

5. Collective Learning

Overview: One reason to think of groups as having minds of a sort is that they can learn collectively from their collective experience. This chapter explores how this occurs in some detail. First, we define learning as adaptive change of mindset, via Toynbee's theory of challenge-and-response. To the extent that groups have collective mindset and face collective challenges, it obviously makes sense to think of them as learning collectively – or as collectively failing to learn. We then discuss learning whether of individuals or groups as an effect of cognitive self-organization. The mechanisms of self-organization (discussed in greater detail in Appendix B) are introduced here; their role in learning is suggested. Section 5.2 takes up the special case of a group that actively tries to learn something, and discusses the notion of group 'consciousness' in those terms. The concluding section offers a simple case study of group learning: that of two newlyweds learning to function as a married couple. The broad conclusion is that groups can and do learn collectively, over and above the personal learning of their constituent individuals.

History teaches us that men and nations behave wisely once they have exhausted all other alternatives.

- Abba Eban

This chapter is about group learning: the ability of a collective mindset to change, develop and refine itself in response to its [experiences](#) – i.e. in response to the totality of suggestions that it receives from its world and from its own current state. Learning may be defined as *adaptive* change: a change of mindset that somehow improves the group's minding, relative to the world in which it functions. In this respect and others, the collective learning of groups bears a strong analogy to the learning of human individuals or other creatures: Some learning is intentional; some is quite automatic. Some learning, (learning of the kind that will mostly concern us here), occurs in response to some definite problem or need or challenge. For example, people had seen birds fly and thought about building [flying machines](#) for thousands of years, before the Wright brothers actually built one. But other learning occurs quite inadvertently – through some sort of happy (or not so happy) accident. Becquerel's discovery of [radioactivity](#) is a famous example. And some learning occurs when things do not go as planned – e.g. when some project fails that had been expected to succeed.

Optimum Challenge

In his well-known theory of [challenge-and-response](#), the historian Arnold Toynbee suggested that civilizations rise and thrive when 'creative minorities' devise novel solutions to problems of great, but not excessive difficulty, which then set a direction for the whole society. The [Sumerians](#), for example, organized Neolithic peoples in the swamps of southern [Iraq](#) to dig irrigation ditches. Ancient China did [something similar](#). The Catholic Church organized a single religious community in Europe, as the Roman Empire was coming apart. So long as a civilization can meet the challenges it faces, it continues to grow. It may fail and come apart when it cannot meet its challenge for some reason.¹

Toynbee's theory leads to a concept of optimum challenge, analogous to those personal challenges that Csikszentmihályi described in his theory of the '[flow state](#)' – the happy state we may find ourselves in when we are fully and freely engaged in some activity which is difficult enough to be interesting, but not so difficult as to be frustrating. So it may be with groups or whole societies. If the challenge is not perceived, or if it is too difficult, a group may be destroyed (or may destroy itself) before the problem is addressed. If the challenge is too easy, it will scarcely be a challenge at all; the group's adaptation to it will hardly be distinguishable from business-as-usual. But if a challenge falls in the '[sweet spot](#)' between these two extremes, it may provoke a wave of activity and cultural creativity which may be remembered ever after as a '[golden age](#)' of high achievement. [Periclean Athens](#), [the Córdoba Caliphate](#) and [Elizabethan England](#) are three well-known examples. In each case, the combination of threat and opportunity produced a societal response, analogous to the [flow state](#) that Csikszentmihályi described.

Thus, Toynbee's theory of challenge-and-response is really a paradigm of learning which can be applied at every level: The young child learning to read, the business firm threatened with competition, the small nation with a powerful, greedy neighbour, the global society threatened by climate change, pollution and depletion of natural resources – all are cases of challenge which either will or will not find some adequate response. Usually, in general terms, though not in detail, it's fairly clear what sort of response is needed. Though we cannot know in advance what new ideas, skills, technologies or social institutions will need to be developed and learned, most of the time we can at least see the problem that we need to solve. If we can do that much, we usually get some idea of the kind of learning that is needed – at least, enough of an idea to start groping around, and recognize a solution when it is found. When many people and/or a power elite can't or won't recognize the problem, then the case is much more serious. The group may disintegrate or be overrun before any solution turns up.

1 Along these lines, Jared Diamond describes some spectacular failures of group learning in his book, [Collapse: How Societies Choose to Fail or Succeed](#).

Modes of Group Learning

In general, as already noted, group learning can be conceived as an adaptation of culture to circumstance: adaptive change to any relevant feature of that culture at the present point in time. Anthropologists distinguish three sectors of a culture – its [artifacts](#), [mentifacts](#) and [sociofacts](#) – and we can make the same distinctions in speaking of group mindset.

- The artifacts of a group include all produced items, manufactured or otherwise, through which that group alters and stocks its habitat for its own survival and convenience: the infrastructure of buildings, roads, and physical facilities of every kind. the furniture, tools, and other movable (but relatively durable) implements with which the group's members live and work; the consumable items (of food, clothing, and whatever else) which they use up on a daily or short-term basis; and finally, the miscellaneous ephemera (e.g. music, lighting, indoor heating and cooling) too transient, abstract or immaterial to be recognized as tangible items.
- Mentifacts include all purely cognitive features: the group's shared concepts and language, its myths and ideologies, its worldviews, paradigms and theories, its values, desires and established goals, and (not least) its stocks of knowledge and information.' Mentifacts are held partly as 'common knowledge,' and partly as the skills and knowledge of experts and specialists – like those '[living national treasures](#)' whom the Japanese designate and honour as keepers of their cultural patrimony. Mentifacts are also encoded stigmergically in the group's artifacts.
- [Sociofacts](#), now, comprise the customary or legally established social relationships of a group – its conventions of interpersonal relationship and its institutions of governance, business and private life. They are familiar patterns of social life that the group mindset makes available. They define how the members do things with each other, and how they get things done.

Some features of group mindset – notably its formative myths, and its concepts and values of personal identity – are highly resistant to change. Other features change swiftly and easily. But hardly any change will affect all members equally. In every case, there will be winners and losers; there will be those who applaud the change and those who don't. For that reason, all change – thus, all group learning – tends to divide the group between 'progressives' and 'conservatives' – between those who see the change as valuable learning and those who see it as corruption and decline. This division is not always painful and deeply polarizing for the group, but it is often so, and it is always there to some extent. Group learning raises issues for the group – is itself an issue – which may or may not be easily handled. As psychotherapists have long known, something similar is true for individual learning as well.

Some Features of Learning

In setting out to think about group learning, several other points are worth making at the outset:

- 1) For groups as for individuals, some learning is intentional but much is not. We will need to explore the interplay between automatism and conscious volition in collective learning. The former can be seen as an outcome of blind evolution or self-organization. As consciousness itself is treated as an emergent feature of some minding systems, so intentional learning too must ultimately be seen as an effect of self-organization – but in a more profound and far more intricate sense.
- 2) Conscious learning requires some recognition of a problem or challenge; some recognition that there is something of importance that we need to know, but don't; some recognition, that is to say, of our fundamental ignorance about something that actually matters. For groups as for individuals, that recognition is painful. The first step to any conscious learning is to ask a question. This humility is difficult for most individuals, and for groups it's even more so. Sometimes it takes military defeat, many deaths and terrible suffering to compel a group to recognize the necessity for fundamental change.
- 3) One way that groups can learn is by entering into games and playing them. The game draws people to invest attention and effort in a certain way, and often to compete in doing so. In this way, trying to do something – anything at all – they find ways of doing it better: more effectively, more cheaply, more attractively and pleasingly to others. They train their children to do this thing, and they keep practising as adults. We can see such learning as a kind of stigmergy,² with the difference that context is created (still on a to-whom-it-may-concern basis) by writing directly onto the group's individual members. Instead of changing the environment, they change their own and each other's brains. In this way, knowledge and skills are formed which belong to the group as a whole, and only secondarily to some of its members.
- 4) Whatever exactly we mean by individual or group identity, we know that it is always forcefully asserted and stubbornly defended. Resistance to honest questioning, to an implicit confession of ignorance, is only one of several blocks to learning – of several ways in which groups and individuals defend their existing identities against unwanted change. We have already offered some discussion of group-think in Section 4.2.2, and review one utter disaster of it in Chapter 6 that follows. That is the most this book can do – except to warn, as I am doing now, that the mindset of modernity from the outset has led to social changes that were bitterly resisted, that the rate of change has progressively accelerated, and that the 'culture war' between progressives and conservatives is now deeper and more bitter than ever.

² See Section 1.3.3

- 5) A final introductory point about group learning turns on the issue of [syncretism](#) – the blending of beliefs and practices from diverging schools of thought. This has been a crucial area of conflict and development in the history of religion, but has been significant too in politics, in the arts, and in mindset generally. On one hand, there are often possible gains to be achieved through 'cultural appropriation' – or through appreciation and emulation, to use more positive language. On the other, there is always an orthodox wing that rejects such cultural borrowing as dilution or subversion of the pure teaching.

In this chapter, I want to discuss group learning as adaptive change to collective mindset that is sometimes intentional by the group as a whole, but sometimes bitterly resisted; sometimes advocated by an [avant-garde](#) faction, but sometimes just a matter of blind self-organization. I will discuss one very basic example: the group learning of a newly married couple who must now work out how to live together – how to function as a single system for many purposes, but otherwise as the separate individuals they will remain. I will end with a discussion of those social structures of discipleship and lineage through which conscious group learning typically occurs.

5.1 Learning as Self-Organization

A mind, we've been saying, is a system capable of 'minding' – of autonomously processing and responding to suggestions on its own behalf. In doing so, it is organized and controlled by 'mindset,' a cognitive structure built and maintained by the system through some sort of learning. We can think of learning as a reflexive or [bootstrapping](#) process, because any learned changes to mindset are always coordinated and constructed from the mindset which currently exists. Through that mindset, the system selectively attends to suggestions, and uses these not only to respond to its current situation and environment, but also to modify its own mindset both [on the fly](#), in [real time](#), and through reflection afterwards.

The patterns of mindset exist and co-evolve as a kind of ecology, as we have seen, organized, in part, by a blind co-evolutionary, ecoDarwinian process, though partly too by conscious volition.³ From this perspective, both group learning and the personal learning of individuals can be studied as effects of self-organization – via the mechanisms introduced below and described more fully in Appendix B. Though none of these mechanisms requires cognition or is intrinsically cognitive in nature, no learning and no cognition would be possible without them.

In sketching the connection between group learning and these mechanisms of self-organization, our idea is that collective minds, just like our personal, human minds, are natural phenomena, shaped by the same tendencies that pervade Nature as a whole. Mind is not a separate 'substance' as Cartesian dualists believed. Rather its elements – attention, consciousness, feeling and think-

³ We discuss the role of conscious intention in Section 6.2 below.

ing – are just convenient abstractions, which help us to think about ourselves and each other: about 'mental' phenomena which seem to emerge from physical processes of biology and communication. In this way, the '[mind-body problem](#),' is seen to be an illusion of language. Physical systems are capable of sensation and thought, and 'mind' is a handy way of imagining what some physical systems do. Human minds are evolved to perceive and reflect on themselves; and they are closely shaped by their participation in social groups – and, as we see in Chapter 2 and Appendix C, for their capability to be shaped adaptively to what is happening to them and around them. For this reason, it makes as little (and as much !!) sense to speak of separate minds as of separate drops of water in the ocean. In the last reckoning, only the *Process* is real; and there is only one of it.

5.1.1 Natural Selection

Let's begin with [natural selection](#) (as Darwin called it), the basic mechanism not just for biological evolution, but for all forms of adaptive, trial-and-error change. By definition, it involves some form of reproduction or copying of an existing pattern, with variations which result in differential 'fitness' for further copying. These variations may be random copying errors or production errors like those of an assembly line which turns out occasional lemons, despite whatever quality control methods), or they may be ingeniously intentional (as in Bach's [Goldberg Variations](#)) on an original theme. In either case, the crucial feature for learning is that any variations are differentially more likely, or less so, to be selected for copying in the future. Those copied more become increasingly prevalent over time – of greater frequency in the whole population. Those copied less die off and disappear.

The principle of 'natural selection' applies as much to learning processes, whether of groups or individuals, as to the biological co-evolution of living creatures. It's just the trivially simple tautology that “Longer lasting patterns last longer than those which last not so long” (as Gregory Bateson put it). In this way it's somewhat broader than the competitive mechanism of creaturely survival and die-off. A pattern may last longer because it occurs more often and is culled less stringently. Or it may just be likely, like a catchy tune, to persist and get copied. There need not even be any copying or variation: just a single durable pattern that persists in time, takes up the available resources and stifles competition, i.e. prevents anything else from gaining a foothold. There may be stylistic variations which are essentially meaningless so far as 'fitness' is concerned.

For group learning, the crucial point is the existence of some idea or theme which persists in its basics, as it gets varied and improved in execution. Long ago, human groups learned to bake clay to make pottery, weave fibre to make fabric, make and use sharp edges to cut their meat. We mostly do these things more easily and cheaply now; our tools have certainly improved; but the underlying concepts of cutting, weaving and baking have not changed at all.

5.1.2 *Self-similarity*

The key principle of [vegetative growth](#), in fact, of all replication, is self-similarity – the requirement that every copy should resemble (at the limit, be identical to) the prototype from which it was made. Any self-replicating pattern of this kind (for example, a behaviour pattern (e.g. your habitual breakfast) will be loosely stable insofar as the pattern is repeated more-or-less faithfully, but ultimately *unstable* if small changes accumulate until a 'tipping-point' is reached, at which the system crosses over into a new 'basin' – a new region of functioning, with different values and principles of selection.

With regard to learning, self-similarity is a principle of cognitive stability – of enduring habit, custom, precedent or design, which serves as a base for variation. Innovations take off as variations on what has been done before, on what is already known and understood. Or, to the contrary, they take off in denial, wilful negation of what went before – like the antithesis that stands an original on its head, or like the negative from which a photographic print was made, before the days of the digital camera. In this way, self-similarity is just the principle of positive or negative role modelling (or of emulation in general). It is a precondition for the natural selection of memes in a mindset as these are varied, taken up by others, and progressively improved.

5.1.3 *Swarming*

[Swarming](#) is collective activity by a large number of autonomous entities that direct themselves only with reference to their near neighbours – for example by moving in the same direction and remaining close to them while avoiding collisions. Examples in nature are the schools of fish, flocks of birds, herds of grazing mammals, and so forth which find a measure of safety from predators in this social behaviour. Humans too make a natural use of swarming behaviour in our styles and fashions and customs. We see it too in the patterns of walking on crowded city streets, and in the behaviour of drivers who stay in lane and keep some distance from one another depending on the speed of the traffic. Armies train their soldiers in swarming as a conscious tactic. The swarm is a simple of way aggregating and coordinating social behaviour, without the need for centralized control.

Human groups use swarming in very subtle ways – in ways which are susceptible, and capable of improvement through collective learning. Consider the emotions of shame and envy, for example, forms of swarming behaviour, in so far as they cue the persons who feel them to some response based on cues received from their close associates and neighbours, and not from any centralized controller. Shame, in particular, is grounded as an affect in human physiology, but very sensitive to cultural interpretation as well. We learn from culture (from those around us) what to be ashamed of, and just how ashamed to be. We learn how to express, suppress and compensate for shame feelings as part of what is needed to gain and keep acceptance as a member of one's group. In this way, groups can deploy shaming as a punishment for failure to

learn, while using shame avoidance to motivate desired learning. They can use envy to get people working toward the same goals, in pursuit of goods (and other rewards) that they have been taught to want. In short, swarm effects help human groups to learn and follow complex patterns of collective behaviour as members look both to celebrities (style leaders) and to one another in choosing patterns to follow.

5.1.4 The Matthew Effect

What already has much will attract more. This principle, called the [Matthew effect](#) (after Matthew 25:29) ensures that the rich will get richer because they are already rich, and that celebrities can be famous just for being famous. It ensures that Web pages that get visited a lot will turn up higher in Google search ranking – and thus tend to get visited more.

In connection with individual or group learning, it can be seen to govern the relationship between learning and practice. What we do a lot becomes efficient, comfortable and habitual, as it gets varied and selected much more than activities performed rarely. What we get good at in this way tends to be pleasurable, by comparison with all that is less fluent. What is pleasurable we tend to do more of, forming a self-reinforcing loop. Combined with self-similarity, the result for mindset is to build further on who we already are: finding new variations, tailoring these ever more smoothly and spontaneously to each current situation.

In conjunction with status, stigmergy and swarming, the Matthew effect acts as an amplifier, turning individual choices into collective ones. Through it, a leader can set the pattern for a whole group as more and more individuals take up and copy what they see others doing. In this way, it makes style and fashion possible, and helps keep custom relatively stable. It plays a key role in turning the population of separate individuals into a group with collective mindset.

5.1.5 Lock-and-Key Mechanisms

The lock-and-key principle is basically about precise fit. As the metaphor suggests, the correct key, accurately cut, will turn the lock and open the door. The wrong key will not. More generally, in a given system, the right component in the right place at the right time will work in a certain way, and produce a certain result. Nothing else will do so. In effect, the system must wait patiently, holding its fire (so to speak) until a good choice for this process comes along. Only then, recognizing its proper target, can it 'shoot.'

In this way, the lock-and-key principle relates a type of situation to its learned response: instinctive behaviour to its sufficient trigger. By its means, a system can await its opportunity, prepare for this, and then act swiftly when it arrives. In this way, a store stays open waiting for prospective customers. It adjusts its product offerings to potential buyers whom it knows are out there.

It puts out signs to attract its passers-by – to make these pause, window-shop and enter the store.

As regards learning, the lock-and-key principle can be seen as a special case of top-down causation (see below), as when a component part evolves to fit and function in a whole system. Zoning laws are a good example for the group learning of a city. The municipal government makes rules about what can be built where, and about which businesses can operate where. There will be a district for factories and heavy industry; there will be streets and districts for retail markets of various kinds – fitting in with these, but separated to some extent from the residential streets and neighbourhoods. The city does not (and cannot) control who will buy a given property or go into a given business at a given location. It merely insists that whatever does should fit – that is, comply with – its over-all regulations. There may be some evasion. There may be lobbying from businesses to change the law. But the zoning laws work on a lock-and-key principle to accept certain uses of a given property while rejecting others. Their enforcement is an instance of 'selection' in the social environment, and of top-down causation as well.

In quite a similar way, both natural and social landscapes select the peoples who live on them, as individuals search out and select desirable environments to which they are already adapted. People choose and drift toward compatible friends and mates. Muggers on city streets look for and attack potential victims (muggees), but will have turf wars with other muggers who want the same victims.

5.1.6 Lobster Trap Effect

A lobster trap sits on the ocean floor baited with chum that any lobster that comes along may want to eat. By a lock-and-key principle, it may be fairly selective – for example, by allowing baby lobsters to escape until they grow big enough to be worth catching. The trap's opening and holding chamber are configured in such a way that once in, the lobster will almost certainly not be able to find its way out again, but will have to stay there waiting to be collected. The general principle is that a change process can be one-way only, or overwhelmingly more probable in one direction than the other, so that random arrivals produce a steady accumulation, or a steady stream in any consistent direction. In effect, the time-symmetry of the system is broken, constrained to change along some pre-evolved pathway. In this way, an acorn grows into an oak tree (if it succeeds in growing at all), and not into pine tree or a willow. In this way, human mothers give birth to human infants, and not to kittens or calves.

Human groups grow and learn under a similar constraint. In each case, a group which formerly could do anything at all is now constrained to do something in particular – just as a long, thin cylinder (like an unsharpened pencil), now balanced on one end, gets nudged, then tips and falls, in some particular direction. In its state of unstable equilibrium, we expect the system

to fall over soon, but do not know in which direction this will happen. Once it begins to fall, that symmetry is broken.

The [ratcheting](#) of technological change is basically a lobster trap effect. So is an arms race or a war, both notoriously difficult to halt once they have gotten started. Similarly, a business firm operates with this same directionality – working to acquire cheaper raw materials, streamline production, and expand its customer base. Systems and components are designed and built to perform certain functions, meeting certain specifications. Training programs are designed on this same principle to produce graduates or alumni with certain qualifications. On a larger scale, gold rushes and similar acquisitive stampedes – for land, for oil, for whatever exploitable resource – motivate human individuals and develop society irreversibly in a certain direction. The history of the Americas (since first colonized across the [Bering Land Bridge](#), about twenty thousand years ago) and history of life on this planet – are good examples of such one-way processes. Historical processes are strongly directional, and required by the lobster trap principle to be so. Not that catastrophes and epochs of collapse are impossible (far from it),⁴ but that societies normally grow, expand and perish in a directional way.

The upshot is what biologists call [teleonomy](#): apparent purposefulness or goal-directedness in living creatures – brought organically, without intention or foresight. On this same principle all learning can be conceived as a one-way [Baldwinian process](#), driven along some ratcheted path by selection criteria of the system's choice.

5.1.7 *Top-down Causation*

'[Top-down causation](#)' (TDC) is the causal relationship invoked when some event or structure is explained with reference to the whole of which it is a part. A whole is something more than the collection of all its parts. It is a network of relationships among those parts, and the [context](#) that this whole network provides for *each* of the parts within it. One might think that 'context' is just a logical abstraction but, *as a whole*, it exerts a causal power to shape or suggest component behaviors – in much the same way that the meanings of individual words are often determined by that of the sentence in which they are used.

For example, [the word 'set'](#) has 25 distinct meanings in the Merriam Webster dictionary, just as a transitive verb. In all its usages together, it has many more. Yet if someone says to you, "Please set the table," you know exactly what is meant. Similarly, both in nature and technology, there are endless examples of parts which evolved or were designed to play some particular role as components in a whole system, and which take their meaning from the systems in which they function. Take the light bulb for one example. When the electrical grid is functioning properly and the wall switch is set in its 'on' position, the bulb lights up a room. If there is a power outage, or when the switch

4 For the role of break-downs in the evolution of structure, see the principle of [Self-Organized Criticality](#) below.

is set the other way, the bulb serves no function whatever. In this and many similar cases, we cannot know how the component will function without knowing the state of the system as a whole. In just this way, the structures in your body lose their functions and start to change immediately when you cease to provide their context as a living system.

We have alternative names for TDC in human groups: We call it culture, governance and government, and we speak of political influence and power. TDC is the shaping of individuals and their behaviour by the groups they live in – the topic of Chapter 9 on '*Embedded Persons*.' Our groups exert what we will speak of as 'context pressures' on the mindsets of individuals, and thus on their perceptions, desires and activities. Newborns are only human animals until TDC has had a chance to work on them – to teach them to present themselves and function as social 'persons.' In particular, TDC makes possible the distributed cognition discussed in Section 3.1 – the capability of those crewmen to navigate their ship, or of our castaways on the island to catch fish from their canoes.

Individual entities are driven by and, in some sense, are one with the systems in which operate. Stigmergically,⁵ through their individual activities, they alter the contexts in which they operate. Yet they retain whatever autonomy (whatever capacity for individual cognition and intention) that they've evolved. Without top-down causation, there could be no systemic learning, nor systemic functioning of any kind.

5.1.8 *Least Action*

The principle of [least action](#), discovered by Maupertuis in the 18th century, states that a certain mathematical property (the *action*) of any dynamic system is 'stationary' (usually at a minimum, but sometimes a maximum or a saddle point) for any natural trajectory. The laws of classical mechanics and, still more, those of quantum mechanics, are often formulated in these terms.

As a principle of choice and action, for groups as for individuals, 'least action' shows up in human affairs as a quest for economy and efficiency – e.g. In [judo](#) or [aikido](#), to throw an opponent with the least expenditure of effort; in military affairs, or industry, to get the most "[bang for the buck](#)." In connection with cognition and learning, 'least action' appears as a principle of interpretation, whereby sensations of your body are perceived (sometimes mistakenly, but with remarkable speed and efficiency) as intelligible events in the external world, and then compressed into narratives; then into political theories; then into slogans and sound bites. Effort of all kinds, including cognitive effort, is costly in various ways and must be economized for that reason. Individuals and groups seek to do so – often as part of their competition. The advance of technology can be seen as a matter of doing more and more with less and less.

⁵ See Section 1.3.3.

5.1.9 *Equilibrium (Balance, Stability)*

A principle of dynamic balance maintains every durable system in loose equilibrium, or periodic oscillation. Through processes of homeostasis (aka feedback), organic systems maintain themselves in the balance that we call 'life.' Through extraction and expenditure of resources, and through discharge of waste products, these systems change periodically over time, but maintain approximately a steady state. The ancient Chinese spoke of [yin and yang](#) and made the necessity of balance between them a central principle of [Taoist metaphysics](#). Western thought too is replete with paired concepts – e.g. good and evil, work and play, fun and comfort, supply and demand – which both limit and give meaning to each other, and hold each other in rough equilibrium over time.

More than a principle of learning, balance (like *least action* just above) is a principle of cognition, manifest in the [dialectical pattern](#) of concepts and values to suggest their opposites, which sometimes sets up conflict in this way. It is used by philosophers and in courts of law to learn the truth about something by (metaphorically) *weighing* the arguments on both sides of a question. It figures in our theory of communication as a bandying of suggestions, which must be '*weighed*' against each other before our choices are made. The weighing and dynamic equilibrium of factional interests and capabilities is a central feature of politics and thus of group learning – one that statesmen and historians perceive in many situations when they speak of 'balance of power.'

5.1.10 *Self-organized Criticality*

[Self-organized criticality](#) (SOC) can be understood broadly as the tendency of systemic order to build itself toward a critical point and then break down when it goes past that point. All organization is precarious, fragile. Where it can exist at all, it builds toward some relative maximum (maximum for its structure and current situation). Beyond that point, it breaks down to a lower level, usually according to a [power law](#) that larger breakdowns are exponentially less likely than smaller ones. In nature, a paradigm example is the avalanche on a snow-laden mountain side. In society, it might be the failure of a business firm, the [collapse](#) of a building, or the [cascading failure](#) of a power grid. The most extreme case would be the failure of a whole civilization which may build up to a '[golden age](#)' but then breaks down into a [dark one](#).⁶

As regards group learning, SOC helps to explain the failure of individuals and groups to achieve or maintain cooperative accommodation that would seem to be in their interests. It helps explain why groups fail to form, or fail to thrive past a certain point, however advantageous they seem. It suggests that there will always be some instability in the accommodations that are achieved – in the groups that form, and in the social order established. SOC helps to ex-

6 See, for example, Jane Jacobs' book, [Dark Age Ahead](#) and Morris Berman's [Dark Ages America](#), both warning of an approaching collapse and dark age of our own civilization.

plain the shapes and contours of our social structures, which build up as they can, but break down from time to time when their stability is lost.

5.1.11 Summary: The Automatic Learning of Groups

Quite deliberately, a group may set itself to pay attention to something and learn something that it believes is important, and that it knows it does not know. In the 15th century, Portugal [set itself](#) to explore the African coast and the Atlantic wind and sea currents. In the 21st century, the US and an international scientific community [have set themselves](#) to understand the workings of a human brain. We'll be discussing such intentional group learning in Section 5.2 below. However, through mechanisms of self-organization that we've just reviewed, groups also learn with no collective intention to do so, as a side effect of what their individual members are after. In this way, for example, mid-19th century Americans [explored their continent in detail](#) as a by-product of the quest for gold in California.

Groups learn collectively as their individual members do, but in several other ways as well:

- They learn stigmergically, as ant hills do, by making changes to their habitat.
- They learn as a collective consequence of swarm behaviour, when their individual members, relating mostly to their private goals and to each other, find themselves functioning as a mob.
- They learn through the dynamics of a market, as individuals and sub-groups, driven by separate motivations, find ways of doing things more efficiently by specializing and trading with each other.
- They learn through top-down causation, as their members are drawn by their social contexts into new games, new relationships, new institutions, and new ways of making a living.
- They learn through natural selection in the memetic repertoire, as some patterns either propagate better, or endure better, than others.
- They learn through self-organized criticality (SOC), as structures of all kinds build up till they become unstable and breakdown.

Groups can learn automatically in all these ways, before there is any collective intention. Often some such intention develops later, as a by-product of what the group is already doing. The [intention to secede](#) from the Union, formed by its southern slave-holding states is one notorious example of a collective intention formed as a side effect of other things that were going on.

With a grasp of self-organization and its mechanisms, we begin to understand the automatic, intentionless evolution not just of physical patterns, but of mental ones as well. With that understanding – that human groups function both as self-organizing and as mindful systems – we have a new and sounder basis for social science. For us here, the crucial point is that a group's politics and its learning are beyond human control: They are not controlled by 'the

gods,' or by 'fate,' or by mere chance (though this last plays a very great role), but by intelligible processes of self-organization. Volition too plays a role, as we'll see next. But this always leaves some slack – some room for unintended side effects. It is through mechanisms of self-organization, of human volition and of chance that a group mindset emerges to constrain and guide its political process of collective thought. It is through this learned mindset and its resulting political process that a group can have a mind of its own.

5.2 Attention and Consciousness

Throughout this book, I speak of learning as a kind of evolution; and I mean this literally, insofar as learning is basically an adaptive process of trial-and-error and tautologous retention of what lasts longer at the expense of what lasts less long. Yet for human groups as for human individuals, much learning also involves conscious attention and intention, where biological evolution is blind. We must not ignore the role of consciousness in cognitive and social evolution, just to stretch the biological analogy farther than it goes.

Group learning becomes really powerful and effective when a group consciousness is involved: when the group makes collectively intentional efforts to acquire and apply skills or knowledge or material possessions that it does not have, but actively wants.

Group consciousness? What could that mean, and how could it come about? We're still not sure what individual consciousness is, or how it could emerge in the electrochemical firings of neurons. Perhaps a thought experiment about group consciousness (whatever exactly that means) can make the [hard problem](#)⁷ of individual consciousness somewhat easier.

Let's imagine a whole world of humanoid zombies who live stigmergically like ants, functioning with collective purpose and intelligence, though wholly lacking as individuals in what we think of as 'consciousness.' As individuals, they do everything that we do, but as automatons; they have no self-awareness at all. Such a world may or may not be possible, but the notion is not far-fetched. We understand ourselves as conscious beings comprised of trillions of unconscious cells. Given the Internet, the World Wide Web and cell phone technology, it is not hard to imagine a future in which human libraries, factories and distribution systems have become astoundingly sophisticated and intelligent while individual human consciousness has atrophied. All we need do is imagine that such a process has gone to completion. Then we can ask: which collective functionalities would make us willing to concede that this global mind was truly conscious, as its teeming individual components are not? And we can answer that at least six collective properties would seem to be involved:

- 1) The first of these stems from an important distinction between sensation and [representational perception](#). Our collective mind, engaged

⁷ See also the more technical account of this problem on the [Internet Encyclopedia of Philosophy](#).

- with and against its external world, as yet has no collective perceptions that we have earned the right to speak of. But it clearly gathers information about happenings in that external world (much as our human senses do) from the impacts of events upon its own functioning. Perhaps it has specialized agents – spies, journalists, academic scholars and the like – to prepare reports on what is happening. In this sense it has no lack of functional sensation from its world without (as yet) their [qualia](#)⁸ – the subjective feeling of these stimuli.
- 2) A second property is the collective and social analogue of the affective colouring or flavouring of experience by human individuals. Our groups have collective emotions, partly but not exclusively taken up from those of their human members. They also evolve capabilities to respond in characteristic, affect-like ways (collective response patterns of excitement, tranquility, curiosity, fear, anger, etc.) to various types of stimulus. Through these pattern, the group acquires a collective palette of emotions that belong to the system as a whole.
 - 3) A third property confers some faculty of reflexive perception – self-perception – upon the minding system. As an entity in its world, that system observes at least some of what is happening to itself – what it does and what gets done to it by the world it lives in. Modern society, with its theories, its pundits and its media, has a great deal of this self-awareness, much more than ancient ones could have had. There is lots of collectively available information about what is happening to the group, including some dim awareness of its collective feelings, but there is still no group perception, as the faculties of attention, conceptualization and imagination have not yet been introduced.
 - 4) But such faculties are coming. A fourth level on the way to group consciousness is the system's ability to manage and direct its sensory and motor resources – in one word, to pay [attention](#). In many contexts, attention is almost synonymous with consciousness: we are mostly not conscious of a nearby event when our attention is focused elsewhere. In fact, however, one can be dimly conscious of something without paying attention to it, though it is scarcely possible to attend to a sensation of which one is not conscious. Overall, we can be sure that the capability for selective attention is a crucial stage in the evolution of consciousness – one that we share, probably, with every other creature that has specialized sense organs, and a central nervous system. It's a capability that human groups and societies clearly share, as evidenced in their fashions, mass movements and controversial issues.
 - 5) Symbolic representation, especially through the medium of language, is yet a fifth level of functionality, distinguishing human consciousness from the dimmer awareness even of chimps and gorillas and our direct

8 Again, see other discussions of this concept on the [Internet Encyclopedia of Philosophy](#), and also the [Stanford Exyclopedia](#).

hominin ancestors. Language opens the way to an entirely new type of consciousness; and language is pre-eminently a collective phenomenon, much more than a personal or individual one. Speech, by this point, must be a biological instinct in our species, taken up through [Baldwinian selection](#) into the human genome; but it takes a group – a closely and persistently interacting group – to evolve and sustain a particular language and literature. This is not the place to discuss how language differs from other forms of communication. The short answer is that language depends on [symbols](#) which juxtapose with one another, and which can be strung together with a grammar, and which refer to one another by contrast and association – unlike [signs](#) which refer to events in the real world.⁹ The crucial point in connection with consciousness, is that individual persons participate in and share the language and cultural literature of their whole society. They take this dimension of consciousness from their society as a whole, much more than the other way around.

- 6) Imaginative [percept](#) construction – what Alfred Korzybski called time-binding – is the last functionality that we'll consider here, a capability to summon '[mind's eye](#)' representations of events and things not present to the senses:¹⁰ memories of past events, anticipations of plausible future ones, counter-factual imagery of every kind. What with language and story-telling, graphic representation and material artifacts with their suggestive values, human groups again have this mode of consciousness more clearly than individuals do. Stories, graphic images and cultural productions of every kind are just that – cultural productions. They circulate, and in doing so become what we are now calling memes: features of group mindset as such.

Considering the collective consciousness of whole societies and groups in this fashion, I think we get a better sense of what we mean by consciousness in human individuals – who are themselves complex 'societies' comprised of trillions of cells:¹¹ tiny biomachines with little or no individual consciousness of their own. Thus, in human individuals as in groups and societies, we can understand consciousness as an emergent feature in which these six specific functions are present.

As with individuals, the conscious feelings, beliefs, desires and intentions of groups seem to occur in a [global workspace](#). For individuals, this workspace is a feature of a brain's connectedness. For groups, it is a feature of its public media, and of existing institutions for public discourse and choice. What we understand by group consciousness, then, are effects of minding

9 See also Section 2.1.3.

10 See also [this article](#) from the the Atlantic magazine, What Does it Mean to 'See With the Mind's Eye?' and this [Wikipedia article](#) on visual imagination.

11 [Best current estimate](#): 37.2 trillion of them.

which occur and are remembered in public, and therefore remain publicly accessible. The conscious learning of groups is that change of their collective mindset from experience gained and remembered in public media and discourse.

For examples of collective consciousness, we can think of [Plato's Academy](#), of the [monastic schools and universities](#) in medieval Europe, of the mutually stimulating [correspondence](#) and published writings of the *philosophes* (mainly in Western Europe) who created what we call 'the Enlightenment'; we can remember the tinkering of inventors who perfected firearms and invented heavier-than-air flight; the missions of exploration in the 15th and 16th centuries financed at first by the Crowns of Portugal and Spain, and then by other European countries. Today, most public learning occurs in institutions specialized for this purpose – through research projects, and pilot ventures of universities and corporations. The [patent system](#) brings even very private, proprietary inventions into the public sphere. Media, libraries and now the World Wide Web ensure a public circulation and access to ideas; thereby they greatly enrich the whole society's collective consciousness, (though maybe not the average consciousness of individuals). Lacking political and economic order, fraught with conflicts of religion and worldview, we find this rich collective consciousness in turmoil everywhere.

5.3 Mutual Adaptation

Personal disclosure: With or without benefit of a marriage ceremony, over the course of my life I have lived with three fine women. None of these relationships was trivial, but all eventually ended. As I have never been an easy person to live with, I am in no position to give advice on living with others. However, I do have some experience of the problem and, perhaps, some standing to write about its difficulty.

It's much easier to love someone than to live with them. Two young people getting married and/or moving in together have made themselves a paradigm case of group learning, the most common that I can think of, albeit on the smallest scale. It goes without saying, of course, that much personal learning is also needed by the individuals themselves. But this can only occur in the context of their relationship. It makes sense to say that the new couple is learning (or trying to learn) to function and to thrive and, as it does so, training its two members in their roles.

What's gained by speaking in this fashion is a clear recognition of two crucial points: first, that the married couple is actually *a new entity*, a more-or-less functional system in its own right; and second, that each of its protagonists is now caught up in a marital '[game](#)' (in the technical game-theoretic sense) presenting each with new payoffs and new strategic choices. As individuals, they may acquire some skill in making these choices. They will certainly acquire some habits. But they will always be doing so in response to the

other person's skills and habits. They may be pulled off their own centres in the process, and may feel like different individuals than they had been before.

Sex itself is a fumbling, embarrassing business for two persons who have never done it before. Even two experienced lovers will need to learn each other's likes and dislikes, and each others rhythms. But it's not just what the pair must learn as individuals. Their 'two-backed-beast' needs practice to get its act together – needs experience and pleasurable habit to find its groove.

Their household too needs time get itself organized: How the shopping gets done; how the meals are prepared; how the tidying and cleaning chores get distributed. And all this takes place against a background of shared preference that remains unknown until it is discovered and charted. Their whole relationship is no longer just a matter of visiting each other's apartments, or of meeting on neutral ground. No longer just a love affair, their daily life now includes a million petty details and differences which will need to be negotiated, and sometimes fought over, before they settle down to a routine. No item of their shared, marital culture will be more important than the customs and rituals that they evolve for quarrelling and making up.¹²

A further question for joint learning is the context in which this marriage is to function. Married life is lived in a community, and in a network of relationships. Both parties have their more-or-less supportive, more-or-less intrusive parents and relatives. The couple needs an income 'to make ends meet'; and this will have to be earned, or otherwise gained. It may be touched by war, by economic depression, by every kind of external event. Whatever happens, the married pair will have to adapt and cope *as a social unit*, not merely as two separate individuals.

Yet another question concerns the ways in which a couple's joint learning stresses its parties as separate persons. The very fact that the marital context will work differently on each party shows how the couple has become a distinct system, with causal implications for its members. After a few years of marriage, neither will be the same persons that they were when they first tied the knot. And neither will be clear exactly how the changes occurred.

Finally, a new couple must anticipate that the arrival of children will shift the marriage-system in unpredictable ways, bringing new rewards but also new difficulties and stresses. With children, the marital group gets bigger and somewhat less organized, but it is still a minding system.

All the above is common knowledge. Everyone who has been married, or observed the marriages of close friends or relatives has seen the stretching and pooling of identities that occurs in such relationships – the way that two persons become "one flesh," even as they remain two separate individuals. They will have seen how these dyads assert, defend and adapt themselves as such, while the persons involved are also changing.

¹² No end of advice is available on the Web and from friends and relatives. This [HuffPost column](#) is a fair example.

Of course, marriage is not the only close relationship, but its intimacy, its biological and social centrality and its potential longevity make it paradigmatic for our purpose. A similar stretching and pooling of identities occurs in every close relationship. Even the smallest, most transient groups are capable of joint attention, learning and intention; thus they may have significant impact on their members' choices, and thus, some mindset of their own.

5.4 Discipleship and Lineage

Jesus had disciples who developed and spread his teaching after he was gone. There is nothing specifically Christian about this. Many other gurus, thinkers, political leaders – important teachers of every kind – have done essentially the same. While the master is alive, a few students gather and stay around to learn what they can of what is being taught. When the master dies, they have a problem: If they hang around the site of their training, they can do little more than squabble about who learned the most, and who is the true successor. Much better it is for the more senior students to scatter abroad, seeking followers of their own. In this way, the disciples of Jesus went to Corinth, to Ephesus, to Rome and other great cities of the ancient world, to spread the gospel and found churches. The disciples of aikido's founder, [Morihei Ueshiba](#), when their master died in 1969, went to London, Paris, New York, Sydney, and other great cities of the modern world to open aikido dojos. In this way, a [lineage](#) develops, as generations of students cite their teachers and their teachers' teachers, and so forth, all the way back to the founder. The end result is a sect or school or field of study – a group of individuals held together, but also divided, by their individual uptake and instantiations of a common teaching.

In groups of this kind, there is a problem of certification and quality control. Everyone starts out as a beginner, responding to the teaching (whatever teaching) with their own personalities, preoccupations and previous learning. If the beginner sticks around, he or she may become a serious apprentice and then a ['journeyman'](#) of sorts, with recognized competence in the field. Finally, the journeyman may become a master and teacher in their own right, with apprentices and journey-persons under them. At each stage of training, there will be some rite of passage, often preceded by a formal examination, or other kind of test, to mark this pupil's graduation to a higher step. At some point, he or she will be told, or given a diploma, acknowledging their right to practice and teach. Exactly how this blessing is given varies greatly from one such lineage to another. But given it must be, as no such group can survive without training and qualifying each new generation of practitioners and teachers: be they priests, doctors, particle physicists or lawyers, or karate instructors, chefs or garage mechanics. The result will be a kind of [franchise operation](#), in which a central organization licenses more or less autonomous outlets, and may supply important services to these, typically charging a fee or percentage for doing so. We see this same pattern with law firms and hamburger joints, with gas stations and churches. [Medieval guilds](#) were entities of this kind. In each case,

there is a brand or known product, a business model, and a certifying process to regulate the market and protect the public (and the brand's reputation) against fraud.

For collective learning in any society, such lineage groups have tremendous importance. One way societies can learn collectively is by accepting new franchises of this kind, or by allowing their existing ones to change. As prospective masters and existing lineages compete for pupils, and as some serious pupils become masters in their turn – adding, subtracting, always personally interpreting whatever they were taught – these groups add their respective memes to the whole society's repertoire. Also, they may organize themselves as business and/or political entities, competing with other such groups for [market share](#) and influence. Some of these rivalries become quite serious, even deadly, as adherents pin their livelihoods and their identities to one or other of these various schools. In hard science, the dispute between competing theories can be settled by experiment. In the social sciences, the dispute between competing paradigms and methodologies may linger decades – or forever, if each has some validity of its own. Between religious sects, there may be bloodshed for centuries.

As an example of collective learning through franchise revision, the history of [the Reformation](#) is instructive – especially for readers who are not Christian and can view that process with detachment. Before 1519, the Roman Catholic Church held an effective monopoly on religion in Western Europe – had, in fact, been one of the central organizing principles of society after the [Council of Nicaea](#) and the [fall of the Western Empire](#). There had been a few major schisms, heresies and calls for reform, but Luther and his 95 theses triggered a religious revolution and civil war, dividing Western Europe against itself, which only ended with [the Peace of Westphalia](#) in 1648.

Luther attacked the corruption of the Roman papacy, and introduced a doctrine of salvation by faith alone. Calvin was a lawyer, and organizer and a more systematic thinker. What he gave to the Reformation was a rigorous and very strict theology which emphasized the power and absolute sovereignty of God, the profound sinfulness of Man, and the Bible itself – not its priestly interpretations – as the sole source of spiritual knowledge.

Remember that this is not yet a world which recognized the right of individuals to their own beliefs. The Westphalian settlement recognized the right of each prince to establish the religion of his subjects – Catholic, Lutheran or Calvinist. It was still very far from conceding a human right to believe, and go to hell, in one's own way.

Henry VIII of England wanted to divorce his wife and had his eye on a lot of rich monastic property. Otherwise he had no love at all for Protestantism. For this reason, [the Anglican Church](#) that he established was not much different from the Catholic one, except in having this king and his tame bishops at its head, and not the Pope and Vatican. But this left the British Isles with an unstable situation which took hundreds of years before it settled down. Many

English wished to remain Catholic. Many Scots and some English preferred a version of Calvinism. The Irish, with no love at all for the English, could not be forced to give up their Catholicism. The only solution was to leave religion as a private concern.

The Irish were not the only ones to use religion as a kind of flag for various political agendas. There was a [radical reformation](#) which tended to deny the authority of *any* established church, and to insist on its inevitable corruption. There had long been peasant uprisings with some kind of religious subtext, and these continued – notably with the [German Peasants' War](#) of 1525, which Luther did not condone.

The core idea of [secularism](#) – that separation of church and state might keep the peace, and thus be advantageous for the state and for religion – took centuries to develop and remains controversial even today. Nonetheless, the whole of Western experience points in this same direction: that religion can no longer serve as pillar of a modern society. Established religion is no longer a source of social stability but of endless conflict. Religion (or its absence) is best left as a private matter.

Still, religious (and irreligious) lineages remain very powerful, and there is no prospect at all of their becoming less so. When a whole society is learning something, I see only two ways that it can do so: It can build artifacts and institutions which inscribe and prescribe the new idea – along the lines of McLuhan's famous dictum that “the medium is the message.” And/or, it can accept and feed a lineage group which develops and propagates the new idea until it saturates its market. Either way, the memes at point acquire a super-personal existence, belonging not just to this or that individual but to the group as a whole.