
Evolution and Sustainable Development

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Abstract

This article explores the implications of employing an evolutionary perspective to the discourse on sustainability. For this purpose, Dawkins' concept of 'memes'—an attempt of drawing a systematic analogy from the evolution of species to the evolution of artefacts—is introduced along with recent further developments, namely by John Langrish who proposed to disaggregate the meme-concept into smaller and conceptually more manageable units: Recipemes, selectemes and explanemes. The article demonstrates the usefulness of this approach and points out the theoretical and practical implications for the sustainability discourse that become visible from such a 'memetic' angle. Among the most interesting themes is the memetic derivation of the concept of co-evolution between the social and the technical which has been discussed in the STS literature for a number of years. In a final section, the article presents a memetic interpretation of a 'strong' sustainability concept and uncovers its impracticality, thus highlighting the necessity for ethical and political action.

Introduction

If we boil down the plethora of analyzes and ideas within the bustling sustainability discourse we end up with two residues that can be dissected no further: technical fixes versus heroic choices. I described these two approaches to sustainable development elsewhere (e.g. Brand 2005) and demonstrated the usefulness of this re-description to conceptually grasp the prevailing sustainability discourse. The spectrum from technical fixes to heroic choices covers almost the whole breadth of the mainstream debate about sustainable development. Some perceive these two main strands as mutually exclusive (e.g. Tate & Mulugetta 1998 or Lamberton 2005) while others argue that sustainability is about employing both: a pinch of better technologies here (i.e. more efficiency) and a dash of more moral and ecosophic lifestyles (i.e. sufficiency) there. This article explores what analytical and practical consequences emerge if we apply Richard Dawkins' (1976) concept of 'memes' to this discussion.

For this purpose, the meme-concept will briefly be introduced along with some further developments by Langrish (2004) who attempted to disaggregate the concept into more handleable units. Memes, according to Dawkins, are the cultural pendant to genes, the essentials building blocks or defining features of man-made things. Just as a gene is not only able to but also 'wants' nothing else but to replicate itself, a meme, too, is a selfish and self-replicating unit of cultural achievement like a song, an idea, a technology, slogan, logo, theory, clothes fashion, ritual, dance; in short any kind of artefacts be it physically or mentally manifested. Whereas an organism serves as 'host' for genes (some might actually say: is exploited by genes), the human mind is the host for memes. Another way to put it would be to say that human beings are the bumble bees of memes. McLuhan made an almost identical comment, although with a strong pessimistic undertone, when he wrote that 'technology has reduced us to the "sex organs of machines"' (cited in Feenberg 1995, 5). Most readers will be familiar with a harmless but sometimes annoying version of this phenomenon of memetic exploitation: a sticky tune that colonizes our mind for hours.

Where the analogy to genetics gets especially interesting is when we apply the Darwinian notion of change to the development, improvement or deterioration of memes. This is a 'neo-Darwinian view of design change [characterized by] natural selection plus memes, their competition, their modes of transfer, and their transformation; i.e. memetics' (Langrish 2004, 15). In genetics, it is widely acknowledged that no gene *Is* (note the capital 'I') inherently better than any other gene. William James (1842–1910) remarked in this context over 100 years ago that 'the finch with the better-adapted beak isn't smarter or nobler than the other finches' (according to Menand 2001, 145–146). He, like many who firmly believe in evolution and natural selection, would agree, in a typically pragmatic fashion, that the beak of one type of finch might simply *work* better in the currently prevailing and largely contingent selection environment than the beak of another subspecies of finches. The reason could be that the finch with the long beak for example better manages to open fruits that happen to be available in its particular time and place than the one with a short beak. The former thus simply has a better chance of survival than

the latter; it is, however, by no means closer to an imaginary culmination of teleological development toward a final state of the ultimately best finch. In other words, genetic evolution is conducting blind trial and error. Genes mutate by random variation, and the result is either retained or discarded by their environment. Their 'survival value (...) is determined by the circumstances they happen to meet and not by any absolute criterion of superiority. Therefore, evolution by natural selection has no preordained goal, purpose, or direction' (Basalla 1988, 135). The plants and animals we see today are then the results of variations that have de-facto proven their fitness and continue to do so in the process of evolution. This does not, however, guarantee their survival until the end of time.

This position is not uncontested: The English philosopher Herbert Spencer (1820–1903), for example, subscribed to a progressive view of evolution toward higher levels of complexity but this view certainly is not, or not any more, a mainstream position. As Langrish bluntly puts it: 'Spencerian progress is nowhere to be seen, and should be consigned to the waste basket' (2004, 19). We can conclude at this point of the discussion, then, that all there is to the phenomenon of genetic change is that organisms whose genes make them well adapted to their environment have a higher likelihood to survive. No other magic, metaphysics, hope- or wish-driven mechanism required. This supports the above statement that the evolution of genes follows blind trial and error. Another position is known after the French naturalist and biologist Jean-Baptiste Lamarck (1744–1829). The core idea of Lamarckian change is that 'individuals adapt during their own lifetimes and transmit traits they acquire to their offspring. Offspring then adapt from where the parents left off, enabling evolution to advance' (Biocrawler 2006a). This idea has triggered lively debates from which those rejecting the notion of bequeathing acquired characteristics usually emerged victorious. For the genetic part of our discussion, the question of Lamarckian change is actually irrelevant. We will, however, revisit it further below in the context of memetics.

Drawing an analogy from genetics to memetics, we can say that those artefacts—ideas, words, habits, technologies, etc.—likely to be reproduced are the ones with memes that make them fit for their specific cultural environment. The concept of memes, for example, has proven its usefulness

as a linguistic tool, which is why it is still around in the academic environment.¹ This observation is exactly what Menand puts in the collective mouths of the fathers of American pragmatism, Dewey, James, Holmes Jr., and Peirce: ‘Ideas are not “out there” waiting to be discovered, but are tools—like forks and knives and microchips—that people devise to cope with the world in which they find themselves’ (2001, xi). Memes and finches therefore have in common that neither of them is inherently better than any other. Some memes might simply *work* better than other memes—either for their own replication (e.g. a computer virus) or for the purposes of those who have the power, money, influence and/or skills to ensure their replication in the form of a school book, patent, registered brand name, sermon or law. In most cases ‘perceived usefulness’ is the main criterion of fitness. This provides support for the above statement that those artefacts get reproduced that fit into the currently prevailing (and largely contingent) *social* selection environment. But again, there is nothing teleological to either genetic or memetic evolution just as ‘there is no [and there will never be] such thing as a perfect mammal, perfect kettle, perfect car or perfect tree’ (Langrish 2004, 5). If these things ever could exist it would be the end of history.

Laissez-faire versus intervention

If we accept this position and if we strive toward any kind of ‘better’ artefact, say, a better automobile, we thus have to admit a certain sense of irony. Ideological fervour for any better artefact would be ridiculous because there is no way of knowing that the improvement we have in mind is Really (capital R) better. Richard Rorty (1989) talks in a very similar sense about the ‘liberal ironist’ who is convinced about her position but who at the same time is aware that her position might not be True in an ultimate sense. History abounds with what we consider today terrible examples of people steadfastly pursuing their conviction of a better world and ending in disaster. This is what Schwartz Cowan means by ‘today’s mistakes may have been yesterday’s “rational choice”’ (cited in MacKenzie & Wajcman 1985, 261). Langrish puts the same idea into a

more evolutionary language: 'Our ideas of improvement are themselves subject to Darwinian change' (2004, 17–18), that is, they are contingent.

Is absolute relativism the inevitable corollary of this observation? This seems to be the case in the eyes of those who derive lethargy and resignation from this deliberation due to the angst that 'anything we do might be wrong'. Others, especially from the far-end corner of (neo-)liberalism, seem to interject that this is the wrong kind of question because if we all just roll up our sleeves for the benefit of whatever suits the individual, we should end up with a cumulative effect that is automatically also best for humankind. In their eyes a *laissez-faire* approach and unhampered markets can unleash the de-facto beneficial deeds of the invisible hand. Economist, neuroscientist and Nobel-winner Friedrich Hayek, for example, pleads for 'the party of life, the party that favors free growth and spontaneous evolution' (cited in Postrel 1998, 30). Among his like-minded comrades is Virginia Postrel, who shows 'how and why unplanned, open-ended trial and error—not conformity to one central vision—is the key to human betterment' (dynamist.com, 2002). Raskin et al. describe the adherents of this position as 'evolutionists [who] are optimistic that the dominant patterns we observe today can deliver prosperity, stability and ecological health' (2002, 9).

Although this debate has clear political implications it would be premature to make any political decision with long-term effects at that stage of the discussion because, again, some dispute the above relativistic position. Its critics claim that we know exactly where our memetic evolutionary journey ought to proceed and that we do have ways of telling whether any given or conceivable artefact is better than any other. Those who share this view can be classified into two main groups:

- (1) Members of the first might argue that certain memes are closer to or more congruent with ultimate Truths (again, note the capital T) in the Newtonian sense. This is what motivated Le Corbusier to proclaim his idea of progressing on the 'proper path' of architecture (according to Moore 2001, 13). Interestingly, the political consequence of this stance can also be anti-interventionist because the allegedly best solution will, sooner or later, prevail anyway. However, most followers of the

congruence-with-Truth idea are convinced that we can and should avoid unnecessary and obvious detours and focus our energies, staff time, funding resources etc. to walk down the pre- or even god-given path which, they claim, can be discovered by human beings. This position has come under massive attack in our postmodern, post-positivist, post-structuralist times. And the STS community (Science and Technology Studies), in particular SCOT (Social Construction of Technology), has made considerable contributions to overcome the naiveté of this position.

- (2) A second anti-relativist group employs moral imperatives to re-establish a superiority claim of some memes over others. Brulle is a representative of this camp because he argues that ‘ecological problems must be dealt with in much shorter time frames than can be anticipated for slow, gradual, or unintended social change. (...) We cannot leave this up to vague, indeterminate, undirected social change’ (2000, 6). Csikszentmihalyi supports this interventionist approach and exhorts us that ‘we have to take things in hand and shape the artifacts that will determine our future’ (1997, 47). From his analysis of the self-momentum of the memes of weapons and automobiles, he derives a call for memetic engineering or eumemics, that is, the attempt to ensure that ‘the memes that are going to colonize (...) the minds of our descendants are not going to be too detrimental to human survival’ (Csikszentmihalyi 1997, 47).

Many who are convinced of the superiority of one memetic destination over others—be it based on positivist, moral or practical ideas—might thus deliberately try to facilitate their reproduction through subsidies, education campaigns, purchases, investments, laws et cetera. But the fact that we can never know what will come around the next corner of evolutionary context and the reality of unintended consequences—termed ‘unconscious selection’ by Darwin (according to Langrish 2004, 14)—should nourish a certain degree of humbleness. Taking into account what has been said before we can even postulate the need for a double irony: First because human beings cannot know with certainty what the best memetic evolutionary destination is and second because they cannot know what the best means are to really get there.

The fact that we cannot articulate the non-existing final destination of memetic evolution, that is, we have no way of 'knowing what to strive for' (Langrish 2004, 16) in an absolutely correct sense, let alone how to get there, still leaves the idea of hope or striving intact. This brings us back to the discussion of Lamarckian change which, for Langrish 'could signify a process whereby change results from striving for improvement, and the further transmission of such improvement' (2004, 8). Whereas Langrish denies a Lamarckian nature of memetic change, the author of an online encyclopaedia claims that memetics 'behaves in a Lamarckian manner, highlighting the irony of a great deal of effort and debate devoted to proving [the opposite]' (Biocrawler 2006b). This position seems plausible because it simply says that artefacts and/or memes are often sequentially improved and that perceivably useful changes get reproduced. If someone finds a way to improve a web-browser in a way that most computer users find useful, it is realistic to expect that all future web-browser releases will have this improvement built into their memetic and literal code. Human beings have always clung to the idea of bequeathing acquired memetic traits in combination with the idea of striving for improvement. And while Langrish and I agree on the double irony, as I called it before, we part, however, over the question whether it makes sense for human beings to strive *nevertheless*.

It is my conviction that it would be utterly inhuman *not* to strive.² However, in order to minimize the risk of pursuing detrimental or even lethal goals with unsuitable or even fatal means both goals and means should be determined in an open, thorough and undistorted (Habermas, 1984) debate—with input from experts who can demonstrate, to the best of their knowledge, the causal mechanisms we ought to take into account. Whether or not we accept this normative call for democratic procedures in the pursuit of seeming improvement, it is clear that human beings cannot be stopped from striving. In other words, memetic evolution might be myopic but it is not blind because human beings have seemingly final or merely contingent desires, goals, aims, ambitions, dreams, beliefs, convictions, habits, routines, preferences and they will always try to intervene in the shaping of artefacts in a way to support their vision. Of course, memetic evolution does not care whether this vision is democratically legitimized and whether human activities are ridiculous attempts to control uncontrollable causal hyperwebs.

Two types of intervention

To recapitulate, arguments for political intervention stem from those who have a strong opinion on what direction the memetic evolution of our society either *will* or *should* take; and most people seem to subscribe to either of these two positions. Regardless of what motivates the argument for intervention (conviction of Truth or moral imperatives) both groups share a trait and a problem: The assumption that the effects of our actions can be anticipated and the impossibility to really do so. The former is genetically hardwired into human brains, at least for relatively linear short-term effects. We are, however, not well genetically equipped to deal with chaotic or near-chaotic long-term effects. And although the attempt to predict the effect of increased CO₂ levels in the atmosphere may appear hubristic and/or pathetic we are compelled to try. Human beings always have attempted to assess the effects of their actions *ex ante* and they always will seek to influence the future. Regardless of how good we are in this game of anticipation and planning two general *types* of possible memetic interventions appear and they resonate closely with the two basic strands within the sustainability discourse.

A first possible approach to shape the trajectory of memetic development is to influence the design of actual artefacts, to refine the ink of ball-pens, to optimize valve heads, or to improve safety features of nuclear reactors. This approach is, in its essence, about improving the recipe of how to do things. The second option to steer the future of memetic development is to influence the selection environment by introducing eco-labels on household appliances, tax breaks for hybrid cars or by subsidies for eco-farmers. The terms *recipeme* and *selecteme*, introduced by Langrish (2004), prove very useful to distinguish semantically and conceptually between these two basic subcategories of memes. In Langrish's own words, recipemes are 'transmittable ideas about how to do things—recipe ideas' (2004, 17). Selectemes are 'ideas about what sort of thing you want to do. They are involved in making decisions between alternatives. They {are} ... ideas about the marketplace, about fashion, and about the sorts of designs that their peers approve of' (Langrish 2004, 17). Selectemes also include 'ideas of desirability held by those who put up the money for the technology,

as well as ideas of desirability held by those who buy the products of the technology' (Langrish 2004, 18).

For those who prefer, like me, a graphical representation of what they think I attempted to cast the relationship between recipemes and selectemes into Figure 1. It shows the recipeme of, say a specific car model, inside a social selecteme. This depiction is inspired by Langrish who argued that 'recipemes (...) have to FIT into an environment of selectemes' (2004, 18). The two don't have the same shape. There are gaps and tensions at certain points which reflect a mismatch between, say the car's actual maximum speed and the socially desired maximum speed; or between the car's gas mileage and the socio-politically ideal gas mileage; or the car's design and the prevailing fashion for cars. Where mismatches get beyond a certain width, the car is likely to be a pretty slow seller or it will be outlawed. In order to avoid this, the car manufacturer will try to optimize the car's maximum speed, its gas mileage and its design. In memetic parlance, the car manufacturer will change the car's recipemes, which is a typical task for engineers. In this as in many cases where a decision on one of these parameters affects the others the best a producer can do is to find a balance that maximizes the fit with the selection environment as shown in Figure 2. In the context of sustainable development, this strategy closely resonates with the 'technical fix' approach.

An improvement of the fit between an artefact and its selection environment can also and equally logically be achieved through strategic changes to the latter (= selectemes) as shown in Figure 3. This is an integral part of all kinds of product policies. Typical examples are entrepreneurs trying to educate potential customers about advantageous product features, business associations jointly lobbying for product labels, politicians who actually introduce them and who grant tax breaks for certain products. Rohracher and Ornetzeder illustrate a selectemic intervention in the context of sustainable development: 'Many educational efforts and information strategies are targeting attitudes of users and aim at behavioral changes [such as] ... using public transport' (2002, 73). Some would argue, and rightly so, that this approach correlates to a 'social fix' agenda.

Figure 1. Recipemes and selectemes

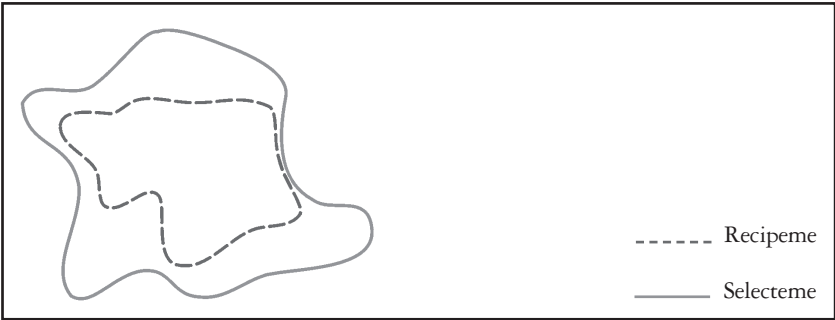


Figure 2. Changing recipemes to achieve a better fit with selectemes

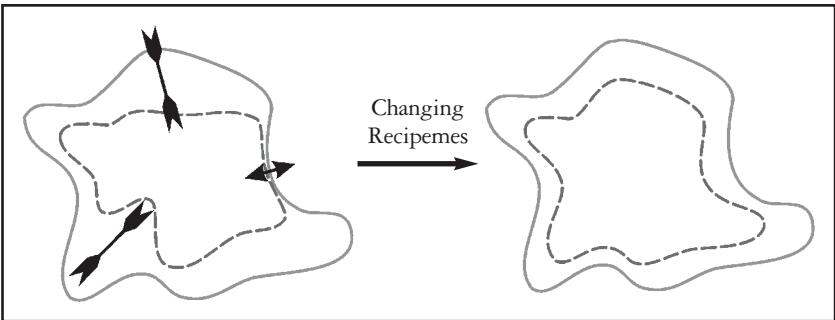
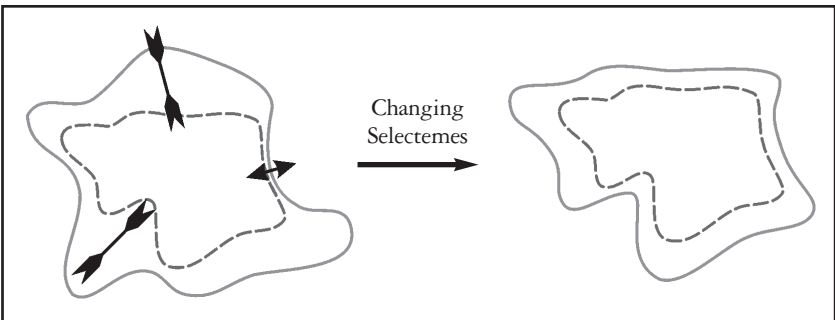


Figure 3. Changing selectemes to achieve a better fit with recipemes



Examples of oscillating memetic changes

Regardless of which strategy is pursued, what matters is that in the end, recipemes and selectemes become more congruent. For Langrish this is a process where ‘patterns of possibilities [recipemes] are compared with the patterns of need [selectemes] until there is a “click”’ (2004, 17). For Maria Abu-Risha, this is a task for ‘purposive pattern recognition’ (cited in Langrish 2004, 17). The following paragraphs contain some examples of the relationship between recipemes and selectemes and are intended to help digest and better understand the concept before proceeding to a third subcategory of memes.

Example I: The history of the bicycle is a good example of how selectemes have changed, not so much through deliberate human intervention but because they have proved obsolete. Early bicycles drew much non-technical criticism, even ‘condemnation from religious leaders, moralists, physicians and members of the public frightened by such an unusual machine’ (McGurn cited in Rosen 2002, 365). Nowadays, however, bicycles are ubiquitous and the reason for this certainly lies in part in their improved design (recipeme) but probably even more so in changed selectemes. People are not afraid any more of getting sick from riding a bicycle, sports has become an almost mandatory part of our modern lifestyle and environmental problems, traffic jams and petrol prices make many of us inclined to use the bicycle.

Example II: The automobile has extremely successful recipemes that have ‘found a medium of replication in the consciousness of humans’³ (Csikszentmihalyi 1997, 46). This has come about by linking the very idea of driving in a self-propelled machine to social status, the public belief in the auto-industry as a job creator, and especially the generation of their own indispensability through the facilitation of urban sprawl. If the social selection environment for cars changes, for example through new legislation, taste, rituals, cultural attitudes, etc., it is quite possible that their recipemes will become relatively less successful. At time of writing the prevailing automobile-recipe is indeed under pressure due to a change in the selecteme setting, partly due to a massively increased price for crude oil. Accordingly, US American consumers

purchased 274 per cent more hybrid vehicles in the month of August 2005 compared to the same month one year before (boerse.ARD.de 2005). The potential future recipeme-complex of automobiles could be electric vehicles. But if one day they become problematic because of the scarcity of rubber for their tires and ensuing taxes on rubber the recipemes of a car will have to respond to this change of selectemes again.

Example III: Nuclear energy fitted well in the 60's ideology of technological progress. The recipemes of nuclear power generation matched well with the prevailing socio-political selectemes, constructed around a belief in technological progress, engineering ingenuity and controllability of nature. After several nuclear accidents, culminating in the 1986 Chernobyl disaster, the social selection environment changed for nuclear energy which explains why ultimately, the German government has decided to phase this technology out over a period of 2 decades. However, this is not the end of history either because the memes of nuclear reactors have adapted (new safety mechanisms) and because the social selection environment has changed among some influential thinkers, including James Lovelock who has recently argued that nuclear energy is the lesser of two evils if compared to the greenhouse effect. This story of oscillation between recipemic and selectemic change seems to support William James' 'procedural model of truth where everything is in permanent transition toward something new, but never toward a predetermined truth' (Brand 2005, 74).

Co-evolution leads to sustainable constellations

We can therefore conclude that the essence of memetic evolution is all about the *constellation* between recipemes and selectemes. If we wish to influence the memetic trajectory we thus need to focus on the tensions and distortions between recipemes and selectemes, not about either of these two—see Figure 4. Schot puts the same observation in this way: 'Innovation (variation) and a set of context conditions (selection) *together* form a technological regime which guides processes of change' (1998, 175; emphasis added). To ignore this simultaneous two-sided mutual shaping process would mean to watch only 'half the court during a tennis game' (Latour 1992, 247). This is the

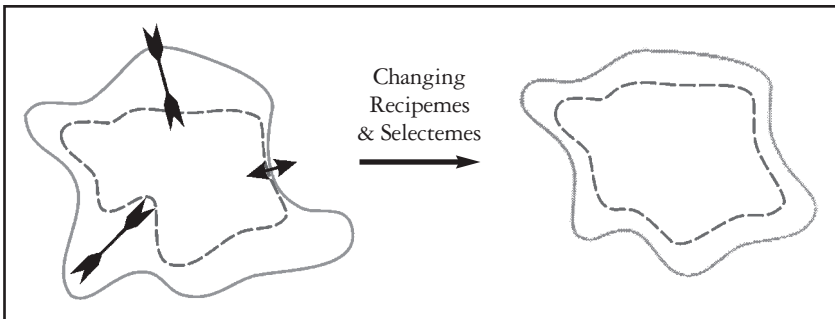
reason why there can never be such a thing as a sustainable recipe; its survival and reproduction is always dependent on the social selection environment. In typical STS parlance we can thus conclude that recipes and selectees co-evolve anyway. A step from this description into a more prescriptive realm should thus entail the recommendation to move from repudiated to strategically harnessed co-evolution and to focus on the facilitation of constellations that can be sustained. In a very literal sense, this seems to be the essence of sustainability. A constellation is sustainable if it has minimal distortions (i.e. small red arrows) between recipes and selectees. A co-evolution between the technical and the social helps to minimize these distortions. Therefore, I dare claim that the concept of co-evolution—in itself an artefact, an idea, a meme—is the better sustainability meme than isolated or uncoordinated efficiency or sufficiency approaches.

A range of authors has undertaken the very important and useful task to prepare the conceptual path for co-evolution or to explain it in more detail. Bijker and Law, for example argue in a co-evolutionary fashion—even though they did not use this particular term—when they assert that ‘social and technical change come together, as a package’ (1992, 11). Molina talks about ‘technical constituents and social constituents [and emphasizes] that in the technological process both kinds of constituents merge into each other’ (Molina 1993, cited in Hoogma et al. 2002, footnote 14, 32). This statement clearly is inspired by co-evolutionary ideas. This also applies to Schot’s criticism of Basalla’s (1988) and Mokyr’s (1990) attempt to develop an evolutionary account of technological change. Both treat variation (the generation of new recipes) and selection as separate processes while in Schot’s view, ‘variation and selection are deliberately combined. Promoters of technological development create expectations in order to explore and adjust the selective environment. Thus, there are various links between variation and selection and precisely these links are important to understand the dynamics of technological development’ (1998, 197). Guy and Shove talk explicitly about ‘the co-evolution of social and technical systems’ (2000, 131) and so do Rohracher and Ornetzeder who argue for a ‘fruitful co-evolution of technology design and use’ (2002, 74). Hoogma et al. take an evolutionary stance to explain the effectiveness of Strategic Niche Management. It harnesses a

co-evolutionary process of variation and selection, in which external selection pressures are anticipated by the innovator organization and incorporated into company R&D and production policies; the external selection environment in turn is shaped by the policies of the innovator vendor and a host of other actors who strive to promote (and control) a particular technology (Hoogma et al. 2002, 19).

Elsewhere (Brand 2005), I also elaborate on the idea of co-evolution and on the way this concept can be employed for sustainability goals. While this book is an attempt to provide advice on how, in very concrete terms, to organize co-evolutionary processes I am convinced of the need for even more practical recommendations, almost like toolkits, on this issue. While this can not be the purpose of this paper, it has at least shown that Langrish's concept of recipemes and selectemes serves as useful heuristic device to underpin the idea of co-evolution from an analytical perspective.

Figure 4. Changing recipemes and selectemes to achieve a better constellation.

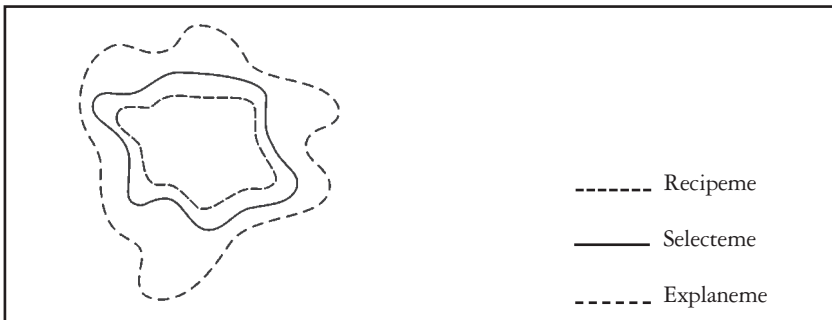


Explanemes

What has not yet been explored is the memetic interpretation of the fact that the social selection environment is itself a social product and is embedded in another selective environment. To use an earlier example: The selecteme 'let's subsidize nuclear energy' is dependent upon other, more generic and less technology-specific ideas like risk-perception,

notions of the good life, ethical standards and so on. These ideas provide the explanations of *why* we select some artefacts for reproduction and others for the idea bin. This consideration is what makes Langrish suggest another subcategory of memes: explanemes. They are ‘ideas that provide the basis for answering “why” questions’ (Langrish 2004, 17). Basalla makes the same point when he states that ‘ultimately, the selection is made in accordance with the values and perceived needs of society and in harmony with its current understanding of “the good life”’ (1988, viii). Explanemes provide the standards upon which we decide which selecteme to apply when ‘[s]electemes are in competition with other selectemes’ (Langrish 2004, 18). They can therefore be described as meta-selection memes and are depicted as such in Figure 5.

Figure 5. The relationship between recipemes, selectemes and explanemes



There are of course also distortions and tensions between explanemes and selectemes but the overall idea of improving their *constellation* still makes sense. So if we succeed in minimizing tensions between recipemes and selectemes *and* between selectemes and explanemes we can expect this constellation to be quite successful, to be reproducible or, in other words, to be sustainable. The idea of sustainable development proper seems to have found a conceptual representation in such a scenario. However, because social dreams, aspirations, and visions are part of this system, they cannot serve as reference point by which we can judge whether or not the

outcome of such a successful constellation is ‘really’ good. A Green Party representative in the US, for example, would argue that the following, smoothly nested meme-constellation is undesirable: Allegedly divinely-inspired, narratives (explanemes) are employed to explain why the national energy security (selectemes) vindicates the development of drilling technologies (recipemes) that can be used in the Arctic wildlife refuge. It seems, then, that another version of an earlier argument comes back here with its full thrust: We have no way of knowing what kind of explaneme we *should* adhere to. While many of us think they know, historical hindsight tells us that the needs that inspired our visions were constantly changing. ‘At one time need prompted the building of pyramids and temples, at another time it inspired movement about the earth’s surface in self-propelled vehicles, journeys to the moon, and the incineration and irradiation of entire cities’ (Basalla 1988, 13–14). In other words, there seems to be no way of ‘proving’ whether a development that can be sustained because of minimal intra-constellation distortions is good. Is this the point where knock-out relativism cannot be fought back any longer?

A memetic interpretation of advertisement seems to support this pessimistic outlook. Advertisement has drifted away from factual information about a product to the creation of a certain attitude to life, certain life styles and the shaping of ideals, wishes, dreams, ambitions, desires, goals, beliefs, convictions. This is, in essence, an explanemic intervention. If a company wants to sell a gas-guzzler it might of course lobby against tax increases on gasoline (selectemic intervention) but it will certainly also emphasize the autonomous life the owner of the new car can live, alone and very masculine at the summit of a winding unpaved road where only a powerful machine can take him—or her, but females are probably less likely to fall for this strategy. While some sustainability advocates might scold this approach as an outgrowth of unethical commercial greed, they are not unlikely to approve of similar manipulative approaches for their ideal. Awareness campaigns,⁴ for example, are a typical tool in the arsenal of environmentalists who try to sensitize people for technological risks, influence their appreciation of organic food or foster the adoption of ‘sophisticated modesty’ (Strong 2001, 5). In other words, explanemic approaches try to influence the public perception of usefulness and desirableness, they try to make things *sexy*.

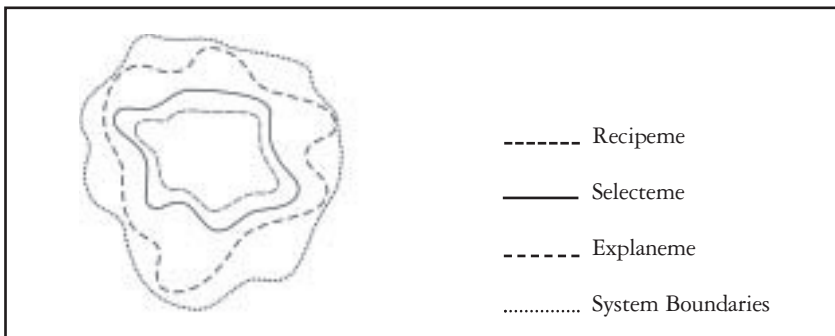
System boundaries

The inability to define absolute explanemes still threatens to drown us in a sea of absolute relativism. Luckily, Richard Rorty offers a life-saving argument which seems to be immune against all kinds of relativistic encroachments: Pain and humiliation. Every human being, Rorty argues, perceives these phenomena in the same way, so it would be nonsense to subject them to individualistic interpretation. In a good society, then, those types of recipeme-selecteme-explaneme constellations are likely to be reproduced in the long-run that prove to be effective in the elimination of pain and humiliation. But unfortunately, there is evidence that this normative imperative is not always adhered to. After all, there have been barbaric times when an ideology of folkish supremacy (explanemes) provided the rationale for a genocide on Jews (selecteme) and thus justified the production of Cyclon-B Gas (recipeme). And for several years, this constellation has actually been terribly successful. The best we can thus do seems to be the development of explanemes under the participation of everyone. This is a call for a participatory and democratic definition of the good life and of the definition where the good life starts to collapse. Once this has been achieved, we should try to monitor our collective drift in relation to this fixed goal—no matter how arbitrary it might be as long as it has been defined in an undistorted debate. This is the idea of *striving* being harnessed for human and humane purposes.

If we cannot agree on a definition of the good life or if we collectively decide to pursue ultimately lethal goals there is still one final systemic border. This assumption rests with the idea that all types of memes are again nested within a larger environment as depicted in Figure 6. This fourth shell is meant to demonstrate that explanemes, too, have to prove their fitness within their environment. Although Langrish does not spell out this idea he seems to share this view at least implicitly because he states that ‘as a society, we can use reason to attempt to make improvements, but there always is uncertainty about outcomes so we still are left with a Darwinian natural selection system underpinning our efforts’ (2004, 14). The notion of an outer, absolute and incontestable environment rests on the premise that there is reality ‘out there’. In this question I side once

more with Rorty, who suggests that there is a ‘distinction between the claim that the world is out there and the claim that truth is out there’ (1989, 4). The criterion of fitness in this case is the avoidance of systemic collapses; be this the financial breakdown of a national pension system or the collapse of the Gulf-Stream. The concepts of ‘environmental space’ (Opschoor, 1994) or ‘ecological footprint’ (Wackernagel & Rees 1999) are attempts to determine final criteria for system overshoot. According to Meadows et al.’s report ‘Beyond the limits’ (1992) we have already violated absolute eco-systemic boundaries. But despite the fact that effects described by these authors have turned millions of people into environmental refugees the world is still spinning. This is not tasteless cynicism but merely evidence for the fact that even systemic collapse is a matter of degree and thus subject to interpretation and power plays.

Figure 6. System boundaries as ultimate frame of reference for all memes



Total collapse can only be detected with certainty in retrospect. Obviously, we should not rely upon such ex-post evaluations. Not because nobody would be around any more to appreciate this knowledge but because the path toward collapse entails huge amounts of suffering for large parts of the global population, including non-human life—whether or not one cares for the latter does actually not matter much. We have been at this point of the discussion already and I suspect there is no Archimedean point to which we can resort. The evolutionary and memetic

discourse about sustainable development is a recursive venture. There is, then, no alternative to the tedious and messy project of permanently setting, assessing and readjusting common goals and of hammering out man-made yardsticks that can tell us whether we are drifting toward or away from them. There will not be definitive and undisputed answers but this is as good and noble as our human situation will ever get. This is, by the way, exactly what Dawkins emphasized in the same chapter in which he introduced, or popularized, the concept of memes:

One unique feature of man, which may or may not have evolved memetically, is his capacity for conscious foresight (...) A simple replicator, whether gene or meme, cannot be expected to forgo short-term selfish advantage even if it would really pay it, in the long term, to do so (...) Even if we look on the dark side and assume that individual man is fundamentally selfish, our conscious foresight—our capacity to simulate the future in imagination—could save us from the worst selfish excesses of the blind replicators. We have at least the mental equipment to foster our long-term selfish interests rather than merely our short-term selfish interests. We are built as gene machines and cultured as meme machines, but we have the power to turn against our creators. We, alone on earth, can rebel against the tyranny of the selfish replicators (1976, 200–201).

Because our 'long-term selfish interests' is not pre-given the argument is forced to go back once again—this time, however, with more optimism—to the aforementioned challenge to collectively define the good life in an open, undistorted and inclusive debate. In memetic terms: We should focus on the development of really good explanemes at all political levels.

Conclusion

Some of the ideas presented in this paper are mere reproductions of earlier ones, others are, to the best of my knowledge, new. Among the old ones is Dawkins' concept of memes and Langrish's distinction between recipemes, selectemes and explanemes. The latter also suggested, at least implicitly, that recipemes can be understood as *nested* within selectemes. What I consider a genuinely new contribution to the discourse on the evolution of artefacts is the 'babushka model', the cascading nesting of recipemes,

selectemes, explanemes and ultimately system boundaries. Probably a more speculative statement is the idea that distortions or boundary violations are more severe in terms of human suffering the closer they are to the outer shells. What I would defend more firmly, however, is my focus on *constellations* between adjacent shells which can be seen as a memetic derivation of what other authors have termed co-evolution.

What difference do these considerations make? They face the same challenge like all ideas: Selection. How many people are likely to adopt and reproduce these ideas; and how influential are they? Is the babushka model and all the rest able to be sustained? Since I do not want to advertise these ideas beyond a reasonable amount I tend to rely on their perceived usefulness. In this regard I think the prevailing selectemes for sustainability-related ideas are rather receptive for the babushka model. Humankind has agreed on some, albeit vague, goals in documents like *Agenda 21* (UNCED, 1992) and the search is on for the best approaches to achieve these goals. The thoughts offered in this paper could be one part of a systematic search heuristic for suitable approaches. The notions of efficiency and sufficiency as well as the working principles of co-evolution, for example, are now better visible and the advocates of co-evolution seem to have new, memetic, ammunition for their cause. It does not seem unreasonable to expect that the babushka model and the idea of co-evolution will see their usefulness erode one day. But as of now it seems equally reasonable to expect that they can mobilize some potentials yet untapped.

Notes

- 1 The search engine Google produces 11,800,000 hits for the query 'meme' even if hits for the French word 'mème' are excluded, www.google.com/search?as_q=meme&lr=lang_en.
- 2 This is not to say that the Buddhist idea of removal of desire is inhuman. Quite the opposite, behind this idea lies the desire to put an end to human suffering (see for example Lamberton 2005).
- 3 Csikszentmihalyi made this point originally with reference to weapons, but from what follows in his text it becomes clear that he would not hesitate to apply this expression to the automobile as well.

- ⁴ An example might be useful here to clarify the distinction between selectemic and explanemic intervention: Governmental financial incentives for insulation of buildings is a selectemic intervention. A change of people's attitudes toward money with the hope that they invest in insulation even if it does not pay back quickly is an explanemic intervention.

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