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Managing multilevel cultural evolution in theory and practice

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Managing Multilevel Cultural Evolution in Theory and Practice

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Abstract

Cultural evolution is taking place all around us, whether we want it to or not. Left unmanaged, it is far more likely to result in problems than solutions. This article is a progress report on the theory and practice of managing multilevel cultural evolution, based on a grant awarded by the UK's Economic and Social Research Council's "Rebuilding Macroeconomics" program.

Rapid cultural change is taking place all around us, most of it unwanted and out of our control. What the world needs now is not love (although that is part of it), but the ability to manage cultural change so that it leads to positive outcomes at all scales, from individual well-being to the planet.

Every person and organization with a prosocial orientation—meaning the desire to benefit others and society as a whole, with oneself among the beneficiaries—is earnestly attempting to manage cultural change—and some of them are successful! The point of this article is not to assert that nothing works except for my new magic bullet. Positive cultural change methods have arisen again and again, throughout history and in the present, converging on better practices and spreading to a degree based on their success.

That's the good news. The bad news is that positive change methods almost always come up against boundaries, which might be geographical, cultural, or topical, beyond which they are unknown. For example, a positive change method that originates in the business world does not easily spread to government, education, agriculture, community activism, or personal improvement. It doesn't even easily spread to all sectors of the business world. And decades are often required for positive change methods to spread to the extent that they do. The very idea that what works in one context might work in all contexts is likely to strike many readers as new.

Something more general and rapid than separate context-specific solutions is required to solve the problems of our age. That "something" is a general theory of multilevel cultural evolution,

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which has only become available during the last several decades. This theory *is* a new magic bullet of sorts because it can be used to manage positive cultural change at multiple scales for any culture and topic area. With a little know-how, the rate of positive cultural change can be catalyzed so that it takes place in a matter of years rather than decades or centuries.

Why a general theory of multilevel cultural evolution only emerged during the last few decades, and why the practical application of the theory is even more recent, are complex topics that will only be touched upon here. The specific focus of this article is to report on a grant that I received from the United Kingdom's Economic and Social Research Council (ESRC)—specifically its “Rebuilding Macroeconomics” program—which had two modest objectives. The first objective was to rethink economic theory from a multilevel evolutionary perspective, in collaboration with the world economist Dennis Snower. The second objective was to actually begin catalyzing the process of positive multilevel cultural evolution in the UK, with sustainability as the focal topic and the help of my nonprofit organization Prosocial World (www.prosocial.world).

Managing Multilevel Cultural Evolution in Theory

This section will briefly summarize my collaboration with Snower, which will fully appear in separate publications. Our academic backgrounds nicely complement each other. As former president of the [Kiel Institute for the World Economy](#) and current president of the [Global Solutions Initiative](#) few people have greater inside knowledge of the economics profession. I am trained in evolutionary theory and at the forefront of establishing multilevel selection as a general framework within the biological sciences, including my 2007 article with Edward O. Wilson titled “Rethinking the Theoretical Foundation of Sociobiology” (Wilson and Wilson 2007; see also Wilson 2015). Dennis and I have also familiarized ourselves with each other's disciplines, paving the way for a smooth collaboration. I have been studying economics from an evolutionary perspective for over a decade (Wilson and Gowdy 2013, 2014; Wilson, Ostrom and Cox 2013; Wilson and Kirman 2016) and Dennis has been absorbing MLS theory and incorporating it into his own writing (Snower 2018, 2019).

Our rethinking of economic theory includes the following building blocks:

Beyond individualism. Individualism—often modified with the word “methodological”, is a commitment to treating the individual person as the fundamental unit of analysis, to which all things social must be reduced. It is sometimes called the one common denominator of all schools of economic thought (e.g., behavioral economics in addition to the rational actor model), but it goes even further than that, pervading all of the social sciences and my own field of evolutionary biology during the second half of the 20th century (Campbell 1994). At the same time that economists were attempting to explain everything in terms of individuals maximizing their utilities, evolutionists were attempting to explain everything in terms of individuals maximizing the fitness of their selfish genes (Williams 1966, Dawkins 1976).

We need to return to the 19th and first half of the 20th century to remember a robust alternative to individualism: The view of society as itself a kind of organism whose properties cannot be reduced to individual psychology or even biology (Wegner 1986). This is how the disciplines of sociology and cultural anthropology established themselves, represented by figures such as Emile Durkheim, who also emphasized the importance of symbolic meaning systems in the anatomy and physiology of the group organism: “In all its aspects and in every period of its history, [human society] is made possible only by a vast symbolism” (Durkheim 1912, p266).

Durkheim’s tradition of group-level functionalism had its day but was eventually largely rejected as too axiomatic, as if every feature of every culture must be interpreted as for the good of the group. Also, the tradition did not provide a strong account of how cultures become adaptive at the group level or the role of individual agency. Hence, when Weber, Schumpeter, and others began to insist that sociological explanations be rooted in individual thought and action, they had a strong point. But when individualism is taken to imply that groups cannot evolve into functionally organized units, then a very important baby is being thrown out with the bathwater!

In an admirable review of Methodological Individualism in economics and the social sciences, Hodgson (2007) shows that it is emphatically not a unified intellectual tradition. As he put it (p 211): “As in most sciences, the majority of economists do their work with little explicit reflection on the philosophical assumptions that underlie their research.” Calling Macroeconomic theory individualistic is especially strange because the main entities of the theory--households, firms, and states--are all groups of individuals. The only thing that qualifies them as individuals is that they are assumed to behave as rational actors—an assumption that is just as axiomatic as the functionalist assumption that all aspects of cultures are for the good of the group.

Rethinking economics begins with rethinking individualism in all its forms. That’s where Multilevel Selection (MLS) theory comes in, which identifies units of functional organization on a case by case basis, as described in more detail below. One reason that a general theory of multilevel cultural evolution only emerged during the last few decades is that evolutionary theory had to advance beyond its own individualistic swing to embrace a multilevel view of genetic evolution (Wilson and Wilson 2007; Wilson 2015).

Beyond physics and the necessity of functional analysis. Economic theory is commonly critiqued as rooted in a 19th century conception of physics, as if there could be a “physics of social behavior” comparable to Newton’s laws of motion (Beinhocker 2006). Nobody put this better than Thorstein Veblen in his 1898 article “Why is Economics not an Evolutionary Science? (p 389-90)”

In all of the received formulations of economic theory, whether at the hands of English economists or those of the Continent, the human material with which the inquiry is concerned is conceived in hedonistic terms...The hedonistic conception of man is that of a

lightning calculator of pleasures and pains, who oscillates like a homogenous globule of desire of happiness under the impulse of stimuli that shift him about the area, but leave him intact. He has neither an antecedent nor consequent. He is an isolated, definitive human datum, in stable equilibrium except for the buffets of impinging forces that displace him in one direction or another. Self-poised in elemental space, he spins symmetrically about his own spiritual axis until the parallelogram of forces bears down upon him, whereupon he follows the line of the resultant. When the force of the impact is spent, he comes to rest, a self-contained globule of desire as before. Spiritually, the hedonistic man is not a prime mover. He is not the seat of a process of living, except in the sense that he is subject to a series of permutations enforced upon him by circumstances external and alien to him.

Newtonian physics was non-teleological and in fact was part of a revolt against the teleological physics of Aristotle. Here is how Veblen envisioned economics as an evolutionary science (p 390-391):

According to this conception, it is the characteristic of man to do something, not simply to suffer pleasures and pains through the impact of suitable forces. He is not simply a bundle of desires that are to be saturated by being placed in the path of the forces of the environment, but rather a coherent structure of propensities and habits which seeks realization and expression in an unfolding activity...Economic action is teleological, in the sense that men always and everywhere seek to do something. What, in specific detail, they seek, is not to be answered except by a scrutiny of the details of their activity; but, as long as we have to do with their life as members of the economic community, there remains the generic fact that their life is an unfolding activity of a teleological kind.

The fact that Veblen was able to spot the watershed difference between economics as a branch of physics and economics as an evolutionary science over 120 years ago, when Darwin's theory was brand new, suggests the need to return to basics, before immersing ourselves in the vastly more sophisticated bodies of theory that both economics and evolution have become.

Living systems differ from non-living systems in two major respects. First, they include entities that exhibit *functional organization*; that is, are well designed to survive and reproduce in their environments. Second, unlike the elements of the periodic table, the properties of organisms are malleable (heritable variation) and therefore change over time in response to selection pressures. Economics as an evolutionary science must reflect these two properties of living systems in both theory and practice.

The study of functionally organized units requires a method of reasoning that is unavailable for the study of nonliving systems. To appreciate the difference, imagine being assigned the task of analyzing two objects; a snowflake and a fruit fly. The snowflake has plenty of structure that arose from the process of ice crystallization, but it is not designed to *do* anything. The only way to analyze it is in physical terms. In contrast, the fruit fly is designed by natural selection to survive and reproduce in its environment. This fact will dominate your entire method of

analyzing the fly. The individual organism will become an anchor of analysis. Everything below the level of the organism—its organs, cells, and molecules, — will be analyzed in terms of their contribution to the functioning of the whole. Everything above the level of the organism—such as fly populations and multi-species ecosystems that include the fly, will be analyzed as a complex system composed of agents following their respective adaptive strategies.

In the study of complex adaptive systems (CAS), a critical distinction needs to be made between a complex system that is adaptive *as a system* (CAS1) and a complex system *composed of agents following their respective adaptive strategies* (CAS2; Wilson 2016). A fruit fly qualifies as CAS1. A population of fruit flies or an ecosystem that includes fruit flies qualifies as CAS2. The most important point to keep in mind is that, except under special circumstances discussed in the next section, *CAS2 systems do not self-organize into CAS1 systems*. For example:

- Natural selection might increase the reproductive rate of individual fruit flies, resulting in population dynamics that become chaotic (Philippi et al. 1986).
- In many species, infanticide—killing the babies of others to have one's own babies—is a major source of infant mortality (Van Schaik and Jansen 2000).
- In many species of migratory birds, females experience higher mortality than males during migration and on the wintering grounds because the males claim the best habitats for themselves. This benefits the individual males but contributes to the decline of the bird populations (Greenberg et al. 2005).
- When beavers move into an area, they transform the ecosystem in ways that are best understood as increasing the fitness of beavers. Collateral effects on other species and changes to ecosystem processes such as nutrient cycling are primarily byproducts of the adaptive strategies of a single keystone species (Bailey et al. 2004).

The fact that CAS2 systems do not robustly self-organize into CAS1 systems calls the very concept of a balance of nature into question. Evolutionary ecologists have largely abandoned the notion that nature, left to itself, strikes some kind of harmonious balance (Bodkin 1990). Instead, natural biological systems are frequently out of equilibrium or can settle into one of many basins of attraction. The word “ecological regime” is used to describe a stable assemblage of species (Biggs et al., 2009), a term that aptly invokes what we already know about human political regimes. In human life, the word “regime” implies a degree of stability but says nothing about how well the regime functions for the common good. Human regimes span the range from despotic to inclusive. Biological regimes are no different. The rejection of the balance of nature concept in evolutionary ecology calls for the rejection of the invisible hand concept in economics, at least in its current form, as described in more detail below.

To summarize, because the individual fruit fly is a functionally organized unit, it becomes an anchor of analysis, governing how we study everything below the level of the individual (its organs, cell, etc.) and everything above the level of the individual (populations, ecosystems, etc.) although in different ways. We could make the same points for a human-made implement such as an old-fashioned pocket watch or even the constructions of nonhuman species such as

a beaver dam or bird nest. Knowing that a watch is designed for the purpose of keeping time, you would study all of its parts in terms of their contribution to the whole. You might also study watches as part of larger systems, but you wouldn't necessarily assume that those larger systems are themselves like a watch, with the watch serving as a kind of a cog.

A major point to make about functionally organized units, whether a biological unit such as a fruit fly or a human implement such as a watch, is that their organization is not *entirely* functional. Evolution—including technological evolution—is an historical process, resulting in adaptations that are more like Rube Goldberg devices or what a tinkerer would assemble from spare parts, rather than what an engineer would produce. Adaptations have byproducts that themselves have no function, such as the color of blood or the triangular spaces (spandrels) that are formed when arches are placed next to each other (Gould and Lewontin 1979). Some traits evolve by chance (e.g., genetic or cultural drift) rather than by contributing to survival and reproduction. Any given trait is part of a developmental system and cannot be analyzed atomistically.

A final category of non-function or dysfunction at the level of individual organisms is evolutionary mismatch. As an example, many species of aquatic insect evolved to use reflected light as a cue to find bodies of water when they are in flight. This results in a fatal attraction to manmade reflective surfaces such as glass buildings and solar panels (Horvath et al. 2010). An adaptation to an earlier environment has become maladaptive in the present environment and only subsequent evolution or a human intervention can remedy the situation. Evolutionary mismatches abound in human life and our impact on the planet has created mismatches for nearly every species on earth (Giphart and Van Vugt 2018).

Levels of functional organization. The previous section might seem to lend support for the intellectual tradition of Individualism, which treats the individual organism as a privileged unit of analysis. But this is true only insofar as the individual is the unit of selection. For example, imagine repeating the example of the fruit fly with a social insect such as a honeybee. The individual bee is a unit of functional organization in some respects but in other respects it is more like a cell participating in the functional organization of the hive. Its cell-like status is due to the fact that many traits in honeybees evolved on the strength of causing hives to survive and reproduce better than other hives, as opposed to individual bees surviving and reproducing better than other bees within the hive. Insofar as the hive becomes the unit of selection, it becomes the anchor of functional analysis (Seeley 1995, 2020; Holldobler and Wilson 2008).

Cancer can be used to make the same point (Aktipis 2020). Cancer is the process of natural selection among cells within multicellular organisms. A cell that proliferates at the expense of neighboring cells is adaptive in the evolutionary sense of the word. Since evolution has no foresight, the fact that cancer cells eventually bring about their own demise is only to be expected—like fruit flies that destabilize their population dynamics with their high reproductive rates. With honeybees, we need to go above the level of the individual organism to find the unit of functional organization. With cancer, we need to go below the level of the individual organism to find the unit of functional organization.

This is why MLS theory, properly understood, provides a paradigmatic alternative to both Individualism and the tradition of group-level functionalism that preceded it. Those traditions were axiomatic about individuals and groups, respectively, as the unit of functional organization. MLS theory is capable of identifying units of functional organization on a case-by-case basis and also identifying the absence of functional organization.

The key to identifying levels of functional organization in nature is by making a nested series of relative fitness comparisons. Genes that outcompete other genes within the same organism become like cancers. Genes that cooperate with other genes within the same organism to outcompete other organisms lead to functionally organized individuals, who often behave cancerously toward other individuals. Individuals (and their genes) that cooperate with other individuals in their social groups to outcompete other social groups become part of functionally organized units that are larger than themselves. Even whole ecosystems can become functionally organized if they are selected as units, such as our microbiomes, which live and die as units along with our genes (Yong 2006).

It is important to stress that competition and cooperation are not alternatives. Instead, lower-level agents *cooperate to collectively compete* with other agents in their environment. In addition, one of the most powerful forms of cooperation is *competition orchestrated for the common good*. The adaptive component of the immune system provides a biological example. It is a healthy competition among B-cells to produce antibodies that protect the whole organism from disease. The reason that the competition is healthy is because it has been shaped by millions of generations of selection at the level of the whole organism. Individuals with B-cells that did not compete constructively were not among our ancestors. Examples of both healthy and unhealthy competition abound in human life.

Levels of functional organization in humans: Having briefly reviewed MLS theory in the biological sciences, the following bold claim can be made for our species: We are a product of higher-level selection at multiple scales, starting at the scale of small groups and tribes during our genetic evolution, and continuing at ever larger scales during the last 10,000 years of human history. Today, cultural multilevel selection is taking place all around us, if we know what to look for.

Despite sharing 99% of our genes with chimpanzees, there is a night-and-day difference in the degree of cooperation. Chimpanzee communities exhibit a little cooperation and a lot of conflict. Naked aggression is over 100 times greater than in small scale human societies. Even cooperation typically takes the form of alliances competing against other alliances within the same community. The main form of community-wide cooperation is solidarity against other chimpanzee communities (Boehm 1999; Wrangham 2019). In laboratory experiments, chimpanzees are so disinterested in each other's welfare that, when given a choice between a reward for themselves vs. the same reward for themselves plus a reward for another chimpanzee (similar to behavioral economics experiments performed on humans), they are indifferent to the choice (Silk et al. 2005).

Something happened during the evolution of our species that resulted in a quantum jump of cooperativity. To the best of our knowledge, that “something” was social control. Our distant ancestors found ways of suppressing bullying and other forms of disruptive self-serving behaviors within small groups (Boehm 1999, 2011). Increasingly, this is being studied as a form of self-domestication, similar to the domestication of our animal companions (Wrangham 2019; Hare and Woods 2020).

In terms of MLS theory, social control suppressed disruptive within-group selection, making between-group selection the primary evolutionary force. The result was an increase of cooperativity in all its forms, both mental and physical. Physical forms of cooperation include hunting, gathering, childcare, modification of the physical environment, defense against predators, and offense and defense against other human groups. Mental forms of cooperation include perception, memory, decision-making, the formation of norms enforced by punishment, and a capacity for symbolic thought vastly greater than any other species (Deacon 1999; Jablonka and Lamb 2006).

The ability to maintain an inventory of symbols with shared meaning and to transmit the inventory across generations resulted in a new process of evolution—cultural evolution—that evolved by genetic evolution and has been coevolving with it ever since (this is called dual inheritance theory; Boyd and Richerson 1985; Richerson and Boyd 2006; Richerson, Boyd, and Henrich 2010). Because cultural evolution is much faster than genetic evolution, it enabled our ancestors to spread throughout the planet, adapting to all climatic zones and dozens of ecological niches. Then the ability to produce our own resources led to an increase in the scale of human society, leading to the megasocieties of today. Against this background, Durkheim’s statement that human society is only possible thanks to a vast symbolism acquires a modern ring.

Of course, symbolic thought can operate on behalf of disruptive lower-level selection in addition to higher-level selection. Increase in the scale of human society was not continuous. Human cultural evolution is a multilevel process, no less than genetic evolution. Cooperation at any given scale is vulnerable to disruption from within (the social equivalent of a cancer) and is itself disruptive at larger scales. A new breed of historian is reinterpreting human history from a cultural multilevel perspective (Turchin 2005, 2015). As a striking example, Josiah Ober, professor of political science and classics at Stanford University, explicitly compares the Greek city-states (poleis) to ant colonies and attributes the remarkable efflorescence of culture during Greek’s classical period to the establishment of democratic governance within some poleis, giving them an advantage in economic and military competition against other Greek poleis and adjacent empires (Ober 2015). When democracies are replaced by oligarchies and autocracies governed for the benefit of a small group of elites, innovation and entrepreneurship tends to grind to a halt.

What took place in ancient times is also taking place in the present, chronicled in books such as “Making Democracy Work” (Putnam 1993), “The Spirit Level” (Pickett and Wilkinson 2009), “Why Nations Fail” (Acemoglu and Robinson 2012), and “The Origins of Political Order” (Fukuyama 2012). Like Ober, these authors are trained in the social sciences, especially the “new institutional economics” pioneered by Douglas North, but are increasingly appreciating the added value of modern MLS theory. They are joined by people such as Peter Turchin (cited above), whose primary training is in evolutionary theory and population dynamics. Turchin’s (2016) “Ages of Discord: A Structural-Demographic Analysis of American History”, should be essential reading for anyone wishing to understand the booms and busts of democracy in America and how to pull out of our current age of discord. My conversation with Turchin in the online magazine *This View of Life* (Wilson and Turchin 2020) provides a broad overview accessible to a general audience.

To summarize, economics as an evolutionary science must be centered on units of functional organization, just like the biological sciences. And units of human functional organization are richly multilevel. Individuals *never* lived alone during our entire history as a species. They were *always* embedded in small and for the most part highly cooperative groups, however much those groups warred with other groups. This dependency of individuals upon their groups is baked into our brains and bodies in ways that require going beyond the strictures of individualism to discover. Historical and institutional schools of thought in political science and economics are already part of the conceptual integration that is starting to take place. Against this background, the school of economic thought centered on individual utility maximization is looking increasingly like a dinosaur.

To make matters even more complex, every individual person participates in multiple groups and has the amazing ability to recognize and behave in ways that are appropriate for the particular context. This has always been the case, all the way back to fission-fusion hunter-gatherer society. This means that individuals can function as lower-level disruptive agents in some contexts and higher-level cooperative agents in other contexts.

This might seem hopelessly complex from a theoretical standpoint, compared to the comparatively simple task of predicting the behavior of utility-maximizing agents. Nevertheless, evolutionary theory manages to deal with the more complex situation and economic theory can also, as outlined in more detail below.

Rethinking the invisible hand. From a MLS perspective, the idea that the lower-level pursuit of self-interest robustly benefits the common good, as if led by an invisible hand, isn’t just wrong. It’s as wrong as it can possibly be. The fact that the invisible hand conjecture can be mathematically proven, given assumptions that never pertain in the real world, is beside the point. In the real world, cooperative arrangements are always vulnerable to disruption, cancer-like, from within and are themselves likely to be disruptive at higher scales. In the absence of higher-level selection, agents pursuing their respective adaptive strategies merely result in

CAS2 systems and do not self-organize into CAS1 systems. This is why the concept of a balance of nature has been rejected in the biological sciences.

CAS1 systems evolve only by a process of system-level selection. When this happens, then the agents within the system indeed act to benefit the whole system without necessarily having the welfare of the whole system in mind. Put another way, system-level selection *is* the invisible hand, winnowing the lower-level behaviors that benefit the whole, like needles from the haystack of lower-level behaviors that would disrupt the whole (Wilson and Gowdy 2014).

Nature abounds with examples. The cells within multicellular organisms and ants within a colony don't have the interest of their higher-level units in mind, since they don't even have minds in the human sense of the word. They have simply been programmed by higher-level selection to respond to their local environments in ways that contribute to the common good.

Human units of functional organization are no different. Unlike cells and ants, humans are capable of behaving with the welfare of their whole societies in mind, but more often they are responding to their local concerns, although not necessarily in a way that resembles *Homo economicus*. Often these lower-level concerns merely result in CAS2 systems, which do not function well as whole systems. When higher-level genetic or cultural evolution results in a human CAS1 system, however, then their members indeed behave, as if led by an invisible hand, to benefit the common good without necessarily having it in mind.

An example from the smart cities movement will help to make these ideas less abstract and begin to segue to the practical application section of this article. The very concept of a smart city envisions a large human population as a CAS1 system, capable of making decisions that qualify as smart in the same sense that a smart individual makes good decisions. The reason that a movement is required is because most cities are not smart. Without some kind of management, they merely become CAS2 systems, not CAS1 systems, and there is no invisible hand to save the day. For example, individuals optimizing their driving decisions do not make for smooth traffic flow, any more than fruit flies maximizing their reproductive rate makes for smooth population dynamics.

One innovation of the smart cities movement is 311, a three-digit telephone number that can be called to report any minor dysfunction, such as a fallen tree, a pot hole, a failed garbage pickup, or a streetlight that needs its bulb replaced (O'Brien 2019; for an online conversation on this topic, see Wilson and O'Brien 2020). It originated as a cultural mutation in the city of Baltimore, with the purpose of handling calls that were inappropriate for 911, the number that is called to report emergencies. Soon it became apparent that 311 could be useful in its own right by turning the citizens of a city into a kind of perceptual organ, relaying information to city service departments, eliminating their need to gather the information for themselves. Terms such as the "eyes and ears of the city" began to be used, once again invoking the image of a superorganism.

Yet, actually designing 311 to function as a perceptual organ for a whole city required a whole-city systemic approach. Merely making the service available wasn't good enough because it would be used differentially by various ethnicities and demographic categories, requiring adjustment to insure equity. In the process of promoting use of the system in Boston, it was discovered that most people were only motivated to dial 311 to report problems in their immediate neighborhood, not the city at large, which needed to be taken into account.

In short, implementing 311 as the "eyes" and "ears" of the city of Boston did not self-organize and required at least some people explicitly having the welfare of the whole city in mind. They were the agents of higher-level cultural evolution, winnowing the practices that worked at the whole-city level from the many alternative practices that wouldn't work. Yet, after the system was implemented, residents of the city merely need to punch three digits into their smart phones to report a local issue, without having the welfare of the whole city in mind.

More generally, to create human CAS1 systems, it is necessary to function in two capacities: As *designers* of whole systems and as *participants* in the systems that we design. In the first capacity, we are agents of higher-level cultural evolution and must have the welfare in the whole system in mind. In the second capacity, we can be guided by the invisible hand that has been culturally evolved by system-level selection.

In this example, only a few members of the society acted in the capacity of designers to create 311 in a way that benefits the city as a whole. More generally, however, it is necessary to consult and receive feedback from all elements of the system to benefit the system as a whole. Multilevel governance must be participatory, all the way down to the level of individuals operating in the context of the small groups that they care most about.

Beyond the economic conception of theory. Many economists like to elevate their profession above the other social sciences for being more theoretically rigorous, by which they mean more mathematical, based on utility maximization. Evolutionary biologists also pride themselves on the generality of their theory and the Oxford English Dictionary even uses Darwin's theory of evolution as its exemplar of the word "theory".

Yet, evolutionary theory looks nothing like utility maximizing economic theory. It is powerful because it rests upon the rock-solid assumptions of variation, selection, and replication. The theory can be described in words and immediately began proving its worth in Darwin's day before a mathematical apparatus developed around it. Today there is rich use mathematical and computer simulation models, including optimization and game theory, but usually targeted around specific topics and always in a dialectic with empirical research. Theory and empirical research work together to answer questions such as: Is a given entity a unit of functional organization? If so, how is it adapted to survive and reproduce and how do its parts contribute to the functioning of the whole (CAS1)? How does the whole interact with other wholes in populations and communities (CAS2)? Which aspects of the whole are functional and what are the many sources of non-function or dysfunction? These are hard questions that often require

protracted study, with theoretical models an important tool to be used in conjunction with empirical research. Part of rethinking economics as an evolutionary science is to rethink the very concept of what a theory looks like.

Toward a new definition and purpose of economics. The final building block for rethinking economic theory is to rethink the very definition and purpose of the profession. The standard definition, dating back to Lionel Robbins (1932), is “the study of how people use scarce resources to satisfy unlimited desires”. There is also a strong distinction between so-called positive economics, which is based on the “facts”, and normative economics, which is based on “value judgements”, with the lion’s share of analysis devoted to the former.

My publications with Snower will unpack the many problems with this definition, including an empirically misleading conception of human objectives, an empirically questionable reliance on individualistic decision-making, an empirically misleading denial of decision making under radical uncertainty, and an inappropriate basis for promoting human wellbeing.

The new definition of economics that we propose is: *The discipline that explores how resources, goods and services can be mobilized in the pursuit of wellbeing in thriving societies, now and in the future.*

We define the purpose of an economy as: *To serve human wellbeing, both individually and collectively, where individuals derive many of their capacities and objectives through their interactions with one another.*

Note that the welfare of the whole system, in a way that is also attuned to individual wellbeing, is the primary objective. Economists, working in a trans-disciplinary academic environment, must be agents of cultural evolution at the scale of whole human social systems that are coupled with natural systems. And the whole system must be the global system, because anything less is likely to be disruptive at the global scale. This does not mean that lower-level social units lose their identity or agency; only that they need to earn their reputations by contributing to the common global good. And this new definition and purpose of economics does not lose sight of individuals. On the contrary, it leads to a far more equitable economy for individuals, mediated through their participation in multiple layers of functional organization.

Managing Multilevel Cultural Evolution in Practice

When we shed our academic pretensions and just look around us, we see groups upon groups upon groups: our families, neighborhoods, schools, churches, workplaces, recreational groups, and volunteer activities. We also see groups within groups within groups: Our towns and cities, counties, states, nations, and the entire earth as one vast coupled natural and human system. Some group activities fall within the domain of economics as traditionally regarded, while others do not. Every individual participates in multiple groups and has the amazing ability to

recognize and behave according to the expectations of the salient group at any particular moment.

If by some heroic effort we could measure the success of each of these groups at accomplishing their particular objectives, we would find that they *vary*, no matter what their scale. Some perform spectacularly without needing to be coached, others experience total meltdowns, and most muddle along somewhere in between.

We would also find that even when groups perform well at their particular objectives, they often cause harm to other groups, either directly (e.g., domestic violence, crime, terrorism, warfare) or indirectly (e.g., current economic systems leading to social inequities and overheating of the earth). They can even cause harm to themselves over the long term, just as cancers ultimately bring about their own demise. A common theme of folk tales is for someone to be granted a wish, only to end up regretting their own choice. The tragedy of unforeseen consequences is played out in real life, at multiple scales, all the time.

This much can be agreed upon on the basis of common experience. The role of a scientific theory should be to clarify and go beyond what all of us already know, in a way that can lead to positive practical outcomes, again at multiple scales. Working over a period of ten years, I and my colleagues have been developing a practical framework for managing multilevel cultural evolution in real-world settings called Prosocial World (PW: www.Prosocial.World; see Atkins, Wilson and Hayes 2019 for a book-length account), which was implemented in the UK as part of the ESRC grant. The practical framework includes the following building blocks.

Core design principles for the efficacy of groups. No matter what their size or specific objective, all functionally oriented groups require cooperation and coordination among their members. A voluminous theoretical literature exists on the topic of cooperation, spanning multiple disciplines. Innumerable practical change methods for encouraging cooperation have arisen on the basis of experience and/or disciplinary knowledge, but almost invariably come against boundaries, beyond which they are unknown. At the end of the day, any given type of group ends up *varying*, from the best to the worst, in their basic ability to cooperate and coordinate to accomplish their own goals.

Is there a set of core design principles (CDPs) that can increase the efficacy of any functionally oriented group? Yes, and the political scientist Elinor Ostrom (1990, 2010a,b) took a giant step toward identifying them with her research on groups that attempt to manage common-pool resources such as forests, pastures, fisheries and ground water. Conventional economic wisdom held that resource overexploitation (the famous Tragedy of the Commons; Hardin 1968) would inevitably occur without privatization or top-down regulation. By compiling a worldwide database of common-pool resource groups, Ostrom showed that they *varied* in their ability to manage their affairs and that the most successful groups shared a set of eight core design principles shown in the first column of Table one.

Ostrom was awarded the Nobel Prize in economics in 2009 for her achievements. On the day of the award, *Freakonomics* author Steve Levitt blogged that if you had asked economists who she was prior to winning “their” prize, most of them wouldn’t know and he was chagrined to be among them³. He had to look her up on Wikipedia. Levitt also predicted that most economists would hate the choice because it signified that the prize was moving toward a Nobel in social science, not a Nobel in economics.

Ostrom’s Principle	Generalized Version	Function
1. Clearly defined boundaries	1. Shared identity and purpose	Defines group
2. Proportional equivalence of benefits and costs	2. Equitable distribution of costs and benefits	Ensures effectiveness within groups by balancing individual and collective interests
3. Collective choice arrangements	3. Fair and inclusive decision-making	
4. Monitoring	4. Monitoring agreed-upon behaviors	
5. Graduated sanctions	5. Graduated responding to helpful and unhelpful behaviors	
6. Conflict resolution mechanisms	6. Fast and fair conflict resolution	Appropriate relations with other groups, reflecting the same CDPs
7. Minimal recognition of rights to organize	7. Authority to self-govern (according to principles 1-6)	
8. Polycentric governance	8. Collaborative relations with other groups	

Table 1: Generalizing Elinor Ostrom’s core design principles (CDPs) for the efficacy of groups

Despite the fame of becoming a Noble laureate over ten years ago, Ostrom’s work is still confined within disciplinary boundaries. She remains ignored by most economists and is well-known primarily among those who study common-pool resource groups. To prove this for yourself, ask any audience if they know the name (as I do routinely) and you will get only a smattering of raised hands.

More is required to recognize the generality of the CDPs and to use them as a practical coaching method for any kind of group. My collaboration with Ostrom and her postdoctoral associate Michael Cox (now at Dartmouth’s Department of Environmental Studies) generalized the CDPs from a MLS perspective (Wilson, Ostrom and Cox 2013). The generalized wording is provided in the second column of Table 1, which can be divided into three categories, as shown in the third column. First and foremost, the group must have a strong sense of identity and purpose (CDP1). Next, it must be internally organized in a way that facilitates coordination and suppresses disruptive behaviors within the group, regardless of whether they are deliberately self-serving or well-meaning but misguided (CDP2-6). Finally, the group must have the authority to govern its own affairs and exist in appropriate relations with other groups, which reflect the

³ <https://freakonomics.com/2009/10/12/what-this-years-nobel-prize-in-economics-says-about-the-nobel-prize-in-economics/>

same considerations (CDP7-8). In other words, the CDPs are scale-independent and needed to govern between-group relations, no less than within-group relations.

From a MLS perspective, the CDPs suppress the potential for disruptive within-group competition, making working together as a group the primary avenue of success. Those who are inclined to be disruptive are thwarted and those who are inclined to be prosocial feel safe enough to extend themselves. The social environment is trustworthy, so the trustworthiness of individuals need not be taken on faith. This was required for the genetic evolution of widespread cooperation in our species, and it is equally required for modern groups to function as cooperative units.

Note that the CDPs are normative conditions, not descriptive ones, since people may choose not to follow them. Also, the CDPs are inherently inclusive and democratic. Since the great danger of social life at all scales is to be taken advantage of, the checks and balances that we associate with democratic governance are needed at all scales. MLS theory provides a much stronger justification for democratic governance as a requirement for cooperation, even extending to non-human species, than more shallow cultural explanations. This does not deny the need for structure and even hierarchy in human social systems, especially at larger scales, but there must be bottom-up along with top-down control.

Once we understand the generality of the CDPs, we can predict that what Ostrom discovered for a particular category of groups (those attempting to manage common-pool resources) will hold for all functionally oriented groups. One way to test this hypothesis is to review the literatures of the various disciplines. For example, Ostrom is little known in the management field, but it is possible to review the management literature for studies that are relevant to each of the CDPs. The evidence for their efficacy in organizational settings is so strong that additional research seems unnecessary (Atkins, Wilson, and Hayes 2019). The results are so obvious in retrospect that the main puzzle is why they weren't obvious all along.

A recent study that I led helps to answer that question (Wilson et al. 2020). Participants provided information on two groups with which they were familiar, a workgroup (defined as any place of employment) and any other type of group of their choice. The information that they provided included how well the group implemented the eight CDPs and several performance measures: group commitment, group cooperation, psychological needs satisfaction, and group trust. The results demonstrated a strong correlation between implementation of the CDPs and the performance measures for workgroups and non-workgroups alike. In addition, workgroups were rated lower, on average, in all eight CDPs, with the largest deficits for decision making (CDP3), local autonomy (CDP7), and sense of identify and purpose (CDP1). In plain English, many people in their workplaces do not have a say in the decisions that impact their work, are not allowed to do their jobs as they see fit, and do not strongly identify with the purpose and meaning of their work. Such deficits will almost surely undermine the performance of a group.

That said, it is important to stress that workplace groups vary in their implementation of the CDPs and merely differ from other kinds of groups in their mean values. Some workplace groups do succeed in implementing the CDPs, with correspondingly high performance outcomes.

Why the average deficit for workplace groups? More research will be required to answer this question, but a strong likelihood is the influence of Milton Friedman style economics on business school education and business practice. If the only purpose of a business is to maximize short term profits for the shareholders and if power is concentrated in the hands of top managers who govern in a command-and-control style, deficits in the CDPs are only to be expected. Never mind that the entire management literature speaks to the contrary!

Competition between companies that maximize shareholder value and companies that strive to maximize stakeholder value is heavily influenced by institutional and legal frameworks, which currently are stacked in favor of the former. Despite this, stakeholder-minded companies such as B-corps (Chen and Kelly 2015) and employee-owned companies (Nuttall 2012) fare surprisingly well, especially in adverse economic environments. They would fare even better in a reformed institutional and legal environment.

The influence of individualism and the rational actor model illustrates the power of a worldview to structure the perception of reality. As Einstein said, the theory decides what can be observed. When the worldview is individualism and the rational actor model, the CDPs become invisible. When the worldview is MLS theory, they become common sense.

After we appreciate the generality of the CDPs, the next step is to develop effective coaching methods and make them available to groups of all sorts. The coaching method developed by PW, which was implemented in the UK thanks to the ESRC grant, will be described in more detail below. First, however, another major building block of PW needs to be described.

Aligning selection pressures with aspirational goals. Coaching a group to better implement the CDPs requires change in a perceived positive direction. This might seem straightforward, but all of us know from our experience that such change can be difficult. As individuals, every year we make our new year's resolutions and typically fail to keep them. As groups, we write our mission and vision statements and typically fall short of their aspirations.

Why should this be? Ironically, it is not necessarily for lack of flexibility. Instead, we flexibly respond to selection pressures that take us away from our aspirational goals. We want to lose weight but also can't resist the food that lies all around us. We want to have good relations with our spouse and children but also want to control them. We want to be team players at work but we also want to climb the corporate ladder. We want to prevent climate change but we also want the convenience of turning up our thermostat whenever we feel a bit cold.

In his 2020 book *Rebooting Capitalism* and a series of essays⁴ in the online magazine *This View of Life*, the behavioral scientist Anthony Biglan shows how macrosocial pathologies associated with the tobacco, arms, food, and fossil fuel industries are only to be expected from a cultural evolutionary perspective, based on the prevailing selection pressures, or “selection by consequences” as the behaviorist B.F. Skinner (1981) put it. These problems are not caused by bad people. They will emerge in any population of people responding to those selection pressures. Only by changing the selection pressures can we achieve better outcomes. This is why it is necessary to manage the process of cultural evolution so that *the targets of selection become aligned with our aspirational goals*. Otherwise, evolution takes us where we don’t want to go.

It turns out that effective methods have been developed to do this in a cluster of applied behavioral science disciplines called Contextual Behavioral Science (CBS), which is defined as “the study of human behavior in the context of everyday life, with the aim of prediction and influence in addition to understanding” (Wilson and Hayes 2018). Historically, CBS has roots in the philosophical tradition of Pragmatism, including figures such as William James and John Dewey, the behaviorist tradition of B.F. Skinner, and public health and epidemiology at the scale of whole populations.

Just as the import of Ostrom’s work is trapped within disciplinary boundaries unless stated in a more general form, the same is true for the positive change methods that have been developed within CBS, which might be either well-known to you or totally unknown, depending upon where you reside in the archipelago of academic and practical knowledge. An example is Acceptance and Commitment Therapy/Training (ACT) developed by the clinical psychologist Steven C. Hayes and many others (Hayes and Smith 2005; Hayes 2019). The T in ACT can stand for either therapy or training. On the bell curve of individual functioning, you need therapy if you are on the extreme low end but can benefit from training no matter where you are on the curve. Even the most elite athletes benefit from training. To a large extent, ACT is useful across the entire spectrum. ACT works by making two basic distinctions, as shown in figure 1, which is called the ACT Matrix (Polk et al., 2014)⁵. The top half of the Matrix represents the world inside our heads—our thoughts, emotions, and beliefs. The bottom half represents the outer world in which we act. In evolutionary terms, this is similar to the distinction between the genotype and phenotype, with our symbolic systems taking the place of the genotype. The term *symbotype* helps to stress this comparison.

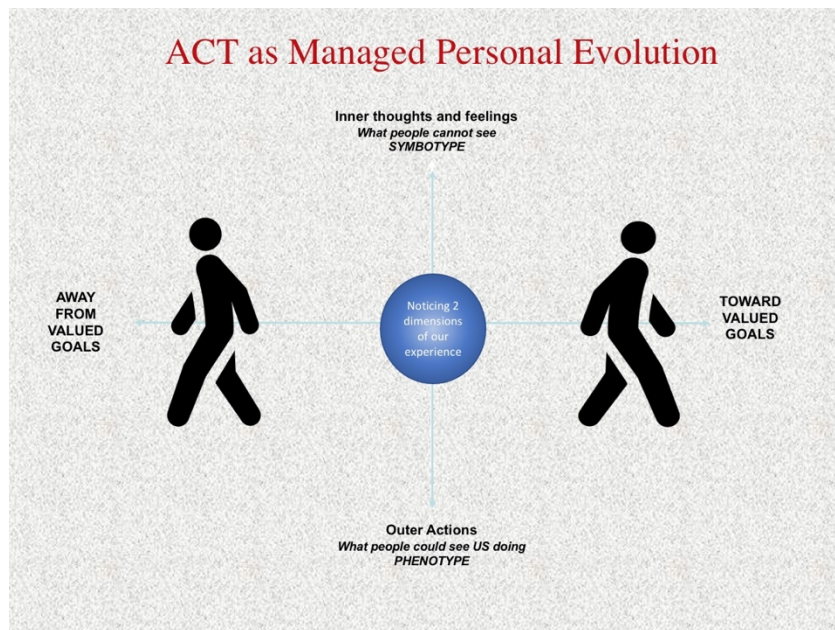
The right and left halves of the Matrix represent, thoughts, feelings, and actions that take us toward and away from our valued goals, respectively. For example, when reflecting upon a valued social partner, we might feel love, respect, compassion, and loyalty (the top right quadrant), which motivate us to spend time with them and do everything we can on their

⁴ <https://thisviewoflife.com/the-cultural-evolution-of-social-pathologies/>

⁵ In some versions of the Matrix, the top and bottom halves are reversed. Prosocial World’s version places inner thoughts and feelings on top to correspond to the head and heart of the human figures. Outer actions are placed on the bottom to correspond to the hands and feet of the human figures.

behalf (bottom right quadrant). However, we might also have feelings of possessiveness and fear that our valued social partner might leave us (the top left quadrant), causing us to seek manipulative control (bottom left quadrant).

A key insight of the Matrix is that most of what shows up on the left side is adaptive in the



evolutionary sense of the word. Fear, anger, jealousy, lust, and the desire to seek manipulative control are all forms of “getting our way” that are underpinned by powerful and genetically innate psychological mechanisms. It just so happens that these adaptive strategies undermine our long-term welfare, much as cancer undermines the long-term survival of the organism.

Figure 1: The ACT Matrix, modified from Polk et al. 2013).

Work is required to remain on the right side of the Matrix. Part of that work is to *accept* the existence of the left side and even accept that some of what shows up might never go away. Another part of the work is to *commit* to working around those obstacles to remain on the right side. Hence the name Acceptance and Commitment Therapy/Training.

Another key insight of the Matrix is that while any person’s current symbotype results in a certain amount of behavioral flexibility in responding to their environment, a substantial change in a person’s behavioral repertoire requires a change in the symbotype. Changing how we act requires changing how we think. The equivalent statement for genetic evolution is that while every genotype allows for a certain amount of phenotypic plasticity, a substantial phenotypic change requires genetic change. More and more, the ACT community is thinking of therapy and training as a managed form of personal evolution, even to the point of thinking of a single person as a group of competing voices that need to become more cooperative (Wilson and Hayes 2018; Hofmann, Hayes, and Wilson 2020). Just as for the study of genetic evolution, the concepts of group-as-organism and organism-as-group are seamlessly merging.

A corollary of thinking of therapy/training as a form of managed evolution is that improvements need not take a long time. Consider what we already know about genetic evolution: Every person is a collection of genes, called their genotype, which influences their measurable properties, called their phenotype. While the gene-gene and gene-environment interactions are highly complex, a single gene substitution can have a measurable impact on the phenotype. We

know this from decades of genetic research and new technologies enable us to surgically insert genes to cure some diseases. These so-called gene therapies don't require a lot of time. Once the genetic change is made, the phenotypic consequences follow.

When we think of our symbotypes as like our genotypes, then small changes in our symbotypes can have a measurable impact on how we act in the world, much like a gene insertion, and need not require a long time. Everyday life abounds with examples of people who were permanently changed by a conversation, a book, or a personal epiphany, which caused them to view the world in a different way and therefore to act differently. Proselytizing religions have perfected the art of the born-again experience. Scientific theories have a way of structuring the way we think and therefore how we act, with utility-maximizing economic theory as a prime example.

It is therefore unsurprising—at least in retrospect—that ACT has proven efficacious at addressing an entire constellation of problem behaviors and need not require a lot of time⁶: In one study, public school teachers experiencing burnout read a book on ACT and worked through its exercises, without seeing a therapist or trainer at all (Jeffcoat and Hayes 2012). Not only was there a dramatic improvement before and after reading the book, but there was further improvement during a follow-up measurement ten weeks later. This means that participants *internalized* a new way of thinking during the study and then *spontaneously continued to improve upon it* on their own.

In a recent ACT study described as a “micro-intervention” (Gloster et al. 2020), couples received 15 minutes of ACT training focusing on psychological flexibility, defined as: “A psychologically flexible person is clear about his/her authentic values, pursues actions in service of these values, and is even willing to do so when it means that they may have uncomfortable negative experiences” (Gloster, Rinner, and Meyer 2020). Couples who received training behaved more prosocially toward each other, as measured by both the Dictator game in the laboratory a week later and real-world behaviors reported using Event Sampling Methodology (Shiffman et al. 2008). As with the burnout study, the frequency of prosocial acts did not decline over this period and even showed signs of increasing.

Once the concept of aligning selection pressures with aspirational goals is generalized from a MLS perspective, it can be added to the generalized version of the CDPs as a practical coaching method, which can potentially be employed at multiple scales—starting with the scale of the single functionally oriented group.

Working at the scale of small groups. A watershed difference between MLS theory and any other theory rooted in individualism is the identification of the small group as a fundamental unit of human social organization. The analogy with social insect colonies is informative,

⁶ For a listing of randomized control trials, see bit.ly/ACTRCTs
. For a listing of meta-analyses, see bit.ly/ACTmetas

although it is important to note differences in addition to similarities. A single ant is its own functional unit in some respects and part of a larger functional unit in other respects. It is *both* a watch and a cog in a larger watch. An ant detached from its colony will become distressed and disoriented. The simplest and most effective thing you can do is not to work with the ant as an individual, but to return it to its colony. The same could be said for the cell of a multicellular organism. By analogy, the best thing to do for an individual person who is not operating in the context of small and appropriately structured groups is to provide the group context (Coan and Sbarra 2015; Wilson and Coan 2021).

A disanalogy is that ants in colonies and cells in multicellular organisms are often expendable in ways that are horrifying from a human perspective. No one wants to be like a skin cell that is sloughed off after having served its purpose for the organism as a whole! In human societies, that kind of power asymmetry almost inevitably leads to disruptive within-group selection. A better biological analogy for human society is the rules of meiosis, which guarantee every gene a fair chance of passing to the next generation. Individual humans need to have a say in the governance of their groups, unlike ants and cells.

With this in mind, the optimal human social environment is to be part of a small group that strongly implements the CDPs and inclusively aligns selection pressures to achieve its aspirational goals. Such appropriately structured groups are predicted to produce a triple benefit: First, their members will thrive as individuals. Second, they will become more effective at achieving their goals as a single group. Third, they will become better at aligning their goals as a single group with higher levels of functional organization.

PW is developing a technology for working with single groups and multi-group cultural ecosystems with the help of trained facilitators. Facilitator training takes place online. To date, over 500 facilitators have been trained from 34 nations. They work with all kinds of groups, from major corporations improving the performance of consultant teams to African villagers evolving new funeral practices to protect themselves from the Ebola virus. The two major building blocks are introduced quickly, resulting in short term benefits but with long-term engagement in mind. The ideal is to form a permanent relationship with groups for continuous improvement and participation in the social construction of higher units of functional organization. This is what it means for a group to become a cell in a multi-cellular superorganism. The need for democratic forms of governance at all scales, which I have already stressed, should alleviate fears about loss of individual liberties.

PW aspires to the rigorous standards of ACT research and also Ostrom's empirical approach to the study of common-pool resource groups. Data gathering is integrated with group facilitation, so that each group ideally becomes part of a multi-group database with pre-, post-, and follow-up information. We strive for multi-group randomized experimental designs whenever possible, which is the gold standard of assessment. That said, the goal of rigorous basic scientific research and assessment should not interfere with the primary goal of implementing PW far and wide in groups of all sorts. It is better to work with groups under suboptimal research and assessment conditions than not to work with them at all. Besides, if PW survives and begins to

propagate through social networks, its spread and diversification becomes its own kind of data, similar to following the course of genetic evolution in field studies of nonhuman species.

The small group is a level of governance that has been hollowed out in modern life, as noted by sociologists such as Robert Putnam (2000) in his classic book *Bowling Alone*. It is smaller than the smallest unit of formal governance and nearly invisible to anyone who views the world through the lens of individualism. Fortunately, it is also the unit that is easiest to work with, without requiring the permission of higher-ups. Even before we begin working at higher levels of functional organization, we can greatly improve the quality of life by reconstructing the “cellular” level of human society.

Working at higher levels of functional organization. Cultural evolution must be managed at all scales, not just at the scale of small groups. Any given intermediate scale, such as the levels of a federalist government, a corporation with its multi-group internal structure, or a major philanthropic foundation, the lower-level units must be coordinated with the good of the intermediate-scale unit in mind, and the intermediate scale unit must be coordinated with the good of still higher levels of functional organization in mind. These coordination goals must be the deliberate target of selection. They will not self-organize and there is no process of “blind” cultural evolution operating at the scale and with the speed that is required to solve the problems of our age. We must self-domesticate our cultures, just as we self-domesticated ourselves during our genetic evolution.

If this task seems daunting, there are positive examples to draw upon at intermediate scales, once we know what to look for. In a series of print conversations and podcasts funded by the Ewing Marion Kauffman Foundation⁷, I explore the thesis that laissez-faire and centralized planning approaches to social change can't work and a managed process of cultural evolution is the only thing that can work. Laissez-faire can't work because the metaphor of the invisible hand is profoundly untrue. It is simply not the case that the lower-level pursuit of self-interest benefits the common good unless selected to do so at the whole system level. Centralized planning can't work because the world is too complex to be comprehended by any group of experts. The only thing that can work is a pragmatic, experimental approach. There must be a systemic target of selection, variation must be oriented around the target, and there must be the identification and replication of better practices, realizing that they will be sensitive to context so that cookie-cutter solutions won't necessarily work.

Variation-selection-replication processes need to be taking place at all scales, all the time. Because this is the only kind of positive social change that *can* work at intermediate scales, it is the only thing that *ever has* worked. The series of conversations validates this prediction for diverse examples of social change, including the tradition of Pragmatism in America, governance at the national scale, economics and public policy, urban planning and the smart cities movement, the Internet Age, rural and international development efforts, business

⁷ <https://thisviewoflife.com/third-way/>

entrepreneurship, and systems engineering. In each case, approaches that err too far in the direction of laissez-faire or centralized planning fail and successful efforts converge upon a pragmatic variation-selection-replication process with systemic goals in mind.

As with so many other examples of effective governance and positive change described in previous sections of this article, the problem of governance and social change at intermediate scales is not an absence of positive examples but the absence of a general theoretical formulation. What works is trapped within geographical, topical, or disciplinary boundaries and remains unknown beyond its borders.

Two points about a more formal and general approach can be made before proceeding to the ESRC grant.

First, the larger the scale of governance and managed cultural evolution, the more technology and big data becomes required. Optimizing the traffic flow of a city or the use of 311 provides an example. It is simply impossible to know the consequences of a given innovation at the level of the whole system without monitoring the whole system and rapid cycles of theoretical model building tested against data. That said, technology and big data by themselves are not sufficient unless integrated with lower levels of governance, all the way down to the “cellular” level of small groups.

Second, the entire planet as a complex coupled natural and human system must be the ultimate scale and target for the selection of better practices. Anything less, such as nations or transnational corporations putting themselves first, is likely to become cancerous at the scale of the whole earth. Many people and organizations already have a whole earth ethic, but MLS theory places its necessity on a rock-solid scientific foundation.

Calling the welfare of the whole earth the ultimate target of selection does not diminish the importance of lower levels of functional organization. They remain essential and the principles of federalism and subsidiarity, whereby lower levels of governance as preferred unless they cause problems at higher scales, have much to recommend them. That is why they have evolved by convergent cultural evolution again and again, from classical Greece, to the Catholic Church, to the European Union. What needs to take place among nations and other leviathan organizations comprising the global village is little different than what takes place at the scale of small groups that implement the CDPs, where members succeed by cultivating a good reputation rather than by the exercise of raw power. The template for good governance is scale-independent and merely needs to be applied at the highest scale.

One example of multilevel economic thinking is the “Doughnut Economics” framework of Raworth (2017), shown in figure two. Economic systems must respect planetary boundaries,

which define the outside of the doughnut. They also must respect social justice and equity boundaries, which define the inside of the doughnut. Remaining inside the doughnut is a planetary affair but must be coordinated with intermediate levels of governance. For example, Amsterdam has declared

itself a doughnut city, which translates into neighborhood groups becoming engaged to make their contribution. This approach is consistent with my collaboration with Dennis Snower, including defining the profession as “*The discipline that explores how*

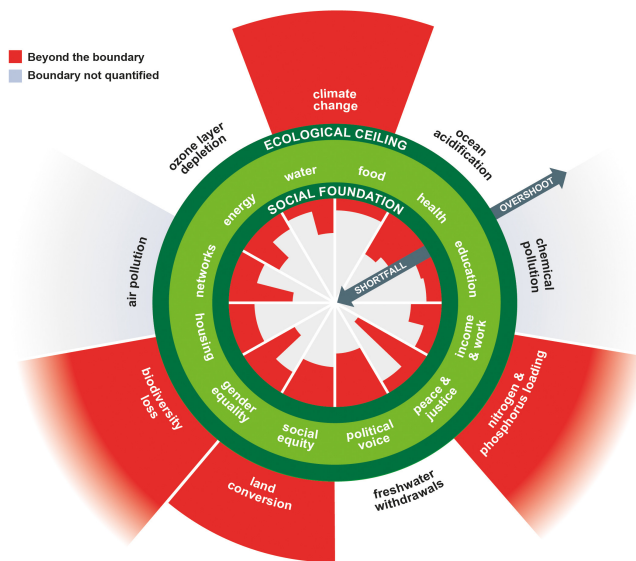


Figure 2. Doughnut Economics Framework of Raworth (2017)

resources, goods and services can be mobilized in the pursuit of wellbeing in thriving societies, now and in the future” and its purpose as “To serve human wellbeing, both individually and collectively, where individuals derive many of their capacities and objectives through their interactions with one another.”

Implementing Prosocial World in the UK

The ESRC grant provided modest funds to implement PW in the UK with sustainability as the focal topic. Broadly interpreted (e.g., “satisfying the needs of the current generation without compromising the ability of future generations to meet their needs⁸”), sustainability refers to just about anything that improves human wellbeing, including but not restricted to environmental sustainability.

The goal of the grant was to implement PW as widely as possible in real-world settings with the help of existing organizations. The first step was a 10-session online training course that itself had a multi-level structure. Individuals (Level 1) were members of small teams (Level 2), representing organizations (Level 3) that expected to work with each other (Level 4).

Recruitment efforts resulting in the following organizations taking part in the course. Descriptions are taken from their respective websites.

⁸ https://en.wikipedia.org/wiki/Brundtland_Commission

The Association for Contextual Behavioral Science (ACBS), an international society “dedicated to the alleviation of human suffering and the advancement of human well-being through research and practice grounded in contextual behavioral science.” With nearly 9000 members worldwide, ACBS has been a major vehicle for the cultural spread of Prosocial worldwide and includes hundreds of members in the UK and Ireland.

The Banking Standards Board (BSB), a private sector body established in 2015 in the UK to promote good practices among banks and building societies, funded by subscriptions from the institutions themselves. The BSB will “provide challenge, support, and scrutiny for firms committed to rebuilding the sector’s reputation, and will provide impartial and objective assessments of the industry’s progress.”

C40, A London-based network of the world’s megacities committed to addressing climate change. “C40 supports cities to collaborate effectively, share knowledge and drive meaningful measurable and sustainable action on climate change.”

Circle Economy (CE), a Netherlands-based international organization dedicated to “empowering a global community of businesses, cities and governments to accelerate the transition to the circular economy through practical and scalable insights and solutions that address humanities greatest challenges.”

Doughnut Economics Action Lab (DEAL), a network dedicated to translating the ideas of [Kate Raworth’s “Doughnut Economics”](#) approach into action. DEAL “is a new organization working with innovative cities, community groups, businesses and teachers worldwide to co-create and spread brilliant tools and resources that turn the ideas of Doughnut Economics into practice.”

The Royal Society for the Encouragement of Arts, Manufactures and Commerce (RSA). The RSA has been at the forefront of social change for over 260 years. “Through our ideas, research and a 30,000 strong Fellowship we are a global community of proactive problem solvers, sharing powerful ideas, carrying out cutting-edge research and building networks and opportunities for people to collaborate, influence and demonstrate practical solutions to realise change.”

The Transition Network (TN). A movement of communities working to transition to a more sustainable lifestyle, which originated in the UK and has become international. “Transition is a movement that has been growing since 2005. It is about communities stepping up to address the big challenges they face by starting local. By coming together, they are able to crowd-source solutions. They seek to nurture a caring culture, one focused on supporting each other, both as groups and wider communities.”

In addition to these UK national organizations and international organizations with UK representation, a number of place-based community organizations within the UK took part, including [Civic Square](#) in Birmingham and teams with ACBS ties in Bristol and Dumfries.

The recruitment of organizations and communities was opportunistic by design. Evolution—whether genetic or cultural—is seldom a smooth climb up an adaptive peak. More often it requires navigating a rugged adaptive landscape that requires descending into valleys to reach higher peaks—or reconfiguring the landscape to turn valleys into smooth upward slopes. In plain English, many organizations that in principle would be interested to take part in a project such as this are not in a position to do so. While any organization can become more flexible at achieving their valued goals with the tools provided by PW, it is important to begin working with organizations with sufficient flexibility and motivation to take part. This requires casting one's net widely.

It is here that the generality of PW's theoretical framework and practical toolkit begins to prove its worth. The organizations that took part might seem to have little in common, other than wanting to work toward a sustainable society, broadly conceived. Each organization is large enough to be a multi-group entity in its own right. Collectively, the organizations work with literally thousands of other organizations with diverse missions in nearly every sector of society, such as health, education, cities, agriculture, and finance. Yet, all of them are faced with the common problem of needing to cooperate at multiple scales and needing to align cultural selection pressures with aspirational goals.

All of the organizations and communities were already impressively efficacious to a degree. A society with 9000 members (ACBS), 30,000 fellows (RSA), thousands of communities worldwide (TN), or 40 megacities worldwide (C40) is doing something right and has much to offer in a teaching capacity, in addition to learning from PW and the other organizations in a student capacity. Nevertheless, if by some heroic effort we could measure the efficacy of the thousands of groups that exist within each organization and the groups with which the organizations work, we would find a bell-shaped curve, from the best to the worst and most muddling along in between. The value of adopting a common framework for thinking about managed cultural evolution and a common set of practical methods with rigorous assessment standards is inestimable.

The instructors of the course were Paul Atkins, PW's chief trainer and ACBS fellow, James Dyke, an Earth Systems scientist at the University of Exeter, who is featured in the documentary film about climate change [The Race is On](#), and myself. Paul teaches online training courses on a regular basis and is first author of the book *Prosocial: Using Evolutionary Science to Build Productive, Equitable, and Collaborative Groups* (Atkins, Wilson and Hayes 2019), which was used as a course text along with online material. The course included regular online meetings, work done between meetings, and coaching sessions with each team.

The course began in early 2020 and was in progress at the onset of the coronavirus pandemic. Enthusiasm and commitment to the course was sufficiently great for it to continue despite the extreme disruption that the pandemic caused. We even adapted some of the material to help members cope with the stressors of the pandemic.

Nearly all participants in the course agreed that PW provided considerable added value to their previous toolkits for working toward positive change. The course concluded with action plans for how PW could be incorporated within each organization and/or the many groups with whom each organization works. Very modest funds from the ESRC grant were made available to facilitate these plans. As with the recruitment of organizations and communities into the course, the selection of action plans to support was opportunistic by design. All of the participating teams wanted to move forward with action plans, but some were in a better position to do so than others.

The remaining funds of the ESRC grant were invested in three inter-related projects:

- 1) A second online training course oriented toward implementing PW in the Bristol school system, NHS, and community at large.
- 2) The formation of a Prosocial development team within the NHS in the Dumfries and Galloway area of Scotland.
- 2) Developing Prosocial Schools, a branch of PW dedicated to educational applications worldwide.
- 3) Continuing to introduce PW to the international Transitions Network.

One page summaries of these projects are provided as appendices. Specific use of funds was guided by the needs of each project, in accordance with the 7th CDP, which provides autonomy for groups to manage their own affairs. Often this included support for key personnel who were already highly engaged on a volunteer basis and badly needed even a small amount of financial support.

The second online training course illustrates the capacity of PW to spread rapidly along existing social networks in all sectors of society. It included over 100 participants working with 13 coaches, who in turn work with Paul Atkins as the main instructor. The coaches include people who have received previous PW training, including participants of the first course. Coaches can in turn become lead instructors so that the training model can be taken to scale.

Participants in the second course were organized into teams, this time oriented more closely toward implementing PW in real-world settings. One team is headed by a group of clinical psychologists with close ties to ACBS and already working in the Bristol school system and other sectors. This is resulting in a “Prosocial Bristol Network”, which already consists of about 40 trained Prosocial facilitators on the strength of the ESRC grant and now needs to expand on its own with resources in hand and future funding initiatives (see appendix 1 for details).

A second team is headed by James Lemon, a clinical psychologist at the NHS in the Dumfries and Galloway area of Scotland, with close ties to ACBS and an early adopter of PW. James had already made a strong start implementing PW in his sector of the NHS, which he was able to

expand thanks to the second ESRC training course. There is now a new speciality within the NHS G&G called “Prosocial Development and Staff Support” funded by an endowment charity overseen by a team of Directors and Senior Executives. The aim is to establish and embed Prosocial across a selection of Acute Hospital wards, departments, teams, and services, community services, and local authority and social care providers (see appendix 2 for details).

Note that Lemon has obtained his own funding for expanding PW from within the NHS. The more PW proves itself, the more competitive it will become for funding from multiple sources. What organization in a position to nurture positive change *wouldn't* want to employ such a general and effective positive change method?

Please consult Appendices 3 and 4 for summaries of the other two projects nurtured by the ESRC grant funds. In addition, the organizations who took part in the first course and did not receive subsequent ESRC funds and available to take part in future initiatives.

In summary, the ESRC grant has been successful at introducing a generalized method of managing multilevel cultural evolution to major organizations and propagating the method through their social networks toward real-world applications in a diversity of contexts, flexibly flowing along lines of greatest receptivity. That said, the ESRC project has not yet resulted in the kind of scientific research and assessment to which PW aspires. That awaits a future stage of implementation.

Conclusions

I will conclude this article with a summary of its two components and how they can be further developed.

Theory: In a recent online essay⁹ published as part of a series titled “Advice to an Aspiring Economist”, Dennis Snower writes that the economics profession has arrived at its “Copernican moment”, “when it is finally becoming clear that the current ways of thinking about economic behavior are inadequate and a new way of thinking enables us to make much better sense of our world.”

A Copernican moment requires *both* the failure of one paradigm *and* the availability of a worthy successor. The second requirement was not available to Veblen writing in 1898, nor to Nelson and Winter writing in 1982—but it is available now thanks to developments in evolutionary science and all of the human behavioral and social sciences over the last few decades. It is notable that evolutionary science itself fell under the spell of individualism during its selfish gene era, so that the resurgence of MLS theory is part of a more general cultural trend toward more systemic thinking. But MLS theory per se is needed to make the vital distinction between

⁹ <https://economics.com/why-behavioral-economics-cant-fix-a-broken-discipline/>

complex systems that are adaptive as a system (CAS1) and complex systems composed of agents following their respective adaptive strategies (CAS2).

In addition to our rethinking of theory that took place as part of the ESRC grant, summarized here and expounded at greater length in future publications, we are starting a new section of the online academic journal [Economics](#), which was founded under the auspices of the Kiel Institute for the World Economy when Snower was president and is now becoming part of the De Gruyter publishing house. The new section will be titled *Economics as an Evolutionary Science* and will have its own editorial board. We hope that *EcoEvoSci* will catalyze academic productivity in this area, along with other fine journals that already publish evolutionary content such as the *Journal of Bioeconomics*, *Journal of Economic and Behavior Organization*, *Journal of Institutional Economics*, and *Journal of Evolutionary Economics*.

Practice: I began this article by saying that its point is not to assert that nothing works except for my new magic bullet. Positive cultural change methods have arisen again and again, throughout history and in the present, converging on better practices and spreading to a degree based on their success. Then I went on to assert that a general theory of multilevel cultural evolution *is* a new magic bullet of sorts because it can be used to manage positive cultural change at multiple scales for any culture and topic area. With a little know-how, it can also catalyze the rate of positive cultural change so that it can take place in a matter of years rather than decades or centuries.

The ESRC grant begins to provide a proof of concept for this claim. In two years, with very modest funding, and despite a pandemic, a practical toolkit for enhancing cooperation in all its forms and bringing cultural evolution into alignment with our aspirational goals is taking root in real-world settings such as schools, hospitals, and communities. The two major building blocks of the practical toolkit—generalized versions of Ostrom’s Core Design Principles and therapeutic/training methods from Contextual Behavioral Science—stand on a strong theoretical and empirical foundation. While the particular way they are packaged and delivered by PW is less proven, our high research and assessment standards will enable us to demonstrate and further build upon success. This, in turn, will enable PW to spread even faster by supporting itself from multiple sources on the basis of the value that it provides. Catalysis—a dramatic increase in the rate of a process—is possible for positive cultural change in addition to chemical change. I look forward to continuing working through Prosocial World to nurture the catalysis that has started with the ESRC grant.

Appendix 1.

The Bristol Prosocial Network 2021

Description of project: As part of our vision to increase prosociality, cooperation and wellbeing across the city and surrounding region, a range of professionals from the NHS and Local Authority (n = 41) were trained as Prosocial Facilitators. This cohort has formed a network of Prosocial practitioners to collaborate and support shared efforts to implement the CDPs across a range of contexts relevant to our professional activities.

Use of ESRC funds: We now have 41 trained Prosocial facilitators working in/around our wonderful city of Bristol. What an achievement and how very exciting this is! At our first network meeting (January 2021), we used Prosocial methods to establish an initial sense of shared identity and common purpose (CDP1) within our local network of practitioners. We clarified the values we want to embody across the network and identified a range of purposes and activities – see below.

Our aspiration is that the network will provide opportunities for peer support/supervision around the use of Prosocial, as well as other professional development functions, such as regular presentations and CPD type events. We can and will shape the journey up together and make it what we want it to be and believe it should be.

Future plans:

1. **Schools:** The potential applications of Prosocial within school communities is vast and wide-ranging. With 20 Educational Psychologists in Bristol now trained as Prosocial facilitators, over the coming years we plan to use these methods to support CDP-implementation in schools across the city. We are in the planning stages of two small-scale school-based projects - one with a school's leadership team and the other with a group of Teaching Assistants. For both of these, we will use and evaluate a six-session Prosocial protocol, which we have begun to develop. We have also recently submitted a paper on the use of Prosocial in schools for peer review in a popular academic journal – The Educational Psychologist in Practice.
2. **NHS Specialist Child Services:** We are in the process of implementing Prosocial within three NHS Child & Adolescent Mental Health Service (CAMHS) teams and specialist services for children with autism, learning disabilities & sexually harmful behaviours. This will support a multidisciplinary team that often experience significant interprofessional tensions to engage in more coordinated working.
3. **Family multiagency working:** There is considerable interest on the part of a few members of our regional network in the application of Prosocial in order to improve the quality and effectiveness of collaborative multi-agency working. Within this, the group are keen to explore how Prosocial can improve the service-user experience of families (as one social group), as they work with CAMHS and other agencies.
4. **Community Homes:** Bristol, South Gloucestershire and North Somerset Local Authorities and our regional network are in the late-stage development of a pilot to deliver of Positive Behavioural Support programmes for 40 individuals with complex needs and behaviour. Each of these individuals will have a small staff team (2-8 people) integrated in a larger care network comprising both public and private providers linked together using Prosocial principles.

Appendix 2.

Dumfries/Galloways NHS Prosocial Network 2021

This department offers psychological therapy to the population of Dumfries and Galloway and works closely with teams across the health and social care partnership to offer consultation, training and supervision. We began using PROSOCIAL 8 years ago in our Medical Paediatric Psychology speciality to support the paediatric teams working with Children and Young People with Long-term / Life-limiting health conditions. The success of this work led to us being asked to support other teams and colleagues across the health region who were facing a number of challenges and our PROSOCIAL work was known across the region (see 'PROSOCIAL' 2019 Atkins, Sloan-Wilson and Hayes page 203).

Covid-19 Pandemic

The Dept PS&R responded promptly to the onset of the Covid-19 pandemic in anticipation of the significant psychological burden it was expected to place on the workforce, and developed a staff wellbeing and psychology support service. The Covid pandemic added further psychological burden to a workforce already known to experience very high levels of job-related stress and at greater risk of poor psychological well-being (Caplan, 1994; Quine, 1998). The Dept PS&R response included a 1:1 Service and also used our established PROSOCIAL framework and experiences. Multiple consultations with individuals and teams found that there was a range of emotional responses to the pandemic. Problems are rarely just related to the onset of Covid-19 – Covid-19 has been a trigger for distress but other factors maintain it. In some instances existing distress has been compounded by Covid-19. These include workplace stress – interpersonal tensions, feeling undervalued or voiceless, lack of role clarity, absent or ineffective communications and suggestions of critical work environments. The staff support service, which explicitly used PROSOCIAL was widely praised and we were encouraged to apply for funding to continue and develop this service. This service was granted funding by an endowment charity overseen by a team of NHS D&G Directors and Senior Executives. A key aim for this ambitious project is to establish and embed PROSOCIAL across a selection of Acute Hospital wards, departments, teams and services, Community Services and Local Authority and Social Care providers and to achieve transformational cultural change.

PROSOCIAL Development and Staff Support Service

The PDSS began on 01.01.2021 and addresses workplace factors that can cause and maintain psychological distress. This includes complex team dynamics, interpersonal relationships, and workplace culture. In some cases these problems will be long-standing and pre-date the onset of Covid-19. Such problems can affect patient outcomes, relationships with other teams, work absence, and recruitment and retention. Chronic, complex, and multi-faceted issues such as these require the expertise of experienced and highly skilled professionals, capable of leading, directing and influencing a multi-disciplinary workforce.

ERSC Funding

The ERSC funding has enabled us to train the key individuals who are forming the core 'PROSOCIAL development team'. By completing the training before the project start date, we were able to 'hit the ground running' as it were. 8 key members of staff were selected to represent Psychology, Organisational Development & Learning, and Medicine, who will then be able to develop PROSOCIAL 'clusters' within their departments, directorates and extended networks. This strategy also supports our focus on CDP8 as we are developing shared identity and purpose across the organisation.

Appendix 3.

Prosocial Schools Report

Description of project:

Prosocial Schools formed in April 2020 as a gathering of eight Prosocial World facilitators. Early members included psychologists in Bristol, UK. By the summer of 2020, the group began to coalesce as an initiation team for a global networked improvement community (NIC). Under the ESRC grant, we supported the following activities:

1. Continue to develop a global network, including [a website](#) and other initiation and sustaining activities, to facilitate peer to peer coaching.
2. Improve a second draft of the [Community Science Field Guide for School Culture](#).
3. Finish and publish a Prosocial Inventory to be used in the NIC process.
4. Coordinate the design and pilot phase of a [Youthcorps](#), with youth participation.
5. Provide customization of the Doughnut Economics Action Lab [DEAL City Portrait tool](#) for schools and/or school-led teams to implement at the meso scale.

Use of ESRC funds:

A lead contractor working 280 hours secured 11 volunteers contributing an additional 154 hours. Resources were also provided in-kind by Global ESD and The Comparative Psychology Department of the Max Planck Institute.

Outcomes and Impact

The links above highlight success. Of note, instead of an inventory we began focusing instead on a diversity of perceived aims identified by stakeholders; this has led to conversation starters that guide users in identifying their symbio-types and phenotypes across the inventory in a more intuitive manner. This approach we believe is generalizable for school improvement efforts and for community science in all domains - social, economic, environmental - to help shift communities from economic efficiency to economic resilience; mobilize prosocial motives; and enhance global cooperation. In addition, we successfully engaged the Bristol UK based [Connect PSHE](#) on a Cross-Cultural study of their DNA-V curriculum.

Future Plans

We have submitted a \$490k, 3-year grant to study how the NIC impacts these intuitive theories of improvement as well as a transferable understanding of the behavioral sciences, and students as *prosocial* community scientists. To compliment the NIC, and in tandem with the website, in early 2021 we will be piloting a polycentric online community platform. We also plan to offer tuition-based professional development to increase our fiscal sustainability. Existing and new volunteers have been converted into standing leadership circles. In addition we are drawing attention from a range of local, national and international organizations. Coming full circle, these organizations and our contacts in Bristol UK appear to offer a well qualified pool of prospective participants. Finally, our success, resources and lessons learned are being shared with a burgeoning Prosocial Families initiative.

Appendix 4.

Introducing Prosocial to the Transition Network Coordinated by: Galen Meyers and Shaktari Belew

Description of project:

Some of the major players in Transition Network were in the Prosocial Facilitator Training course, originally, due to our recommendations long before this project formally began.

Now, several of us that are involved in Transition and familiar with Prosocial are doing what we can to make sure the learning process that was seeded in Transition continues and spreads. We were met with tremendous support from Prosocial, and the ESRC.

We created original training material, comparing and integrating Transition and Prosocial approaches to collaboration. We repackaged what we felt are some of the most valuable insights, tools, and methodologies of Prosocial in a way we felt would resonate even more deeply with the movement.

Over the course of 3 months, we offered 2 introductory webinars and a total of 8 learning group sessions. We helped create spaces where those of us who are familiar and enthusiastic about the Prosocial toolkit could connect with one another and help each other deepen our Prosocial explorations together, and to share our enthusiasm with others in the movement, and beyond.

We encouraged participants with interest to bring Prosocial to their groups, and to pursue their own Prosocial Facilitation Training, and to stay connected, and we continue to explore possibilities to share wider.

Use of ESRC funds:

Thanks to the ESRC funds, these webinars and sessions were provided at no cost to individuals and groups connected to the Transition Town movement, or similar groups and movements.

The funds went almost entirely towards hourly compensation of Galen and Shaktari in order to organize, design, create, promote, and deliver the webinars and learning experiences.

Future plans:

We will be seeking grant funding to continue on these paths, and we will be exploring ways we can ensure the project can fund itself.

Prosocial Facilitation Awareness Raising

We intend to continue offering and evolving our Transition and Prosocial learning experiences.

Prosocial Facilitation Implementation in Transition Initiatives

We would directly support the work of a handful of local initiatives with trained Prosocial facilitators to implement prosocial facilitation in their local Transition initiatives, and document and share their experiences with the wider network. We aim to work with researchers.

CDP Assessment into Healthcheck

We would design a Prosocial based CDP-Assessment and propose to TN to integrate it into a revised Transition initiative "[Healthcheck Survey](#)".

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