differential sensory and motor inputs, thus establishing a basic linkage between the world and the brain. Selection is guided by the set of genetically transmitted value systems, which define the fitness of neuronal units as reflecting certain causal mappings between events and states of the world and their effects on survival and reproduction, and which operate via the release of a number of neurotransmitters and other chemical substances in the brain, such as endorphines which relate with affects of pleasure (a value, for example, can be, 'eating is better than non-eating').

Edelman's theory of Neural Darwinism sees the brain as a highly dynamic and fluid system, in which neuronal groups constantly compete for resources, and which is guided by phylogenetically evolved value systems.

The decisive stage for the emergence of mind, and also the particular contribution by Edelman on the theory of Neural Darwinism, is the further increase of complexity by means of re-entrant signalling and mapping. This

Consciousness emerges as an aspect of complex re-entrant signalling and mappings between different parts of the brain.

refers to the increasing density of signal relations between neuronal groups which map different aspects of reality. Re-entrant signalling is different from feedback mechanisms in neuronal network models of error correction, as it primarily results into the active construction of the world by the brain. Via re-entrant signalling, neuronal groups end up in stable arrangements. The central point is that even the most simple concepts, such as viewing a chair, appear to be very complex and highly dynamic neuronal phenomena in which hundreds of maps in different parts of the brain are related by re-entrant signalling, and which remains to be a selectionist process.

Clearly, this approach can be easily fit into the memetics framework that we elaborated earlier. We can now put more details on this view, as we can state that a neuromeme cannot be a simple neuronal structure (or even a simple neuron as in the much quoted grandmother neuron). A neuromeme is a recurrent pattern of mappings which are maintained dynamically in a selectionist process, in which that neuromeme is continuously reproduced, but possibly also altered and modified through time. This observation allows us to sketch the neuronal foundation for conceptual blending.

In the model of Neural Darwinism, the brain can only stabilize in the interaction with the external world, in particular via signalling across brains.

In this framework, a blend is simply a higher-order mapping that builds an more elementary maps in the neuronal system. Precisely because of the highly fluid nature of neuronal group selection, one can explain why the brain constantly creates novelty in the sense of new mappings between partial aspects of concepts that organise sensory and motor inputs. In a selectionist system, there can be no fixed reference, and there are only fuzzy meanings that pop up from the dynamic course of neuronal variation, selection and retention (Edelman 2005: 98ff.).

Now, it becomes clear why the externalist account of meaning and knowledge holds true from the naturalistic perspective: The creative brain would explode in mere fantastic imaginations, if it were isolated from other brains. That is, without an external fixation all meaning would become arbitrary in a solipsistic closure of the brain. In particular, as Edelman had already suggested in (1987: ???), the stability of re-entrant signalling within

the brain depends on communication, that is signalling among brains. This is precisely where the role of language comes into play. Again, this ends up with the naturalisation of another famous Wittgenstein argument, namely the impossibility of a private language (for a survey, see Candlish 2004). A private system of meanings cannot be evolutionary stable. This allows for a radical conclusion: The 'outer world' is not simply something that the brain refers to, but the brain needs the world in order to stabilise its own functionings. In this sense, the world is a part of the brain. This is the most radical version of externalism, though being based on the notion of the primacy of the brain as a phylogenetically evolved system that appropriates the world as a way of maintaining its existence. That is, the world impacts on the evolution of the brain (in the sense of Dretske 1995), such that there is an selectionist force that works into the direction of a proper functioning of the organism in ist interactions with the world, but this relation is turned upside down if we consider the functioning of the brain as such. For the brain, the world is a necessary part of its own functioning. In other words, evolution had adapted the brain to the world, but brain operates in a way that the world is adapted to the brain. This is the deeper reason why human language has an implicit ontology which differs a lot from the established scientific knowledge about the structure of the world (Pinker 2007).

The most radical version of externalism sees the world as a necessary element in the proper functioning of the brain.

In the naturalistic perspective, the relation between neuromemes and external artefacts is a necessary one in the sense that the artefacts play the essential role in stabilising the complex patterns of mappings in the brain. However, this is only one aspect of the more general role of the environment in stabilising the neuromemes, as it is posited by externalist epistemologies. In case of human beings, conceptual blends rely on words as external physical structures in order to proceed. This differs from Fauconnier and Turner's approach, where words appear to be mental phenomena as the concepts that relate with them. They do not refer to the fact that all blends operate in communicative contexts, that is we blend concepts in order to achieve a goal in communication and interaction. How is it possible that this works between different individuals? This is because we rely on artefacts, that is, phonetic units of language, which trigger the activity of neuromemes in different

Conceptual blends are neuromemes that are triggered by linguistic artefacts.

brains. This is always context-dependent, i.e. a neuromeme always operates in individual networks of brains. But the ongoing inflow and outflow of artefacts, i.e. signals and words, continuously activates stable and recurrent patterns of neuromemes which underly our cognitive system. This implies that all causal effects of linguistic artefacts are fuzzy and open-ended to a partial degree.

Now, a blend operates via the simultaneous activation of different neuromemes which interact in a larger emerging neuronal network. The blend does not bulid on interactions of entire sets of neuromemes, but it is sufficient to generate new partial re-entrant signalling patterns among a subset of maps that are part of the pre-existing neuromemes. Once the blend is related with an artefact, it becomes a meme in turn. Thus, the apple on the desk is not a meme, but ride is a meme. If ride is exchanged across brains, there is a fuzzy activation of all underlying networks segments, without being accessible to consciousness. But they can be made explicit via other blends and uses in propositions. This is also the foundation for the emergence of novelty via the Fontana mechanism of accumulating neutral variations.

Finally, current research in evolutionary psychology and psychiatry suggests that the creative activity of the human brain might also be directly supported by a corresponding value system, which is the “play” system. Play has been shown to be essential for language development in children, and language is in turn central for the peculiarly human expressions of play, especially role playing. Role playing is in turn a core activity in human societies, as in religious ceremonies or in the performing arts. Thus, there appears to be a direct neuroscience correspondence between what we regard as ‘cultural’ activities of humans and the primordial, evolutionary selected value systems that govern neuronal evolution in the brain.

Human creativity is triggered by a fundamental evolved value, that is, ‚play“. Play drives both blending and neutral variations.

6.3. Ontological creativity

What happens if a new word is created and accepted in a community of language users? I have laid down the claim that this is an act of ontological creativity, which means that the world has been enriched by a new thing. There is a seemingly naive justification for this claim: The artefact clearly is a thing, so the world has been changed, in terms of its space of possible states. This seems to be naive, because I do not talk about meanings etc. But from the externalist perspective, there is the simple fact that a word is a matterenergy strcture that causes processes in the brain which are in turn related with matterenergy structures. That is, a word is a cause, and there is no cause without ontological status, i.e. without existence. In this fundamental sense language is ontologically creative. The major flaw of all traditional theories of meaning was that language was treated like money in economics, namely, just like a pure medium that depicts reality, but that is not itself a part of this reality, just as money is seen as not producing utility. The naturalistic view on language argues that language creates reality simply because a new word is a new thing, standing beside the things which is was traditionally supposed to refer to.

This approach is fundamental for our further argument, especially in the context of institutional creativity, and it introduces a different methodology than economics, in particular, normally adopts. It is grounded in the basic ontological premise that something that does not cause something does not exist, and vice versa, that a cause has to have the ontological status of existence (Bunge ????). In a naturalistic framework, this means that if we assign the status of a cause to a phenomenon, then it exists in the sense of being a part of the one world. Of course, assigning the status of a cause to something is by no means an easy task, as it requires a sufficient understanding of the causal relations in the world, which we often do not have. But we are not allowed to keep the two notions of a cause and of existence separate. This is what Bhaskar (1989) has labelled transcendental realism in the sense that, for example, causal hypotheses about social structures necessarily imply their existence, thus enrichíng the ontology. This compares with the standard methodology of eeconomics, which avoids ontological commitments, and treats methodological individualism as a mere

Language does not simply reflect reality, but creates reality in the sense of adding things to the world. Words are causes, and causes exist.

analytical device, even though that finally would lead towards the ontological premise that in social systems only individual human beings exist.

In the theory of memetics as propounded here, the ontology of human social systems appears to be an entirely different one, as it is composed of bodies and things, which both have causal status. This includes words as physical things which are constantly manipulated in a community of speakers of a language. Following Wittgenstein's private language argument, a word cannot be only depend on the speakers 'meaning', because it is the word itself that shapes what the speaker develops in his supposedly autonomous intentions. So the word has an ontological status, because it is an independent cause in a chain of interactions. At the same time, a word can be created anew, such that we can talk about ontological creativity. But in the naturalistic setting, this does not relate to the idea of an individual mind just thinking about a new word and uttering it suddenly, imbueing it with mental content. The new word is the result of an evolutionary sequence of utterances in a community of speakers, such that we cannot equate the creative agency with individual creativity, but with the evolutionary process involving the continuous exchange of verbal artefacts among many individuals (see also Aunger 2002: ???).

Language is not a mental phenomenon, but compares with technology. Words are things with functionings, and meanings are part and parcel of those functionings.

The significance of this seemingly naive statement becomes evident if we compare words with technological artefacts. A technological artefact embodies regularities in the physical world, that is, it is an element in a sequence of causes and effects. If we create a new artefact that did not exist before, we change the world in the sense of introducing a new thing into it. There is no essential difference between this role of technology and the functioning of a word. Words refer to causal chains in human social interaction, whereas technologies mostly do not primarily refer to this, but with causal effects between other things. However, following the signal selection approach outlined in Part I, many technologies simultaneously operate in the physical and the social world, such as weapons. The application of physical force is in fact not essentially different from the use of a word that threatens this use, and the weapon is at the same time a sign of its

effect. In sum, the proper approach to language would be to see it as a technology or a tool, and not as an aspect of mental processes. A word is a hammer, that is, it has a functioning, and the meaning is just supevening on that, even being a part of that functioning.

We can better understand the essential similarity of language and technologies from the externalist perspective if we look at technology from the theory of conceptual blending. This also allows to relate Darwinian theories of technological change and innovation with our naturalistic interpretation of conceptual blending (for a survey, see Ziman 2000).

Darwinian theories of technological change posit that the creation and diffusion of new technological knowledge follows the VSR paradigm, or, simply, a trial-and-error process with retention. They are based on the early theories by Campbell (1960, 1974) on evolutionary epistemology, and fit into the general framework of the analysis of new knowledge that was offered in Part I. For example, when in the first decades of the 20th century the design of aircraft was continuously improved, engineers presented a great number of possible shapes of aircraft and their parts, such as landing gear (Vincenti 2000). This process first showed a large variety of variants, until the population of aircraft converged to certain local optima. This process was very similar to artificial breeding, in the sense that the engineers did not have the necessary knowledge for discovering the oprimal design just on theoretical grounds, jumping directly towards a global optimum. Instead, they defined a fitness function (in this case, speed), and chose those variants that approached the maximum speed. In principle, this kind of search is modelled today in engineering approaches that directly apply evolutionary algorithms on design problems, thus using an evolutionary model as a vicarious device to substitute for real-world testing. But precisely this analogy demonstrates also the fact that the real world process also follows an evolutionary trajectory.

Technological evolution follows the VSR dynamics and can therefore be interpreted along the lines of the naturalistic version of conceptual blending.

Most technological innovation, apart from few foundational techniques such as a hammer or nuclear fusion, builds on the recombination of existing

technologies. Modern technological artefacts consist of more simple modules which may also be used for many other different purposes. This is true for all major inventions that drove the industrial revolution, such as the steam engine. Watt's steam engine emerged from a number of recombinations of available technological elements and builds on a previous history of the evolution of artefacts that use steam to drive simple mechanical processes, such as a pump. There is no single breakthrough event such as inventing the steam engine as such. Ending up with a solution is an evolutionary process in a double sense: First, there is a sequence of trials and errors in the history of artefacts using steam for different purposes. Second, the very process of invention is a trial-and error process of its own. In the case of Watt's steam engine, one can add that this process was simply contained after he had filed for a patent, because this allowed him to actively suppress further variations buliding on his technology, thus leaving the impression to later generations that this was 'the' steam engine (see Boldrin and Levine 2008:???). Without patent protection, it might just have ended up as one version in a large series of variants.

The steam engine as such is a combination of other technologies, such as boilers and pistons. The steam engine ist therefore a blend of these modules. After the invention of the steam engine, it could become a module in other technologies such as the steam locomotive, which is a blend, in turn. So we can say that technological evolution exactly follows a VSR dynamics, which we can interpret as ongoing conceptual blending, both collectively and individually. Individually, inventors such as the famous Edison actually fostered evolutionary processes by systematically creating room for blends, such as during the invention of the telephone (???).

Once a technology has been created, the possible states of the world has chenged, which opens up new possibilities for creativity. This is the most fundamental expression of ontological creativity, which reflects the same mechanism in language. Once a word has been created, it can be used in new combinations, thus giving rise to new blends. Technology and language enrich the world in the same way.

6.4. Conclusion

We have now put together a number of essential ingredients of an externalist account of creativity. This amounts to de-centering the notion in the sense of shifting attention away from the creative agent to the process. It is not human individuals who are creative, but the evolutionary process in which they are a part. In a sense, creativity is just creative evolution. Yet, this does not mean that all creative processes are just reduced to one ontological pattern or layer of evolution. In particular, we have analyzed the evolutionary processes in the human brain, which can be bimodally interpreted as ongoing conceptual blending or Neural Darwinism. Thus, conceptual blending supervenes on the physical process of neuronal selection. This does not mean that cognitive evolution can be reduced to genetic evolution. However, genetic evolution certainly is a source of the value systems that underly the selective processes in the brain, following the precepts of evolutionary psychology.

A key driver of creativity is individuality, which in population genetics would just implode into the notion of random variation. Individuality is related to the notion of identity. It is precisely in that context that we can reconcile the evolutionary views on creativity with the heroic ones: It's just a matter of scale. From the population perspective, Edison is just a random variant. If we scale down, we see that, given the immense complexity of the brain processes underlying creativity, it appears to be an essential element of creativity that it is just Edison, who produces all that, and nobody else, and that Edison, in spite of all the creativity flowing out from his actions, somehow remains the same, in the Kripkean sense. This is why identity and creativity are necessary conceptual complements.

Chapter 7.

The Bio-Logic of Identity

In this chapter, I will overview some foundational issues of identity, which aim at relating biological theories with philosophical contributions to the issue. This provides the ground for dealing with the economic theories of identity in the next section. In a naturalistic approach, this step is indispensible, as we need to give an externalist account also of identity. In doing that, we automatically stay in conflict with methodological individualism in economics, at least on first sight.

The economics of identity has to be embedded into the onotological and biological approaches to identity.

I begin with a short sketch of philosophical problems and will continue with discussion the two main reasons why individual identity is a problem in a naturalistic setting. The first reason is that the biological boundaries of the organism are not fixed, as epitomised in theories about the extended phenotype. The second reason is that the brain sciences suggest that the brain is not a systenatically integrated unit, but a set of loosely integrated modules. I conclude this section in proposing an evolutionary model of the individual, that later serves as a framework for the economics of identity.

7.1. Ontological aspects

The notion of identity is one of the most fundamental concepts in philosophy and logic, while being one of the most intricate ones at the same time (for a survey, see Noonan 2006).This insight is, however, also disputed, given the fact that identities underly most of the formalism that we apply to understanding the world. After all, a mathematical equation is an identity, which builds on the most fundamental identies, such as preserving the identity of a variable. From that perspective, identity might also be just seen as a foundational concept, which cannot be further dissected.

Following the early treatment of identity bei Leibniz, no conception of identity can solve the dilemma that predicative identifications cannot ultimately prove numerical identity.

Yet, identity does not seem to be an innocuous term, which was always evident from the fact that the classical definition of identity by Leibniz, the

principium identitatis indiscernibilium [*the principle of the identity of indiscernibles: see* http://www.chlt.org/sandbox/lhl/dsb/page.156.php]; $x=y \rightarrow \forall F(Fx \leftrightarrow Fy)$, poses the difficulty that it only works into one direction. To prove the identity of an object, we fix whether all properties *F* are the same, but if we hit on objects with the same properties we cannot really tell whether they are identical numerically (see Tugendhat and Wolf 1986: 171ff. or Deutsch 2007). For this, we need an encompassing system of identifying objects in space time, which would add to the Leibniz criterion. This means that even in the case of the most fundamental notion of logical identity, we face the problem of identification. This becomes even more important if we consider the notion of change: Many entities undergo changes through time, in particular living things: How can we say that a developing individual remains the same through time? Strictly applying the Leibniz criterion, there would be only an infinite number of different individuals with time indices that indicate different properties that develop through time. But what constitutes the unity of those developmental trajectories?

So, as we see, the mere tautology $A = A$ is a very complex proposition unless we take *A* for granted. If not, the notion of identity is deeply enmeshed with the notions of existence and the notion of predication.

In this context, it is extremely useful to revive a notion of medieval Aristotelian philosophy, which touches a central concern of modern analytical philosophy, too (Pieper 1973). This is the question of the ultimate constitutents of reality in the sense of the irreducible individuals (the *principium individuationis*), i.e. the question of substance (Bunge, ???; Robinson 2004). In Aristotelian philosophy, this question was bridging ontology and metaphysics. In most simple terms, philosophers believed that substance can only be individuals, implying that all categories that we use to describe their properties, could only be seen as existing in a world beyond our human reality, such as the Platonic world of ideas. If one puts this possibility aside, the meaning of the equation between substance and individuals is just to state that nothing that can be said about individuals can grasp their substance, as all predication consists of assigning elements to

classes. Therefore, it is precisely the essential properties of individuals that make them inaccessible to any kind of predication. Medieval philosophers coined the term *individuum est ineffabile* for that.

Clearly, this means that the only way to refer to individuals is to give them a name which is at the same time unique. This is precisely the role of proper names, which pose very big troubles to modern philosophy since Frege and Russell. This is easy to understand, in fact. How can we identify the individual named 'Mary Smith'? Well, we can give a description of minute details, but in fact that means that we simply add classes and classes of concepts, hoping that ultimately the shared set of those classes will only contain one individual. But this process is never binding in the sense that even if there is only one individual at the time being, this does not logically preclude the possibility that there is another being with the same properties. Further, as we have seen earlier, this approach poses insurmountable difficulties for the use of names in counterfactuals: We can construct possible worlds in which the individuals have totally different properties as in this world, still they seem to maintain their identity. Therefore, another solution to that problem has been presented by Kripke, which is to reconstruct the history of that person, going back to the initial moment when this name was given to precisely this entity. If that chain is unbroken, we can say that we have identified Mary Smith. Actually, this underlies our practice of identity cards, where the birthplace, the birthdate and the name seem to suffice to fix the identity, including an unbroken series of registrations with certain government organisations.

Aristotelian philosophers coined the term *individuum est ineffabile*, meaning that the ultimate constituents of reality, i.e. the individuals, cannot be identified by predication.

This corresponds to the Kripkean treatment of proper names, thus showing that identity is an evolutionary concept in the sense that identification cannot rely but on the explicit .account of a chain of events linking up with the time when the entity came into being, or, when it was baptized.

Viewed from the perspective of modern theorising, the medieval proposition *individuum est ineffabile* can be reinstated as the proposition that the individual is irreducibly complex, in the sense of algorithmic incompressibility. The Kripke criterion for proper names is irreducible because ultimately it would require a complete description of the entire developmental trajectory of an individual. There is no way to reduce this complexity further by referring to regularities that can be predicated. However, algorithmetic incompressibility implies that the individual is a

random phenomenon in the strict sense, that is, even a probability distribution does not apply as a regularity.

If the individual is a random phenomenon, Borel's paradox applies, which states that it is impossible to prove that a phenomenon is random, because that would imply that we are able to apply certain regularities on the phenomenon which are implicated by the proof (cf. Chaitin, 2005: 122ff.). This is another way to state the medieval *individuum est ineffabile*. This means, to prove randomness we can only proceed by counter-example, that is if we succeed in algorithmic compression. This logical difficulty underlies the conceptual problems that we face when discussing identity.

In modern parlance, *individuum est ineffabile* means algorithmic incompressibility, hence genuine randomness.

In sum, identity is a fundamental concept for understand the world in terms of existence. It is directly related to the notion of the individual, as individuals can be seen as ultimate ontological constituents, in whatever physical shape, or, in the pure logical sense. Individuals cannot be properly identified without a criterion of identity. However, precisely this criterion is impossible to define, in the sense that what makes an individual unique cannot be accessible to predication, or, is algorithmically incompressible. In this sense the world is random (for a related argument, see Popper 1982). This is the most fundamental reason why any ontology must be an evolutionary one.

Indeed, what we have discussed so far is closely related to the Darwinian turn from essentialism to population thinking (Mayr 1982: ???). Darwin challenged the assumption that species are immutable classes of individuals which share some fixed properties, which can be described by the naturalist. For him, species turned out to be fuzzy sets of individuals that manifest random variations in their properties, which are an input into an ongoing process of variation, selection and retention, in which average properties emerge as characteristics which undergo continuous changes. Thus, in an evolutionary context the problem of identity boils down to the problem of how indivicuals and populations relate.

The ontological analysis matches Darwin's move from essentialism to population thinking in the definition of the species concept.

7.2. Populations, individuals and brains

The first question is how we define the individual, having further applications of this notion in economics in mind. This requires us to fulfil two criteria (see Davis 2003). One is clearly to select one individual from a number of others, which includes the requirement of being neat about the boundaries of an individual, the individuation problem. The other is to re-identify an individual through time. Economics takes both propositions for granted. This manifests the deep embeddedness of economics into the history of European thought, which ended up in the exaltation of the human individual as the fully autonomous root of society. The sociologist Elias (1969b) has coined the term *homo clausus* [locked, closed, 'inside'] to refer to this phenomenon, in which intellectual history converges with the evolution of social norms and values (compare Taylor 1989). In this conception, the individual is seeen as being delimited by the boundaries of the body, and all causal powers of the individual reside within this bodily realm, ending up with the idea of an autonomous will. Thus, the standard notion of the individual is internalist, in the sense that all essential characteristics of the individual lie within the boundaries of her body, or, against the background of the approach of this book, within the brain.

The belief into the autonomous individual which is defined by the boundaries of her body is an outcome of Western European social and intellectual history.

Modern science raises doubts about this assumption for two reasons. The first is an extension of the Darwinian move to population thinking, the second, to be considered in the next section, questions the unity of the brain in the sense of a coherent identity.

The first observation is that some influential schools of thinking in modern biology reduce biological phenomena on the level of genes, in the sense that what is the 'individual interest' is actually determined by the complex interaction among genes throughout the process of variation, selection and retention which makes up evolutionary change (the classic is Dawkins 1989). In the most radical view, the individual is just a vehicle for the genes' interests, in the sense of a surface phenomenon that results from competition and cooperation among genes. The direct expression of this is the possibility of altruism on the individual level, which results from the shared identities of

In genetic reductionism, the individual becomes an ephemeral property of an evolutionary process of gene selection, with genes transcending the boundaries of the body.

genes beyond the boundaries of the body, i.e. the inclusive fitness concept (for a summary, see e.g. Trivers 1985: ???). This is the main reason why this biological debate has direct consequences also for economics.
The conceptual background for this approach is the distinction between genotypes and phenotypes. What we normally regard as being the individual, is just the phenotype, that is an ephemeral expression of the biological information stored in the genes. Genetic reductionism strictly follows the Weismann doctrine, that is, no purely phenotypic information is ever transmitted across generations. From this follows, that in evolution only genetically stored information matters. As genes are not confined to the boundaries of the body, the individual does not play a central role in evolution, apart from the fact that individual, genetically represented traits of phenotypes are selected in the evolutionary process.

This approach raises the question, how do genes recognise their identities across the boundaries of the different bodies that are constituted through their activity? Obviously, a gene has no cognitive device to recognise another gene. Therefore, all genes in a body have to rely on a mechanism that identifies shared genes which is itself genetically based. Clearly, this problem results into a serious difficulty of self-referentiality, because the mechanism of identfying shared genes is itself an object of such kind of a mechanism. In other words, genetic reductionism only shifts the problem of identity to the level of gene identity. This holds true for both the gene and the scientific observer. The gene as such has no cognitive device to recognise the sameness of other genes. The scientific observer seems to have a criterion, namely chemical sameness. However, chemical sameness is not the property that counts for evolutionary analysis, in which the sameness of a gene has to be stated in terms of the sameness of its functions, i.e. gene expressions. Indeed, even if a gene had a cognitive device, it would face the corresponding dilemma, as it could not inspect the sameness of other genes as the resarcher in the lab, but only on the basis of the gene expressions. Now, the simple fact is that genes and gene expressions are by no means deterministic and unequivocal mappings (for a survey, see Jablonka and Lamb 2006: ???).

Genetic reductionism presupposes a mechanism for identying sameness of genes across their vehicles, i.e. organisms. This could only work through gene expressions, which are, however, not unequivocally determined.

Hence, stating gene identity in terms of gene expressions is not possible.
It is fascinating to observe that the solution provided by evolution directly reflects the logical difficulties inhering the notion of identity. The distinction between the biological self and the non-self is made by the immune system of an organism (Tauber 2006). The immune system is an autonomous evolutionary process within the body that is only genetically based in principle. That means; the very criteria that ultimately establish the borders of the individual in terms of a vehicle are not determined genetically, but result from a complex developmental path in which the immune system learns to distinguish between self- and non-self elements. This learning process follows the VSR mechanism, in turn, because the fundamental challenge to the immune system is to continously generate novelties, that is, new antibodies, which respond to the possibly high speed of the evolution of harmful entities that impact on the body, viz. the antigens (Hull et al. 2001). In doing this, the immune system achieves a remarkable feat, which is to distinguish between possible novelties that are generated within the individual and those that come from external sources. This is a very complex distinction, indeed, because there is a constant inflow of external entities, and overreaction of the immune system needs to be avoided. Thus, the immune system actually operates like a cognitive system in which every antigen is assigned a ‚meaning' in the sense that it is put into a context, which varies the reaction of the immune systems. This also holds true for the identification of self-entities. The immune system is a creative process in the sense of constantly generating new ‚artefacts' (antibodies) and creating new meanings at the body/environment interface. Jablonka and Lamb (2006: 68ff., 88ff.) speak of the interpretive capacity of the immune system.

The evolutionary solution of this problem is the immune system.

The immune system is an autonomous evolutionary system that generates a self / non-self distinction and hence, meanings in the sense of interpreting chemical and biological novelties. It is unique to the individual.

This shows that the problem of recognising genetic similarity across individuals is by no means an innocuous one. In fact, it was only solved by the evolutionary emergence of a mechanism that is almost completely independent from the genotype that controls the ontogeny of the individual. This, however, means that the individual is an emergent property of the developmental process and cannot simply be reduced to the information stored in the genotype. It needs emphasis that the immune system is unique in

the sense of algorithmic incompressibility: Every individual has an immune system that is specific to this individual alone, and it cannot be transmitted to other individuals apart from the transfer of some components in the embryonal stage, if we talk about mammals.

Thus, we can conclude that the individual is an irreducible emergent property of the evolutionary process, even if this would be conceived along genetic reductionist lines in the first place. Genetic similarity, or, the problem of gene identity, cannot be solved in a straightforward way, which exactly reflects the logical and ontological difficulties with identity. This argument can be further radicalised by recognising the fact that there is a long tradition in biology to regard the species as an individual, and not simply a class of individuals (Brooks and Wiley 1988; Gould 2002: ???). This principle of individualisation is, again, logically homologous to the Kripke argument on identity and proper names. That is, we cannot define a population of similar individuals without referring to a set of common boundary conditions for their variability which relates to a common past in the shared genealogical origin. This is precisely the form as an emergent property of the evolutionary process. The form, however, is also transcending the boundaries of the individual as reflected in the working of the immune system. Therefore we can conclude that the notion of identity in teh context of biological evolutionary theory is a complex one: One the one hand, the boundaries of the individual dissolve in the notion of genetic relatedness across individuals; on the other hand, the resulting need to fix a criterion for genetic identity ends up with the conclusion that this is context-dependent in a principled way, as it depends on a number of higher-level, emergent evolutionary mechanisms, such as the immune system or the species-specific phylogenetic constraints.

Gene identity also depends on the emergent properties of species qua individuals, i.e. phylogenetically rooted forms that constrain variability.

In other words, in the framework of evolutionary theory identity appears to be an emergent property of an evolving system of distributed physical cognition. From this follows, that the individual cannot be treated as a given in a naturalistic approach to the human sciences in general and economics in particular.

Let me briefly turn to the second argument why the boundaries of individuals cannot be simply regarded as a given. This follows from modern brain research, which we have already scrutinised to a certain extent in the context of Neural Darwinism.

Whereas the genetic view on human individuals seems to dissolve the boundary between the individual and the population, there is another reason to doubt the integrity of the individual that works from within. This is the belief that individuals correspond to an entity that itself cannot be further analyzed, the mind. This assumption is deeply embedded in the Cartesian legacy of European intellectual history, which states the dualism of brain and mind, and which therefore immunises the concept of mind against any views that question its unity based on organismic processes in the broad and narrow sense. This unity also underlies standard economic analysis, in which the individual is modelled as a unified and coherent decision system. Granted, economist would say that there is no ontological interpretation at all of this, but still the implication is that for the analysis of economic systems, this is the fundamental analytical presupposition (Gul and Pesendorfer 2008).

This belief has been seriously undermined by modern brain science. The picture that emerges from brain science is one of a modularised brain, which is itself an evolutionary system, as radically elaborated in Neural Darwinism. In this system, consciousness is a surface phenomenon that expresses certain results of coordination, but does not reflect the actual working of the brain (Dennett 1991). The most important features of the brain, for our discussion of identity, are:

- The brain can be analyzed in terms of four different aspects, namely the affectual versus the cognitive, and the conscious versus the unconscious, with the fundamental different modes of operations, especially serial versus parallel (for a concice summary, see Camerer et al. 2005).
- The brain operates in terms of sets of problem-specific modules that integrate different functional areas, and that build on specific linkages

between affects and cognitive models, such that emotions obtain the role of a central coordinating mechanism (Damasio 1996; Tooby and Cosimedes 2006).

- And as we have seen already, he brain operates as a highly dynamic evolutionary system of variation, selection and retention of neuronal patterns that emerge from random firings.

The Condorcet-Arrow theorem on the impossibility of collective preference functions proves that a modularized, evolutionary brain cannot coalesece into a single, coherent and integrated decision unit.

Such kind of a system cannot construct a unified decision unit out of itself, which, interestingly, follows from an economic theorem, i.e. the Condorcet-Arrow theorem on the impossibility of collective preference functions (Steedman and Krause 1986; Ross 2005: ???). Neuroeconomic research has shown that it is perfectly possible to reconstruct single modules of the brain as rational decision units in the sense of as-if optimisation (Glimcher 2003). However, this implies that the interaction between those units cannot be governed by one unified and coherent decision system. This is why, ultimately, many decisions arrive at the level of consciousness and finally require a true decision between alternatives that cannot be put into a clear sequence.

There is a major conclusion following from this analysis of the brain: The unity of the brain cannot emerge from the brain, but requires an external anchor. This external anchor is the interaction between brains, mediated via symbolic systems. This is a principled argument, ultimately related to impossibility theorems in formal systems. As long as the brain is analyzed as a single entity, it can never escape the paradoxes of self-referentiality. Therefore, the very functioning of the brain has to rely on an external system. This is the ultimate foundation of externalism in cognition.

The two arguments link up in the Edelman hypothesis that brains can only stabilize via the embeddedness into species-specific comnunication among brains.

The important implication of externalism is that brains can never be analyzed without first, an interdependence between brains, and second, without taking the medium of interaction into consideration. If we link this up with the previous argument on population thinking, the intimate relation between the two is straightforward to recognise, and has been already stated by Edelman (1988: ???). This is that the operations of the brain require an external

embeddedness into species-specific communication processes. This is the reason why ontogeny plays a central role in all mechanisms of gene expression, and why ultimately it is impossible to keep the role of genes and culture, viz. an essential part of the human environment, or nature and nurture apart (Oyama 2000).

7.3. An evolutionary model of the individual

I will now develop a model of the individual that incorporates the two major insights of recent biological and neuroscientific research. For this, it is important to discuss one additional point: This is how we can conceive of the individual potential for action, given the fragmentation within the brain and among populations. How can we account for the fact of intentionality, in the sense of us feeling to act intentionally, and others perceiving us to act intentionally? For this, I adopt an approach that has also been crafted by the Darwinian theorist Richard Dawkins (1982). This is the notion of the extended phenotye. I will present the thesis that intentionality is an externalist notion closely related with identity.

The extended phenotype refers to the fact that the adaptive functions of many living systems are not only located within the boundaries of the organism. For example, a bird that builds a nest externalises an important part of the adaptive function to raise offspring, give it shelter and so forth. In this sense, the phenotype includes the nest.

The notion of the extended phenotype serves as an evolutionary foundation for an externalist approach to intentionality.

This argument is not without pitfalls, because it raises the difficult question where we can actually draw the limit of the extended phenotype. In the most general way, every ecosystem provides important functions for the single organisms. From that perspective, the extended phenotype would include the global ecosystem, which is the idea behind the ‘Great Chain of Being’, or the Gaia hypothesis. This problem can be avoided if we relate the notion of the phenotype to a narrow sense of causation, and if we exclude other organisms, that is, concentrate on artefacts. That is, the phenomena in question must be directly related to some actions and behavioral patterns of the individual, and there must be an ongoing feedback in the sense that the artefact is created by

the individual, and external determinants of the artefact trigger behavioral responses. For example, the bird builds the nest, and if a a storm damages the nest, the bird will repair the nest. Following that definition, only symbiosis and similar phenomena will stay at the still fuzzy boundaries of the extended phenotype.

We can extend this notion to the notion of extended brain in the case of human beings (Sterelny 2004). This externalist approach has been crafted in different areas, such as cognitive science and philosophy. It is very close to the extended phenotype approach in the sense that it states that the functions of the brain are partly externalised in artefacts. However, there is a new dimension in case of human beings. This is because the by far most important artefact is language. We have already developed the main building blocks of this approach in Part I. What we need to add now is an explicit externalist theory of agency and intentionality. This extends on some preliminary thoughts on endogenous agency in the first part of the book.

James Coleman (1990: Chapter 19) has developed the basic characteristics of the model that I am going to present now. He distinguishes between the object self and the acting self, the receptor and the actuator. That means, a person is dualistic in the sense that one aspect of a person concentrates on the evaluation of external effects on her status, and one aspect deals with taking decisions over actions. This introduces a fundamental symmetry between organismic human individuals and organisations, because both can be analyzed in the framework of an abstract principal-agent model. In that setting, the receptor is the principal, and the actuator is the agent.

A minimal approach to brain modularity is the theory of two basic modules, as in Coleman's distinction between the object self and the acting self. This is supported by brain science which distinguishes between two different circuits reflecting 'liking' and 'wanting'.

This distinction can be supported by recent insights of brain sciences, including the principal-agent framework (Brocas and Carrillo 2008). In psychology, Kahnemann et al. (1997) distinguish between 'decision utility' and 'experience utility'. These two different measures of utility refer to the actuant and receptor, respectively, and have been related to different areas of the brain and the related activity patterns (Trepel et al. 2005). Decision utility appears to be represented in the Dopamine system, a modulatory

neurotransmitter that is released by neuronal firings related to expected rewards. The Dopamine system is heavily geared towards the ventral striatum which in turn integrates the Amygdala and the prefrontal cortex. The latter is the system in which anticipatory planning is located, whereas the former is mainly the place where emotions are triggered. The striatum has two parts, with the dorsal striatum mainly focused on experience utility, which especially processes neuronal activities generated in the limbic system. Although the specific aspects of this picture are by no means empirically settled (Tom et al. 2007), there is increasing support for the distinction between decision and experience utility. This relates to many approaches in the literature which distinguish, for example, between the liking and the wanting system in the brain, or between different aspects of choice behavior, either short-sighted-hedonistic or long-term planning (for a survey, see Brocas and Carrillo, 2008). Therefore, Coleman's early proposal is strongly supported both by recent theoretical advances and empirical results.

In our context, there is an important consequence: We cannot assume that the acting self has full knowledge about the object self, and vice versa. On surface, this is a strange constellation, but it reflects the evolutionary advantage of phenotypic plasticity. That is, if the environment is increasingly unknown, the acting self cannot know the immediate effects of unknown environmental features on the object self. Yet, at the same time this enables the acting self to explore new environments, whereas otherwise the organism would stick to the current environment. This gap is further enhanced with the emergence of language. Once language mediates between the individual and the world, the needs of the object self are also represented symbolically to the acting self, which, however, precisely implies that there is no internal representation. That is, even though the ultimate measure of goal achievement seems to be internal to the individual, its capacity to act is externalised. There is no direct access to the object self.

This means, the notion of phenotypic plasticity is of deeper significance for the analysis of identity and intentionality, as it corresponds with our discussion of gene identity. Phenotypic plasticity implies that the

environment is not simply a given to which the organism adapts, but it carries essential information about how to adapt. In other words, the extended phenotype is not simple an extended adaptive mechanism, but it carries the necessary knowledge to manifest proper functionings at all. In the Darwinian paradigm, this means that the environment and the genotype interact causally to transmit knowledge inter-generationally (for an early statement, see e.g. Odlin-Smee 1988). In the analysis of agency and intentionality, this means that agency is only possible because of the externalisation of the functioning of the acting self.

From this, two consequences for the analysis of agency follow, with direct consequences for fundamental economic categories. First, consumption is an active learning process, as the acting self needs to discover which action causes a positive feedback from the object self. There is no such thing as a given utility function. Second, there is large room for error in the process, without opening up a direct solution, because the acting self is not necessarily aware of the error, as there are internal benchmarks missing. That is, the person can be stuck in local optima without ever achieving the global optima. We can safely assume that the need for curious play is an important input for this evolutionary process within the individual, because play and adventure might randomly push the system in new states which might break up suboptimal local optima.

This basic model is further supported by the recent economic research into happiness, which was triggered by the familiar observation (the so-called Easterlin paradox) that increasing levels of income are not associated with increasing levels of subjective happiness (Frey and Stutzer 2002). This is easily explained by the distinction between the two aspects of the individual, as the biological system of the object self is mainly an internal equilibrating device which is independent from the external representation of goals and states which operate in the acting self. Especially, the acting self may locate the individual in a relational space of characteristics, in which status considerations may play an important role. Status has been shown to be an important ingredient in human learning via imitation, as one mechanism in

information diffusion is to observe the behavior of high status individuals, who have proven themselves to be highly successful (Richerson and Boyd ???). However, status is a relational category, which means that in status competition the absolute level of income achieved does not matter for decision making. Therefore, the level of satisfaction of the object self is totally independent from the level of decision utility which corresponds to the categories that underlie decision making and which measure relative success in a reference group of individuals.

The distinction between object-self and acting self can explain empirical facts such as the Easterlin paradox on happiness.

Thus, a fundamental feature of our model of the individual is uncertainty and ignorance about the determinants of satisfaction of the object self. Therefore, consumption is an explorative and creative act, unless it happens in the trodden paths of habit and social conventions. This differs considerably from the standard eonomic model of preferences which are clearly assumed to be known by the individual. For the analysis of identity, this implies that the identity of the acting self is externalised, whereas the object self remains within the boundaries of the body. This is fundamental for the economic analysis that we scrutinise in the next section.

We can further submit that the satisfaction of the object self is based on neurophysiological mechanisms which themselves relate to reproductive success in the basic biological sense. However, this does not imply that observed consumption behavior can be directly reduced to genetic determinants, precisely because of the fact of phenotypical plasticity. The only thing that we can say is that long run average consumption patterns should converge towards a maximisation of satisfaction of object selves, and that this satisfaction will correlate with differential reproductive success. Now, precisely because the linkage between the object self and the acting self is mediated via language, this implies that there are group level effects on individual reproductive success, in the sense that information related to reproductive success is externalised in the social context of individual decision-making. This is the reason behind the co-evolutionary theories about human behavior which suppose that there are two driving forces, biological and cultural evolution. As we have already shown, this does not preclude the

possibility of divergent evolution driven by the forces of signal selection. However, at the same time it is not possible to disentangle these forces of divergence, because even the very foundation of the adaptionist force, the genetic information, is externalised.

Co-evolutionary theories are based on the fact that the genotypic information transmission is necessarily externalized to the cultural environment, such that divergent forces of signal selection cannot be disentangled by principle.

With reference to agency, we can say that linguistic representations of determinants of object-self satisfaction are external parts of the acting self in the sense that they convey the necessary knowledge for taking decisions. Again, we realise a fundamental difference to the standard economic model. In that model, goods are immediate determinants of individual utility. In our model, goods as symbols are external complements of the acting self in the sense that they carry knowledge about which kind of good might contribute to the satisfaction of the object self. For example, culinary culture is not simply a way to directly maximise utility, because culinary habits differ widely across human environments. Therefore, the culinary items themselves carry knowledge about which items might possibly enhance satisfaction. I cannot simply choose them according to some direct signals sent by my object-self, but it is them who choose my behavior, to put it provocatively. This corresponds to the ANT approach: The food item becomes a mediator; that is, part and parcel of my agency.

Correspondingly, goods are not simply satisfying wants, but represent the knowledge necessary to express wants at all, being mediators in the sense of ANT.

This externalist approach to the individual can be further extended if we consider the instruments that are needed to get satisfaction. This distinction is well recognised in the economic literature, especially in Becker's (1996) consumption theory which distinguishes beteween the fundamental preferences and the instrumental preferences. Interestingly, Becker's approach seems to be very close to the model presented here, apart from the fact that Becker does not consider the role of ignorance. But Becker assumes that the capability to fulfill fundamental preferences depends on the skills to handle instruments that eventually achieve this goal. In his parlance, this is human capital. However, human capital formation is itself a process external to the individual (see Davis 2003: ???). In this sense, Becker's approach is externalist.

This idea can be further extended to include all instruments that finally are related with the ultimate goal of the satisfaction of the object self. Again, we have to consider incomplete and imperfect knowledge about these instrumental relations right from the beginning. There are different approaches in the literature, with Sen and Nussbaum's approach possibly the broadest one matching to our model. In a nutshell, they distinguish between the functionings and the capabilities, which, to a certain extent, corresponds to the Beckerian distinction between fundamental and instrumental preferences. However, the functionings refer to proper functioning in a particular society. This could be systematised in a general set of needs indicators as proposed by Corning (2005), for example. Capabilities refer to the individual instruments that ensure a proper functioning. Therefore, it seems appropriate to include capabilities into the model of the individual. However, in the Sen approach both capabilities and functionings appear to be externalised, which amounts to an etic approach to the object self. In this case, an etic needs indicator would substitute for the irreducible and inaccessible object self. However, this amounts to an outright denial of the object self, because the would be no distinguishing feature of individuality, because needs are similar or even identical across individuals.

Gary Becker's theory of instrumental and fundamental preferences fits into the approach proposed here; the difference lies in the recognition of the uncertainty of this relation.

In such a framework, what would be the role of individual identity? This has been made most explicit in White's (2008) notion of identity. White posits that identities are primarily modes of control in complex networks. We can relate this to the notion of functioning: The ultimate aim of control is to safeguard proper functioning. Therefore, all instruments that assure proper and sustainable function can be seen as being a part of the individual identity.

Identity is an essential functioning in terms of control in complex networks with other individuals. The notion of possession includes all other instrumental means of control, thus being reflected in the basal brain mechanism of loss aversion.

I propose that this is the ultimate root of the empirically well established notion of loss aversion which underlies prospect theory, and which is related to the behavioral inclination to assert possession over goods. That means, there is a tendency to include possessions into the identity of an individual, because it is those possessions which determine the capability to control. It is crucial to recognise that this capability to control is not an immanent property of the individual, but depends on the interests of other individuals in those

attributes. Therefore, the major determinant of the value of individual instruments does not lie within the individual, but lies in the social networks into which an individual is embedded. This closes the circle to Coleman, who centers his theory on the notion of interest (Coleman 1990: ???). Interest is the foundation of relative power, in the sense of controlling uncertain outcomes in complex social interaction.

I summarise the model of the individual that emerges from this analysis in figure 7.1.

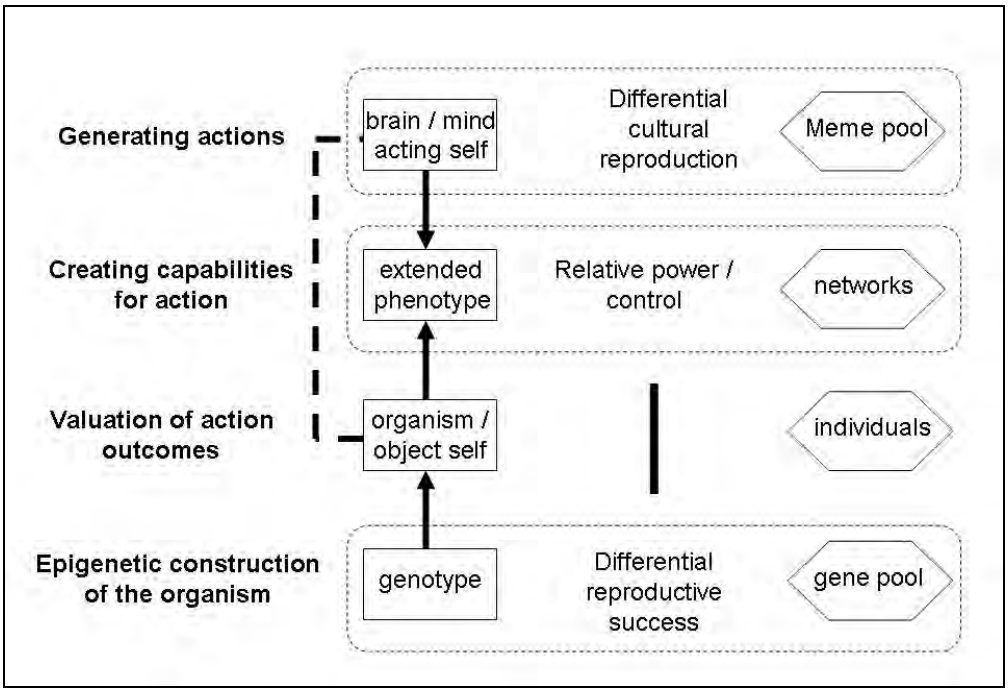

Fig. 7.1: The evolutionary model of the individual

The individual is a dynamic system which consists of different levels and parts. There is only one level which has no external reference by definition, this is the body. The body includes the brain, which is, however, a distinct phenomenon as the brain is embedded into a meme pool, that is, its external cognitive processes. Yet, there is a fundamental barrier between individuals, even though they might build a group of individuals, which is that there is no way of direct introspection into another individual. All introspection has to work via symbolic systems, including even static aspects of the body such as stature (Männel 2002). This fundamental barrier makes the level of the organism so special. On all other levels, there is a direct interaction between

In the evolutionary model of the individual, the organismic level stands out because it is the only level with an absolute barrier between different individuals.

the individual and other entities in its environment. On the level of the genotype, this works via shared genes across individuals. On the level of the extended phenotype, this results from the inclusion of things and other individuals into the capabilities of an individual, and on the level of the brain / mind, these are the shared memes. As a result, the individual identity emerges from the interaction of these levels and is therefore an externalist phenomenon. Yet, it does have an internal anchor, which is precisely the barrier between organisms, and is manifested in the distinction between object-self and acting self: The object-self is the ultimate reference of identity, because it is the unifying physical fact that links up chains of events from birth to death.

The levels manifest distinct processes both horizontally and vertically, which all follow an evolutionary pattern, i.e. a VSR dynamics. On the respective levels, different fitness criteria hold. On the genetic level, this is differential reproductive success of genes (and not genotypes). On the extended phenotype level, this is relative control power determining social success. On the brain / mind level, this is relative memetic reproduction in cultural evolution. These three levels are linked up with each other via the vertical relations. We can directly realise that the model is non-reductionist, as it features a co-evolutionary dynamics, which converges into the level of the extended phenotype. That is, cultural and biological evolution operate independently from each other, but they are interlinked via the effects of both on the relative success in social competition in networks.

The levels relate with different fitness criteria of the corrsponding VSR dynamics, and they are vertically integrated, because of relations of supervenience and downward causation.

However, there is a lever that connects the two levels, which is the relation between the acting and the object self. The fundamental valuations of the object self emerge from the ontogenetic process that is generated by the genotype, so that there is a feedback between biological fitness and the levels of satisfaction on the level of the object self. These valuations inhere brain processes, thus directly emerge also on the level of consciousness, however, in the most general sense of satisfaction or, relative happiness and well-being. The acting self therefore always operates in a tension between these experienced valuations which do not convey any kind of precise information

about the causes, and the deliberate formation of action and action capabilities on the level of the networks.

7.4. Conclusion

We have now prepared the ground for the explicit discussion of the economics of identity. The main insight of this section lies in the relevance of basic ontological problems of identity across different areas of scientific research into the individual. This is why I talk about the bio-logic of identity. In a nutshell, this is the irreducibility of the individual in the logical sense of predication, i.e. identification via general terms designating properties. In formal terms, irreducibility means randomness as algorithmic incompressibility. Thus, the only alternative to identify the individual is the evolutionary one, in the sense of a full account of the history of events that link up the current state of the individual with ist originating state. This solution underlies Kripkes treatment of proper names and natural kinds, it fits to the Darwinian treatment of the relation between the individual and the species, and it helps us to understand the individuality of human agents. Subsequently, I will show how these arguments help to solve some issues in the economics of identity.

Chapter 8.

The Economics of Identity

8.1. Game theory with identities: I and We

The importance of identity in economic theory can be best explained by the role of types of players in achieving Pareto-optimal solutions in strategic interaction. Take, for example, the classical workhorse of a prisoner's dilemma. As a one-shot game, there is no other solution than the non-cooperative one, which means that the two prisoners will both confess, ending up in a Pareto-inferior Nash equilibrium. In the context of classical game theory, the only way to get out of the dilemma is to move to a repeated game structure in which the strategies can also serve as punishments. That means, if one prisoner cooperates, and the other cheats, the first prisoner will be able to punish the second in other rounds of the game. If the future losses from cheating are big enough, it turns out to be rational to cooperate.

The other solution to this problem is shared identities, which in economics translate into interdependent preferences (Sobel 2005). This can happen in different ways. One is that the two prisoners share an identity in terms of directly taking the utility of Alter into consideration (the classic on this is Taylor 1987: 112ff.). That means, if one prisoner cheats, and the other cooperates, the cheater will directly include the loss of Alter in her preference function, thus reducing the actual gain from cheating. Of course, that would simply imply that the pay-off function is no longer that of a prisoners dilemma, but what counts is the underlying structure. That means, the game form remains the same, in the sense of the payoffs in physical terms (years in jail). But because of shared identities the two prisoners will manifest underlying utility functions which will trigger cooperative behavior.

In standard game theory, interdependent preferences between Ego and Alter give rise to utility functions that maintain a cooperative solution.

However, shared identities do not necessarily trigger cooperation. There is also the possibility that a shared identity gives rise to spiteful behavior. In that case, the PD will be even more problematic. So, there is another problem how identities can be known. Just having the interdependent preferences and

knowing them is a different thing. At this point, the internalist foundations of strategic game theory comes into play: As long as Ego can only operate on the basis on explicit knowledge of Alter's preferences, there would be a need for a binding inferential mechanism. This is the reason why this problem can best be solved in the context of evolutionary game theory, where identities take the form of correlated strategies, such that there are triggers that coordinate strategy choice among populations of players, and such that the imposition of some minimal structure, in particular neighborhoods, safeguards the attainment of the cooperative solution (Skyrms 2004).

Thus, independent from the specific reasons why an agent may be cooperative, there must be a way to signal this to the other agent. Even in the case of the one-spot PD, there is a difference between the case that the two just by happenstance have met to commit a crime, without knowing each other, and the case that the have had an ongoing relation beforehand. In the second case, they would be able to know the other players' type. Clearly, there are two problems here. The first one is that in classical game theory players are just opportunistic, without further modification, so that cooperation cannot be a feasible strategy for them. Even prior knowledge just results into sunk costs for present decision making, and will hence be disregarded. Second, even if a player were unconditionally cooperative, how can the other player trust into this? How can he trust into a signal that shows that cooperative attitude?

The only way how players can overcome these two problems is to adopt an identity which cannot be changed, and to rely on signals that cannot be faked, at least in principle. The first part of the solution has been analyzed in a classic contribution by Frank (1988). The only way to fix an identity is to give it an emotional basis, which turns it inaccessible to rational choice. In more recent analyses of evolutionary psychology, this position has been vindicated in the sense that we can safely assume that the evolving human species must have developed an emotional set-up that eases cooperative solutions in PD situations and other problems of cooperation, because human groups, that share such a structure, would have succeeded in competition with

The fundamental duality of cognitive-deliberative and affective-emotional functionings in the brain is the evolutionary solution to root identity in emotions that are beyond conscious control.

other human groups. Viewed from evolutionary theory, the human brain needed to evolve mechanisms that first, allow for credible signals of the identity of agents, and second, enable individuals to detect cheaters (Cosmides and Tooby 2005). Thus, we can present a game-theoretic rationale for the observed modularity of the brain, especially with regard to the separation between deliberative and emotional functionings, with the latter being partly independent from conscious control.

However, this argument from group selection would rely on mechanisms of group boundaries which cannot themselves have a genetic basis, given the observed plasticity of human beings, especially with regard to culture. Therefore, evolution can only foster the emergence of the capacity for forming identities, but not the identities themselves. Thus, what needs to be added is a layer of identity which enables human beings for almost arbitrary phenotypical flexibility, but at the same time builds on the capacity for absolute emotional commitments, closed to rational opportunism.

This has emerged via language as a group marker. Human language poses a formidable difficulty to cooperation, which even transcends the dangers of rational opportunism, because language allows for the construction of arbitrary counterfactual worlds, hence identities. Language and lies are deeply enmeshed. So, on first sight the emergence of language multiplies the original dilemma of cooperation. However, this also means that evolution must have supported the emergence of a capacity to solve these additional dilemmata of language. There are three fundamental devices here, the cost of acquiring a language, the historicity of language and the commitment to truth. It is an interesting fact that children are not born with a language, and that the capability to learn a language declines during the developmental process. Apart from especially gifted individuals, the vast majority of people never learn a seond language without any markers of this fact. This applies not only to languages but even to minor modifications of dialects. In fact, language allows for an immensly complex variation and recognition of slightest phonetics, semantic and syntactical differences, which are very difficult to learn in their entirety for most of us, and which even shine up when using a

Language is a problem and its solution, at the same time. It creates the possibility of counterfactual cheating of identities, but at the same time has evolved into a medium of fixing identities-

second language, that is dialectal variants of the first language even influence the use of the second language. Therefore, these distinctions are a highly reliable marker of identities in terms of group affiliation.

We can extend this observation to all aspects of human symbolic systems, and add the evolutionary hypothesis that only non-functional markers of symbolic systems can serve as markers of identities (on this point, see Munz 1993: ???). This is because a functional marker can easily diffuse across group boundaries, as it serves a purpose that is independent from this group identity. Only a costly non-functional marker will resist those forces of diffusion. So, we can speculate that most aspects of non-functional items in human culture are ultimately related to this function of group markers.

Language is a costly group marker and it is the medium into which individual identities are embedded as a historical phenomenon.

Language allows for the narrative construction of identities, which means that an identity is actually a history told in a community of language users (Ross 2007). Interestingly, this aspect closely follows the theory of proper names in the sense that the ultimate anchor of identity is a story that leads back to certain origins, and which in terms of the concatenation of events is singular by principle, that is, there is a probability close to zero that history will repeat itself for an individual. This means, language allows for the reflection of indivdiual histories that in the end establishes the identity. This embeddedness of identities into languages is a twofold one. First, language is the medium in which the narrative of identity takes place. This narrative is shared in a group, so that it cannot be changed arbitrarily. Second, as indicated previously, language itself has the property of historicity. As a result, once an identity has formed, it cannot be simply changed by individual choice, as it is embedded into a given practice of language use, which is a collective phenomenon.

Finally, language is based on truth. This is a fundamental feature that changes the conditions for signalling in a principled way. Normally, the economic theory of cheap talk assumes that signals can be faked with zero costs, as the use of language is almost without any cost (Farrell and Rabin, 1996). However, as has been demonstrated in the philosophy of language, the very

The use of language builds on a lexicographic preference for truth.

use of language might imply a commitment to be truthful and relevant (in terms of the Gricean standards, see Lycan 1999: ???). If there is a cost of lying, or if there is even an absolute, hence lexicographic preference for truthfulness, the second part of the problem of cooperation is neutralised (for a game theoretic approach, see Demichelis and Weibull 2008). There are two main reasons for accepting this proposition. One is to assume a principled truthfulness, which is based on the assumption that language as such will fail if there is no commitment to truth. The other is an evolutionary one, namely that human beings seem to be equipped with emotions that make it easy to discover lies and make it difficult to lie (for a classic, see Ekman 1988). Again, such a predisposition can only be based on a notion of group selection, which is intertwined with the problem of the emergence of group markers.

Ross (2005: ???) puts these arguments together in the argument that standard game theory is missing one intermediate level of games. On the one hand, there is the "game of life" which is modelled along the lines of evolutionary game theory (see also Binmore 1994). The other is the standard strategic game, i.e. the particular setting of strategic interaction. In between, there is the game of identity. The game of identity builds on capacities that evolve in the game of life, and it fixes the types of players in the strategic game.
We can summarise these different insights into one fundamental proposition: In a species with complex, language-based social interaction there is an evolutionary rationale to develop individual identities which at the same time imply shared properties across those identities. Shared properties are the precondition for solving strategic dilemmata through the emergence of correlated strategies. Given the central role of language, the condensed expression of this is the transition from I to We. For example, Hollis (1998) has shown that strategic dilemmata of trust can only be solved when individuals perceive themselves as acting in a team, such as a team of soccer. This presupposes a capability to make binding statements of the kind 'we will do this and that' instead of arguing from the mere I perspective. Sugden (2000) has introduced the concept of team preferences for this, which applies for all kinds of collectives which are based on shared identities, such as the family as a primordial unit.

In Tuomela's (1995) extensive philosophical treatment of these issues, it becomes evident that team preferences cannot be simply understood in terms of the standard economic approach towards individual autonomy and voluntary agreement. Here, the standard Arrow impossibility theorem applies again, that is, there is no way to reconcile the two notions of a collective preference and individual autonomy. Tuomela argues that collective intentionality emerges in all systems that allow for a power differential across members of a collective, such that the behavior of individuals is governed by three different sets of rules and beliefs. One is the rules which emanate from a collectively recognised authority which also can impose sanctions against deviant behavior, the other is the set of endogenously emerging norms, and the third, which especially has to underly the second, is a set of shared 'we' beliefs, which means that individuals share a fundamental readiness for joint action, and that this is common knowledge in the collective. Tuomela further distinguishes between operative and non-operative group members, which means that the latter at least implicitely accept the actions of the former on behalf of the collective.

A central human capacity is the capability to form We relations.

Thus, a human collective appears as a task-right system for which power asymmetries are constitutive. In our context, this means that there is no individual intentionality without collective intentionality, and therefore no individual intentionality without implicit power relations with other individuals. This is because individual intentionality is always a part of collective intentionality in the case of shared identities.

As Sen (1995) has shown, this conclusion, which ultimately results from the impossibility theorems on collective preference functions, can only be reconciled with any notion of individual freedom if the process of generating and expressing individual preferences is designed in a way to minimise power differentials. This leads back to the role of language.

We beliefs evolve out of an ongoing rational discourse in which human individuals mutually influence their preferences and end up with enhanced interdependence and shared identities. This turns standard internalism in game theory into externalism.

As Elster (1998) and Viskovatoff (2001) have been argued, rationality can take different shapes beyond the rational choice pattern underlying standard

game theory. An important form of rationality is deliberative discourse which aims at reconciling viewpoints among individuals by rational argument. In deliberative discourse, language is used to shape the preferences of the individuals who interact strategically. That means, communication does not simply signal identities, but it also serves to shape identities. This argument closes the circle: Once every game is seen as embedded into a language game that establishes We relations among the individuals, interdependence of preferences becomes the normal case.

Clearly, this approach turns standard game theory from a mentalist and internalist theory into an externalist one. The formation of identities becomes part and parcel of the strategic setting as such. These might be modelled in a simple way as "altruistic" preferences, but this term simply confounds the true causes of the interdependence. In terms of our model of the individual, we can state that the acting self is embedded into an ongoing process of communication in which her identity emerges, which then guides decision making in a particular context.

8.2. Social and personal identity as central categories of cultural science

Identities build on relations among individuals. This idea lies at the basis of the only systematic attempt to include identity into standard economics that has been made by Akerlof and Kranton (2000, 2005). Their model of identity starts from a utility finction of the following type:

$$U_j = U_j\,(\mathbf{a}_j, \mathbf{a}_{-j}, I_j) \qquad (1)$$

In the Akerlof and Kranton model, identity is a property of network relations which are patterned according to social categorisations of individuals. Identity generates utility in the standard economic sense.

This function establishes two elementary facts. First, utility is created in a network of actions of individual j and the actions of all other individuals a_{-j}. Second, utility directly depends on the identity I_j.

This identity is a complex phenomenon and is in turn described as:

$$I_j = I_j(\mathbf{a}_j, \mathbf{a}_{-j;}\, \mathbf{c}_j, \boldsymbol{\varepsilon}_j, \mathbf{P}) \qquad (2)$$

As we see, identity is also defined as a network phenomenon. This implies that actions always have a two-level effect. One is the effect on the state of the individual, the other is the effect on the identity. For example, if I buy a car, this changes my state via the different services made accessible such as transport. At the same time, the car will affect my identity, if only that I become a 'car owner', which might have some implications for my self-perception. If the car is a status good, many other effects add to this, such as my identification with a particular group of people. These effects are covered in the other three expressions in the utility function. **P** is a set of social prescriptions that determine the application of social categorisations $\mathbf{c}_j$ which apply for a particular individual *j*. This application is determined by the actual individual features $\boldsymbol{\varepsilon}_j$ that are the basis for the categorisation. So, **P** appears to be the mapping from $\boldsymbol{\varepsilon}_j$ to $\mathbf{c}_j$.

The A/K model gives a very good account of one of the essential economic aspects of identity, which is related to the network embeddedness. The central concept is that of externalities. As we have seen, the actions of others affect Ego's level of utility. However, this is always mediated via the identity. There is a direct and an indirect channel.

The direct channel is obvious. For example, if I violate the dressing code of a particular social network, this might first, reduce the utlity of a dress for me, because I do not feel at ease with that violation. There can also be direct feedbacks when others frown on me. The indirect effect is more interesting. Why do others frown on me? This is because when I do not follow the dressing code, I question their identity. So my individual action, that does not affect others utility at all, still changes their state of satisfiaction if they feel that their identity is threatened.

In the network, identities are interconnected via the externalities of individual actions on other individuals' identity.

This externality is very important, as it provides a reason for a central phenomenon on the stabilisation of social order, namely second-order punishment, which is difficult to explain by standard economics. A second-order punishment happens when a bystander of an interaction feels obliged to punish somebody who does not punish another one which is deviant. For

example, if I violate a dressing code, and another person does not frown on me publicly, others will frown on her. Given the A/K model, it is immediately evident why this is so important. If I alone change the dress, in fact I do not question the categorisations. But if a second person seems to agree, there is the potential of a new categorisation emerging. This threatens the identities of all bystanders, such that they feel motivated to punish. In other words, the second-order punishment interalises external effects of the original interaction.

Therefore, it is the A/K model that gives an explanation why systems of categorisation are stabilised by individual actions, which is a major explanation of social structuration.

The A/K model of identity is a linguistic one in the sense that the core feature is the system of categorisations. Categorisations are not simply fixed but depend on the individual properties. So, a first question is how those properties are defined and determined in the specific case. This is an act of predication which in turn has to depend on linguistic categories. Thus, the individual properties and the categorisations are interdependent. The complexity of this relation is easy to understand if we compare the categories of gender and sex. At first sight, sex determines gender. Sex may be regarded as a property, gender as a categorisation. Now, queer theory asserts that there is no necessary relation between sex and gender. That would imply that the categorisations themselves define the properties. If individual identity simply follows external categorisations, a person might just accept the established ones and therefore takes a set of properties as a given, for example, 'feminine' ones. However, there is also the option to question the categorisations and to adopt a set of properties that match the preferences.

The A/K model is based on language, because categorisation is predication.

This example shows that the A/K model is incomplete in a fundamental way. This is because it exclusively relies on categorisations to generate levels of utility. Clearly, this repeats exactly the same problems as with the Aristotelian discussion of individuality. Categorisation is predication, and the A/K model implies that the person simply vanishes behind the categorisations.

In his criticism of the A/K model, Davis (2007) therefore argues that the model only includes the social identity of an individual, and proposes that it needs an anchor, which is the personal identity. He modifies the utility function:

$$\boldsymbol{PI}_j = \boldsymbol{PI}_j [U_j (\mathbf{a}_j, \mathbf{a}_{-j}, I_j)] \qquad (3)$$

In Davis' extension of the A/K model, personal identity is seen as the anchor and ultimate source of valuation of the social identity.

In this function, personal identity is the ultimate source of valuation in the sense that a fundamental separation is undertaken between the utility measure and personhood. It is the person which values levels of utility that are generated by the A/K utility function, including a set of social identities. The question is whether this is just a kind of meta-preference, which ultimately can also be cast into the language of utility, or something different.

Indeed, the A / K model is formally homologous to Beckers' theory of preferences (Sobel 2005: ???), which implies that we could just equate social identities with instrumental preferences, and the personal identity with the underlying fundamental preference. This leads into a logical circle, unless the fundamental preferences are treated as exogenously given. In their discussion of the A / K model, Kirman and Teschl (2006) therefore propose to relate this model to Sen's capability approach that we already mentioned earlier. They distinguish between a where-identity and and a 'who' identity. The A / K model explains revealed preferences as the direct expression of a choice of social identities, so explains where in the social space an individual is located. This approach does not explain outright deviant behavior in the sense that might reject conformism in the first place, in search for another identity. This is the 'who' identity. This approach seems to grasp an important fact of life, namely that some people at a certain stage of their life, when they do no longer feel satisfied with a set of social identities, try to break it up.

This scenario can be easily accomodated in our evolutionary model of the individual. In the externalist definition of the acting self, the A / K model fits perfectly as it is a purely externalist one, in the sense that the categorisations

The social identity relates with the acting self, personal identity with the object self.

are exogenously given, and individual choice depends on them. But at the same time, the object self is the ultimate source of valuations (experience utility). However, as we have detailed earlier, there is a fundamental knowledge gap between the two, as the valuations of the object self cannot be the basis for individual choices. That means, the search for who identity cannot be driven by the preferences expressing the A / K where identity, but only by a most general feeling of well-being. I submit that this can be further detailed in terms of a set of emotions that interact and determine the instantaneous state of well-being. For example, a certain state of the individual might trigger fear facing uncertainty, such that action is taken to reduce this emotional state, but this action cannot be directly be based on a reliable and detailed knowledge of cause and effect. In Kirman and Teschl's (2006) account opf Sen's approach, this is called 'Sen maximisation', meaning a drive to improve well-being, without being based on a complete and consistent utility function.

However, this still leaves open how a particular action comes into being, apart from mere random outbreak. In this regard, Kirman and Teschl offer the proposal that who identity relates to the desire to realise a certain self-image. The social identity is a means to attain this self-image. So one could argue that the state of the object self is reflected in a measure of dissonance between the current status and the self-image. I propose that a self-image is entirely different from social identities, as it involves an individual developmental trajectory through time, hence fulfills the criterion of individuality in the ontological sense. That means, a self-image is rooted in the past history of the individual, and it is guided by future projections. These are individualised, in turn, as they refer to a vision of one's own future individuality, and because they are informed by imitation of other individuals. That is, the self-image does not relate to social categories, but to personalities (see also Horst et al., 2006).

The ultimate valuations by the object self refer to a self image hat emerges as an evolutionary trajectory connecting an inviduals' past, present and future. This is irreducible personhood.

This notion of 'who' identity follows the Aristotelian approach, which would imply that personal identity cannot be categorised at all, as it is beyond predication. It is just the irreducible personhood. Davis (2007) argues that

personal identity is based on a set of deontological commitments. These flow out from the self-image in terms of requirements that result from the adoption of that image. So it might be more appropriate to speak of reasons in general, which directly corresponds to our previous discussion of calculative utility versus rational reasoning. A self-image is supported by reasons in two senses, first, the individual provides reasons for adopting this self-image, and second, it provides reasons for taking particular actions.

This conception finally closes the externalist framework. This is because we can now argue that both the where identity and the 'who' identity are phenomena of language. So, what is the difference between the two?
The difference lies in the anchoring in the object or the acting self, respectively, and correspondingly in the different role of predications in asserting one's identity. The social identity in the A / K model builds on explicit categorisations, which can be also part of reflections on the level of consciousness. That means, I can reflect upon my social identity in terms of the recognition of my allegiance to certain social groups, and I can also communicate about this with others, thus providing reasons for my actions in terms of my social identity. Thus, the social identity corresponds to the level of the acting self. In the A / K model, this is given exogenously, whereas Horst et al. (2006) argue that the set of social prescriptions itself evolves continuously, as the individual actions also change the meaning of social categories incrementally. Thus, for example, if I assign myself to the Social Democratic Party in Germany, the nature of this assignment certainly has changed over the past thirty years. This raises the problem how far we can speak of a stable identity at all (Davis 2005). For this, we need the notion of personal identity.

Social identity is based on linguistic categorisations, personal identity is based on story-telling.

The personal identity is a linguistic category, too. But it does not rely on categorisations, but on story-telling, in the sense of providing reasons by pointing out the consistency of actions though time (Ross 2007). As this is based on the object self, there is no way to give a direct reason for the chosen actions, but only claiming that the action stay in continuity with one's self. In this, projections of the future self play an important role, which build on

counterfactuals. Out of these, the commitments are generated which make the personal identity a stable phenomenon. However, this stability is not directly accessible to predication, so that it corresponds to the physical unity of the body and hence, the object self. In the same way as the body can be seen as a point in a chain of physical causes and effects beginning with the moment of birth, the personal identity corresponds to a chain of descriptions of chained events.

In sum, the economics of identity can be reformulated in naturalistic terms. This is rooted in the neural darwinistic proposition that the stability of neuronal processes in the brain can only be achieved via communication among brains. This implies that both social and personal identity have to be interpreted in externalist terms. The stability of this identity is by no means a given, as the underlying structure is an evolving entity. It depends on the interaction between the two levels of the individual, the acting and the object self, to which the notions of the social and personal identity correspond. There is no other beacon on which identity can be based. In particular, we ourselves cannot know whether we are the same because we can only perceive that we are the same, given the fact that we perceive a closed chain of events leading up to our current state. Therefore, we need to rely on external anchors to assert and justify our assumption of identity. These anchors are not stable either, because they are a part of the evolving system of language. However, they provide stability in two senses. First, they provide the acting self with standards of decision making, and they embed the object self into a history of individual changes which is consistent in the sense of closed causal chains.

Identity is continuously evolving.

This allows to take a significant step beyond the literature on the economics of identity and to complete the final turn to naturalism, which is to conceive identity as an analytical category of cultural science. The externalist view on identity requires the explicit consideration of the role of artefacts in evolving identities. Artefacts directly reflect the interaction between different levels of self and identities. Take, for example, food habits. Typically, food habits are part of a social environment, as dishes are often standardised and might also

In the externalist view on identity, consumption is constitutive for identity, and does not just produce utility.

reflect certain behavioral patterns in social groups. At the same time, individual food habits go back on a personal history of food use. Thus, eating a certain food might reflect both social and personal identity. That means, the food item is an external anchor of the formation of identity. Esspcially, the repetitive use of certain foods is a part of the chain of events that constitute personal identity, even though it is simultaneously involved in stating social identities.

The same can be said of many other consumption items, such as dressing habits. Therefore, from the cultural science point of view identity is inextricably enmeshed with the material environment of an individual. Changes of identities and hence, cultural change, will be reflected in changes of this material context, such as in changing dressing standards. Even slightest modifications can express different identities.

Therefore, we reassert our earlier proposition that goods are not simply items of physical consumption, but bimodally operate as signs. They do not simply generate utility, but at the same time the make up the very identity which in standard economics is seen as being the basis for the utility function. In a sense, this radicalises the revealed preference approach in economics. Revealed preferences are desriptions of choices that do not assume that there is a real utility function behind, that is, the utility function is only a formal description of the observed choices. This corresponds to a radical externalist position. In the naturalistic framework, this argument can be maintained, but the descriptive framework needs to be changed into an evolutionary one. This implies to eschew the rational choice framework underlying revealed preference theory. Instead, the agent behind the revealed preferences is a complex evolutionary phenomenon in which different levels of evolutionary processes interact, according to the model of the individual presented in the previous section.

The externalist view on identity matches the externalism of the revealed preference theorem, but eschews ist underlying rational choice framework.

Chapter 9.

Identity and Institutional Creativity

We have so far considered creativity in terms of artefacts. As a final topic, in this chapter I consider the special case of institutional creativity, which I ground in the observation that identities are essentially shaped by the institutional context of individual action. This is not the place where I can develop on a fully-fledged cultural science approach to institutions. So I simply state that institutions are a determinant of identities in the same way as, for example, consumption goods do. Institutions very often underly social categorisations, and they are utilised by people to achieve certain aims in a similar way as they use goods as tools for goal realisation. As we shall see, in this sense institutions are things. The major difference lies in the complexity of the mechanisms that underly the persistence and the functioning of the institutions, and, in particular, institutions are not pre-existing but created by human action.

From the viewpoint of cultural science, institutions are an essential element of the externalist approach to identity.

Institutions are part and parcel of an externalist notion of identity, which implies that the notion of an economic agent cannot be defined independent from institutions. This idea played a central role in early American institutionalism and in continental approaches affiliated with the historical school. In the course of the twentieth century, it was abandoned by economics in favour of the notion of the universal rational individual, only surviving in certain fields of economic anthropology (for a survey, see ????), and, of course, outside of economics. In more recent economic theorising about institutions, the neat separation between the rational individual and the institutions is maintained by the Niew Institutional Economics. The only line of thought that approaches the older ideas is the cognitivist understanding of institutions, which relates their functioning with the cognitive models underlying individual choice, and which can be shared between individuals (Denzau and North 1994). However, this literature still seems to maintain the assumption about some universal agent properties working behind the veil of

The interdependence between identity and institutions is a forgotten theme in early American institutionalism.

divergent cognitive schemes. Cultural science claims that there no way to conceive of an agent independent from the institutions into which her actions are embedded.

9.1. Performativity and ontological creativity in institutional change

In economic theory, the distinction of informal and formal institutions is widely recognised (North 1990). Both differ from social norms and customs in that they are always supported by sanctions. Formal institutions are supported by special organisations and hierarchical structures through which sanctions are applied, informal institutions emerge from social networks and mainly build on spontaneous sanctions, such as social ostracism. In the latter case, there is a difference between norms that people are aware of and others that they follow unconsciously, and which might be only become explicit when an external observer appears on the scene and communicates their observations.

In economics, institutions are mostly treated as epiphenomena of problems of coordination, in the sense that they emerge as equilibria in repeated interactions, or emerge as a rational agreement among autonomous individuals. Both approaches seem to fail in assigning the right ontological status to institutions, which is also of prime relevance for our further arguments. Clearly, given the role of sanctions in maintaining the institutions, there is a direct relevance of Tuomela's analysis to which I referred earlier. Institutions always imply a power differential in the sense that an individual can be forced to comply with an institution. However, as Tuomela has made clear, this power differential can be an accepted one in the sense that the institution is based on collective intentionality, independent from whether only a subgroup of individuals has the explicit power to sanction. This notion is the direct bridge to our analysis of identity, as collective intentionality is a reflection of shared identities within the group that manifests the institutions. This approach is different from the standard economic approach to institutions, which separates the individual from the institutional environment. However, there is a relation with approaches that define institutions as shared cognitive models, because this implies a convergence of identities (Aoki

intentionality, hence shared identities, even if sanctioning power lies only with a subgroup in the population following the institution.

2001). Yet, the shared cognition approach is an internalist one. In this section, I present an externalist account of institutions.

Searle (1995, 2005) introduces a conceptual framework to institutions which is highly compatible with the naturalistic approach proposed in the book. His starting point is the recognition that institutions are a speciest of facts; that is, they have ontological status. This because they are causes of actions. They are only special in the sense that a distinction has to be made between observer-dependent and observer-independent facts. For example, if we consider Mount Fuji, this is a mountain, hence an observer-independent fact that persists whether human observers watch it or not. But at the same time, it is an institution in Japanese culture, which is a cause of numerous social actions. As such it is observer-dependent, because these causes depend on the existence of the observer. However, they are not simply subjective beliefs. For example, an institution such as the Central Bank can issue money, which ultimately rests upon the beliefs of the economic agents. Yet, money is a fact which is involved in many physical causes and effects in the world. Further, institutions are ultimately based on brute facts, that is, chains of events that involve physical action or things, such as real punishments or artefacts supporting institutionalised behavior, such as the judge's elevated chair. In this regard, Searle's approach is compatible with the ANT proposition that physical things can be mediators in networks of social interaction. Indeed, we can define a mediator as an observer-dependent fact.

Institutions are observer-dependent facts, hence are a part of the physical world.

So, what does it mean if we say that money is created? Searle argues that the emergence of an institution is based on three different capacities. One is language, which involves the possibility of metaphors and manipulation of meanings. The second is collective intentionality, which is made possible via language and other emotional devices of the human brain. The third is the capability to assign functions, which is based on the more fundamental capability of transferring meaning. Thus, it is immediatly evident that Searle's notion of institution can be rooted the notion of conceptual blending, as developed earlier in Part II. Let us look at the details.

Institutions are a phenomenon of language. They emerge via conceptual blending, or, in Searle's terms, via status functions.

Searle argues that the fundamental precondition for an institution coming into existence is a so called status function. Status functions enable language users to create constitutive rules. Constitutive rules create a social reality which is not directly based on pre-existing forms of social interaction. The status function has the general form of «X counts as Y in context C», as for example, a mountain counts as Mount Fuji in Japanese Shintoism. The status function underlies the more specific formula that directly defines an institution, and which matches with Tuomela's approach, this is the so-called power creation operator «We accept (S has power(S does A))» which is based on the collective intentionality that is expressed via a conceptual blend, such as treating Barack Obama as the President of the United States.

This status function essentially depends on collective intentionality and language. Therefore, Searle's reasoning is directly supported by Wittgenstein's private language argument, in the sense that status functions cannot work just for me alone, and that it is even impossible to set up an institution individually. This is because there would be no reasonable way to define deviance in case of an entirely individual institution. This corresponds to the impossibility to fix meanings in language. Therefore, language-based collective intentionality is the basis for institutions as observer-dependent facts, the latter being understood in the ontological sense.

This is why we can and have to include institutions in our general notion of ontological creativity. It is straightforward to see the direct relevance of conceptual blending here, as we have already outlined in Chapter 6. That means; Searle's approach is a detailed elaboration on the notion of performativity in institutional evolution. Going back to the example of the forex market, the vascillation between the generic spaces of gambling and the agro-futures markets can be seen as a different context C. So, Searle's C corresponds to generic spaces. Once the context was shifted, it became possible to treat foreign exchange in the same way as agro-commodities, even though there are certainly differences in their functionings. This caused an explosion of institutional creativity in the financial markets, as many new

status functions were created, which are based on conceptual blends, such as the invention of many other kinds of options and futures.

Now, Searle (1995: Chapter 6) makes the important point that institutions depend on the background, by which he means capacities that enable individuals to act according to the institutional pattern. This notion is easy to grasp in an externalist approach, because we can say that institutions themselves are an essential part of the individual capacity to act. This straightforwardly matches many approaches in economics which equate institutions with knowledge, in the sense that they store and transfer knowledge which is partly subject-independent (Hayek ???; North 2005). That is, institutions structure social interactions which would otherwise face fundamental uncertainty. This structuration implies that one cannot simply view institutions as constraints, as many economists do. They are enabling at the same time, because without them the knowledge to act under undertainty would not simply exist. If that were true, it follows straightforwardly that institutions are a part of the individual identity. In our model of the individual, this refers to the acting self.

Institutions are a constraint and an enabling force at the same time, because they carry knowledge in the externalist sense.

Searle argues that institutions work because the individuals develop skills that are specific to these institutions. That means, behavior according to institutions is not simply guided by incentives to follow the institutions, but mainly by dispositions to follow, without necessarily knowing the full extent of the institution, if it were described by an external observer. So, the notion of rule follwing is misleading in an essential way, because there is simultaneity between the functionings resulting from the dispositions and the behavior matching the institutions. It is not necessary to represent institutions internally to be able to follow an institution.

In Searle’s terms, rule following is in fact manifesting the disposition to behave in a patter corresponding to the rule.

This is basically an externalist approach to institutions, which states that rule following flows out from the formation of an agent identity which is corrsponds to institutional structures. As with all externalist arguments, the only way to explain this is the evolutionary one. This means, the fit between individual behavior and institutions emerges in an evolutionary process in

which both the individual and the institutional level interact as transmitters of knowledge enabling the functionings that work behind the observed reproduction of institutions.

9.2. A case study: Money from the cultural science point of view

Let us briefly consider a simple example, the emergence of money. Money is certainly one of the crucial economic innovations in the emergence of the modern economy, and it certainly plays a central role in any explanations why the Western world underwent industrialisation, whereas China failed, because China did not continue with its early tradition in creating monetary institutions. In this picture, we can draw all elements together that we have developed so far, ending up in a hypothetical account, which is supported by many observations. I will not concentrate on historical details, but the underlying evolutionary dynamics. The central question is, how can we explain the difference between a mere good used in indirect exchange from the institution of money?

Carl Menger presented an evolutionary account of the emergence of money.

For this, it is most appropriate to refer to Carl Menger's (1892) very influential theory of the evolution of money, which has been well-reveived also in the modern economic literature (e.g. Schotter 1981). Menger argued that for money to emerge, the simple fact of a difference between sale and resale price of a good is a necessary condition. In a group of individuals who barter goods without money, the problem of matching dyadic exchanges can only be solved if some people are willing to keep goods for some time even if they cannot use them by themselves. This is only possible in the longer run it the resale price of the good is sufficiently high. From this it follows that traders will converge on the use of goods with that property, which is in turn determined by their physical properties, such as storability and dividability for future exchanges. Further, there should be an expectation that the good will remain scarce in the future, such that price expectations are stable. Given these conditions, a mechanism can be created which will cause an increasing demand for the good in question, thus further enhancing ist saleability.

However, Menger adds two additional observations that directly entail conceptual blending. The first is that in the initial stage, different goods compete, and there is not yet an anchor for stabilising the expectations. In other words, the ex-post expediency of money cannot drive its emergence, so the functionalist fallacy must be avoided. Therefore, two additional forces come into play, one is the formation of habits and the other is the observation of others. Especially imitation will drive demand for one particular good, ceteris paribus, thus enacting precisely the mechanisms of social network markets that we have already considered in Part I. The final step in the emergence of money is the explicit recognition that a certain goods serves as money. Only after this had happened, it became possible to institutionalise money in an explicit way.

Menger's account involves conceptual blending in habit formation and imitation.

In order to understand the three steps of habit formation, imitation and institutionalisation, we need to add an aspect that is neglected by Menger. This is the problem of trust among individuals who might cheat about unobservable qualities of the goods used for indirect exchange. This adds a social network dynamics to the process. We can distinguish the following steps, which are depicted in fig 2-5.

The first stage, which Menger identifies with habit, is the transformation of particular individuals into positions of trust in a trading community. This means that a social learning process is triggered which is based on observation: In an intitial transaction, information is generated which diffuses to observers, hence qualifies as an information externality in the underlying network. As a result, the emerging money commodity and the trusted individual merge in their role as mediators, that is, the good and the individual mutually reinforce their trustability and resalability. In fig. 9.1, this relates to the transference of trust in A from individual B to C. Viewed from the cognitive requirements, we can classify this as a simple inductive reasoning, in the sense that past experience is extrapolated into the future.

This is different in the next step, which is imitation. In this case, individuals who strive to obtain status in a group of traders will tend to imitate the

example of the successful trader, which is driven by the expectations of potential trading partners that extrapolates on the role of A. This is an analogy based on elementary principles of conceptual blending. This means; a trader A' blends with the role of another trader A in the perception of trader C, thus generating an incipient process of conceptual formation of the notion of a good for exchange, i.e. early money. Once A' starts to interact in this way, the inductive chain is started anew which involves other individuals such as D. In both cases, once the mechanisms have emerged, a commitment mechanism begins to hold which can be analyzed according to the conventional game theoretic ideas about reputation etc., that is, there are growing incentives for traders A and A' to keep to their promises.

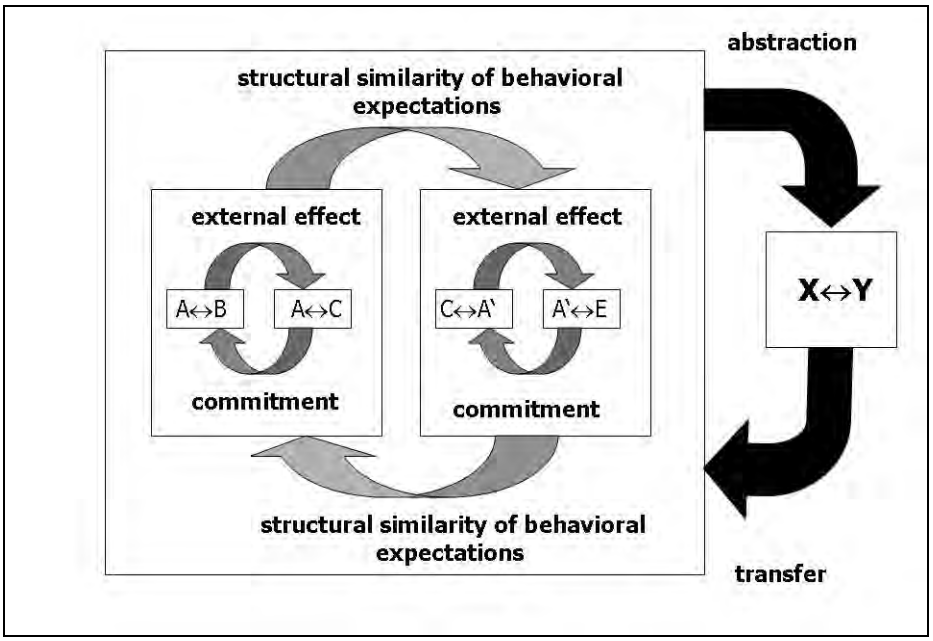

Fig. 9.1 How money works

The final step happens if both the role of the traders and of the good are put on an abstract level. This is a much more complex conceptual blend, because it means that the role of trust is transformed into institutional trust and the role of the good is transformed into a generalised medium of exchange. Interestingly, this transition can be clearly identified in the historical sources reflecting the early emergence of money. To summarise a complex story, as has been demonstrated by Hutter (1994), the historical emergence of money in the Eastern Mediterranean went hand in hand with a semantic oscillation between 'metal sign' and 'signed metal' especially at the boundaries between

In the early history of money, signed metals were blended into metal signs.

different social and political systems. Metals emerged as a medium of exchange precisely for the reasons that Menger had identified. However, at those boundaries, ordinary network relations maintaining relations of trust were much weaker. Early coins were just pieces of metal that bore punchmarks resulting from physical testing of the quality. These marks could serve to recognise the origin, so that a semantic ambiguity emerged. The question of origin was important to form an expectation about the quality of the metal pieces. This turned the pieces into a medium of exchange in original trading communities, and their use could spread in the moment when the pieces were deliberately coined, i.e. additionally stamped with images of sacred animals, which allowed recognition beyond community borders. From that time onwards, the early history of money was inextricably linked with the merger of the value carrying functions of money and the imbued authority of the political powers who later even defined and exploited the right to issue money. This marks the transition to the final stage of abstraction.

As we see, the emergence of the institution of money is inextricably linked with an explicit role of collective intentionality which is embedded in power structures in the sense of Tuomela. Institutional creativity is based on a status function of the form, 'treat metals as money in the context of a politically embedded market'.

From the naturalistic viewpoint, the evolution of money involves neuronal processes which turn money into a direct reinforcer.

We can further strengthen this account with reference to the neuroeconomic observation that money is a direct reinforcer, i.e. may carry independent utility in the economist's sense, which would result into a direct contradiction with established notions of economics (Camerer et al., 2005: 35f.). In modern economics, money is regarded to be a veil, and has no independent utility. This is reflected in the way how institutions seem to suggest a neutrality of money.

As has been elucidated in Lea's and Webley's (2005) survey of the pertinent literature on money in contemporary social systems, money comes close to a 'drug' in the biosocial sense. More exactly, they identify money as a perceptual drug, i.e. a perceptual stimulus that elicits some positive

organismic responses without actually producing the ultimate benefits, comparable to other runaway signalling systems in nature. For example, gaming can work as a drug, insofar it activates human motivators such as curiosity, without the action directly contributing to fitness. A drug parasitises on other motivational systems, which is a clear sign of meme activity, i.e. a meme hijacking a genetically preformed organismic mechanism. As money can be shown to be a direct motivator in stimulating parts of the brain that are related with immediate rewards, this seems to be the main reason why money plays a very special and central role in many human societies. Lea and Webley propose that money especially piggybacks on an essentially human instinct, the instinct to trade. This is also the basis for the merging of the tool and drug aspect in existing uses of money.

Money involves a specifically human emotional complex that generates the capability for social exchange.

As has been argued by Ofek (2001), trade and social exchange in general are constitutive traits of the human species and presumably developed out of the specific setting of utilising so-called 'contrived commodities' collectively. This refers to the collective consumption of large game, or the sharing of fire, which have the common property of being excludable, but at the same time being non-rivalrous (large game could not be stored at those times, so additional consumers did not reduce the consumption of the successful hunter). That means, trading goes back on reciprocal altruism, which emerged out of a system of ongoing exchange with possible punishments. This seems to be one possible adaptationist explanation for the fact that the cognitive system of humans is not guided by a general purpose rationality even in the case of exchange relations, but by special decision modules that focus on the detection of cheating and the maintainance and control of implicit social contracts (Cosmides and Tooby, 2005). These can be shown to match activation patterns in the brain that correspond to the 'theory of mind' pattern (Ermer et al. 2006).

These observations can be related to the historical observation, and most interestingly in our context, the transition to modern money in the context of emerging large-scale market systems goes hand in hand with an historical stage of the demonisation of money. It is this stage by which money qualifies

as a meme, in the sense of particular monies in particular societies that operate as a sign that instigates particular neuronal responses. Money appeared to be related to specific emotional complexes, related to the broader semantic field of the cardinal sins. This is the major reason why the transition to capitalism was most easily achieved in societies with a specific religious setting, because the emotional coding of money was different. In Europe the accumulation of money obtained the role of an indicator of religious rightness in Calvinist settings, whereas in Catholic Spain the demonisation of money prevailed for a longer time. Interestingly, this demonisation of money was also observed in China during the Song dynasty, replicating the European views that the diffusion of money signified the transition from the moral economy to a new way of life, full of uncertainties and new dependencies from anonymous powers (von Glahn ???). Thus, we can say that the evolution of money, similar to the example of forex futures in section ???, reflects a vascillation between different conceptual blends, some inhibiting, some promoting the emergence of more complex monetary economies.

The interaction between cognitive blends and emotional patterns is visible in the historic shift from the demonisation of money to its functional role in modern capitalism. This involved the emergence of new identities, such as the investor.

Finally, this blending was directly related with the formation of identities, partly involving ethnic identities, partly the emergence of new types of personalities, such as the investor (Preda 2005). The investor is a complex social identity which was perceived in a net of metaphors related to risk, gambling and calculation, out of which eventually the rational investor emerged as a central figure in the emerging global financial markets. This close interrelation between finance and identities continues until the present, especially in the role of the traders on institutionalised financial markets, who, far beyond the economic view on rationality, manifest a social and personal identity which is deeply embedded into the behavioral standards governing the trading community, and into the evolving emotional structure that underlies their individual satisfaction with dealing in risk and uncertainty (Zaloom 2004; Hassoun 2005)

So, and summarising, we end up with a naturalistic view on the institution of money, which emphasises the following points.

- Money emerges out of a process of social exchange via a conceptual blending that involves physical properties of goods and tranfers meanings in the sense of Searle's status function, once the cognitive transformation into a medium of exchange has taken place.
- This conceptual blend is embedded into a collective intentionality which thematises relations of authority and sancticity in a community of users of money, thus embuing the institution of money with sanctioning power.
- Money as an artefact is directly related with memetic structures that link up with reward mechanisms in the brain, thus activating emotions that are related with social exchange, thus providing an independent incentive to use and accumulate money.
- In the longer run, money is related with the emergence of social identities which hook up on personal identies of individuals who deal with money in a specialised fashion, such as professional traders. This is an essential part of the emergence of global capitalism as a distinct social structure.

Conclusions to Part II: Consequences for the economic analysis of the creative economy

I have developed an externalist approach to identity and creativity. In conclusion, I wish to outline several consequences for economic analysis in the more narrow understanding, and especially for the analysis of the creative economy.

As a simple rule of reference, I submit that the fundamental distinction between standard economics and cultural science is the question of the separation between the individual and its environment. This fits into the traditions of the scholarly debate, where protagonists of a cultural viewpoint reject the hypothesis of methodological individualism. Cultural science radicalises these criticisms in the sense that it adopts a wholesale externalist point of view in which the individual appears to be an emergent property at complex interfaces of evolutionary processes on different levels, such as the evolution of neuronal structures in the brain or the evolution of technological artefacts. From the viewpoint of cultural science, there is no such thing as an autonomous individual, unless it emerges from evolutionary processes. This latter proposition can reconcile economics with cultural science, as cultural science maintains that there is a domain-specific validity of certain economic assumptions about the individual, insofar economic systems as artefacts are also external determinants of individual phenomena.

Cultural science rejects the fiction of the autonomous individual in economics.

This rejection of the autonomous individual has many consequences for economic analysis. One of the most obvious ones in the understanding of the Creative Economy is the understanding of creativity as a process property and not as an individual activity. Standard economics sees the roots of creativity in the individual, which entails an exclusive emphasis on the incentives and motivations for creative in the normative and positive analysis

of the institutional framework for creativity. Thus, standard economics always emphasises the pivotal role of intellectual property rights. This does not match with the cultural science framework, in which creativity is seen as a property of evolving networks of individuals and things related to them. In simple terms, creativity is a collective phenomenon, and it involves the role of things as mediators of human action, as they are external forms of knowledge. For example, when Watt struggled to preserve his patent rights on the steam engine, he effectively blocked a collective process of improving the steam engine in an evolutionary process of tinkering and experimenting by others, such that there were serious impediments for activating distributed knowledge in the networks of individuals and engines (Boldrin and Levine 2008: ???).

Correspondingly, creativity is seen as a collective property of an evolutionary process, but not as a kind of individual action. This has direct consequences for the established theory of intellectual property.

As cultural science extends the notion of creativity to the analysis of institutions, this role of intellectual property rights in the contemporary economies can be explained as going back on creative acts of their own sake. Evidently, it is of utmost importance to understand the role of conceptual blends in the creation of institutions, because this, for practical matters, also allows for critical reflections of metaphors. When economists strongly recommend intellectual property rights, they contribute to the performance of a particular kind of economy, and they do not simply describe functional necessities which seem to leave no other choices. The institution of intellectual property rights is based on a conceptual blend that equates knowledge with other goods on which possession can be claimed in principle, and presupposes corresponding properties such as the clear identification in space and time. It does not simply describe knowledge in terms of certain institutional possibilities, but it creates a particular kind of knowledge. As economists informed by cultural science, we can question this blend, based on our naturalistic understanding of knowledge, and we can propose other metaphors.

By stating a particular theory of intellectual property rights, economists perform a particular kind of economy.

In this sense, the Creative Economy can be conceived as an act of institutional creativity. Following our analysis of institutions, this raises the question whether the Creative Economy is also related with a new kind of

economic agent. This is a familiar topic from economic anthropology, where other transitions in economic systems have also been analyzed in terms of changing identities of agents, such as in the classical debate about the moral character of the peasant economy, which was challend by the universalist claims of economic rationality (???).

Agent identity is an essential difference between the cultural science approach and standard economics. All economic actions are seen as expressions of agent identity, and as actions maintaining and changing agent identity. Agent identity is a determining force of the emerging patterns of social interaction. In cultural science, economic analysis cannot be based on the notion of a universal rational agent. Against the background of externalism, this includes a fundamentally different approach to consumption, because agent identity is seen as externalised in consumption patterns, in the sense that consumption goods are mediators in the networks of economic action.

From the viewpoint of cultural science, different economic systems involve different agent identities.

This is not the place to add further detail to this proposition, but I wish to hint at the elaboration in the tradition of status preferences that was initiated by Veblen (???). Following the A/K model, consumption patterns correspond to social identities which themselves are embedded into social categorisations of status orders. Consumption is a process that reproduces social identities, and which gains its creative force in being also related with stating personal identities. Status preferences are a well-developed field in economics (Frank 1985; ???). Their recognition entails many changes in standard policy prescriptions in economics, such that cultural science becomes immediately relevant also for more practical concerns (Frank ???).

If cultural science posits that creativity is a collective process, there are also profound implications for distinction between consumption and production. Consumption patterns are also driven by conceptual blendings, and this means that creativity involves users and consumers of products as well as inventors and producers. Current discussions about ‘produsage’ (Bruns XXXX) and other processes in the Creative Economy reflect this

fundamental point.

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