

## CHAPTER 2

### EMOTIONAL AND RATIONAL MIND

When we review our rational discovery of objects and events, we often find that they consist of components that in turn can be distinguished into subcomponents. Components may serve as subcomponents, and subcomponents may present components in other conditions. Objects or events may be components or subcomponents in larger conglomerations. Hence, most aspects we explore can be designated as subcomponents, components, or composites depending on our focus. We may use the terms object or event to designate the level of combination we are primarily trying to explore, accomplish, or change. To uncover the reasons for the functioning of objects or events, we may not have to comprehend all or any of their components. The combination of their components may be so stable that the resulting properties can be attributed to the objects or events, allowing us to use them without an investigation of their constituents. Then again, circumstances may require that we take more intimate command of objects and events. We may want to enhance them, build, prevent, or guarantee their stability, secure their occurrence, or control them better in other respects. For these purposes, we may need to know to some extent what components create the functions of the entirety and how they create these functions. To achieve that knowledge, we may have to understand the presence, properties, and interaction of components at several successive constituent levels. But it may often be unnecessary to investigate the deepest possible levels to sufficiently ascertain the nature and the source of behavior we are trying to understand, effect, or affect.

We familiarize ourselves with components so we can assemble them to functioning objects or events or so we can control or alter existing objects or events. We can derive some of this knowledge by isolating components. Isolated components may tell us about aspects of their nature by direct impressions emanating from them on our senses or on measuring devices. We may extract important basic knowledge by studying the behavior of components separately. But we may only understand their functionalities sufficiently to support our purposes if we observe their interaction with other components or combinations of components. That requirement may apply not only when we try to assemble an unprecedented or emulated object or event from components but also when we attempt to understand the workings of an object or event to use or otherwise affect it. We add to our knowledge of components by witnessing their effect on one another as parts of the same object or event, on combined aspects of such an object or event,

on the remainder of such an object or event, and on the external context of such an object or event. To be complete and to afford us information about possible challenges and opportunities, we may also venture beyond and research the behavior of components in contexts that are not part of an object or event we are trying to build, use, or otherwise affect. To most comprehensively establish our knowledge and reveal useful means, we may observe the effects among components and combinations at different stages of assembly that are unrelated to an immediate intent. We may thus synthesize substances in a variety of combinations and observe their reaction to understand their utility and to use the product immediately or to possess a future example.

However, synthesis alone might not complete our understanding. We gain additional insight by separating components from combinations. Here again, our wishes and inquiries may not always be focused on constructive purposes for a particular object or event. Most basically, we may attempt to separate components from combinations to use them in another context and may need to understand how that can be accomplished. We may also seek to alter an object or event by breaking or diminishing its functions. This may require that we learn to subtract components. To find relevant components for such an undertaking, we might have to test the separation of various components alone or together from their participation in an object or event. Even if we pursue constructive purposes concerning an object or event, we may have to separate or maintain separation of certain components to enable or enhance its functioning. Further, components that we might require or find useful in building, using, or otherwise affecting objects or events may not occur separately. We may have to subtract components from combinations to identify and understand the existence and properties of such components and to test and observe their correlations. When we separate components, we overwhelmingly have an eye on using the result in a synthesized position. In a constructive setting, our observation of components' behavior during and as a consequence of severing their relationship with other components may illuminate them and such other components. We may use such insights to reconstitute the deconstructed object or event or to construct another similar or different object or event. Even when we attempt to disable functions, we may wish to confirm the effectiveness of deconstruction for immediate purposes, future repetitions, and to preserve their reversibility for present and future purposes by comprehending the essential functions of severed components. Thus, when we isolate components, we often record their synthesized state we are dissolving and the processes involved in and resulting from separation to attain control.

We may then conclude that without undertaking analysis and synthesis it may not be possible to understand or influence functions within an existing object or event or to conceive and create a new object or event. Analysis and synthesis appear to be indispensable, connected processes to comprehend the workings of our domain and to shape it according to our needs. As we separate and associate components, we understand participants and relational causalities that constitute objects and events. This also permits us to distinguish relevant components from others that have no material effect on a result or counteract or inhibit the result. To ascertain the involved participants, their properties, and their interactions that create the existence and functions of an object or event, our inquiries move back and forth between separation and correlation. To gain sufficient understanding of and command over an object or event, we may have to engage in such an interchange between analysis and synthesis at several stages of assembly. What we may commonly call analysis therefore often reveals itself as a process of gaining comprehension that comprises both analysis and synthesis. To prevent misunderstandings, further discussions apply the term analysis in its precise sense of separating components from an entirety and use the terms investigation, examination, or their synonyms to refer to the combined process of analysis and synthesis.

Although the limited application of this investigative technique of analysis and synthesis to individual settings may be instructive, it alone does not seem very efficient. Our understanding of the particular causalities in particular settings we explore enables us to train our behavior should we encounter such a setting again. It may also allow us to re-create such a situation and its effects. However, limiting ourselves to the re-creation and the avoidance of identical settings would not seem to be very helpful. Trying to re-create the exact circumstances that have previously induced pleasure and taking precautions solely when we detect circumstances that are identical with those that have previously led to pain are not the most effective ways to use our experiences. We rarely enjoy the luxury of encountering identical circumstances in our attempts to satisfy our needs. The differences in the settings we encounter are at times extensive. If our mental skills are limited to working with identical circumstances, we might not be able to act effectively or efficiently or might not be able to act at all. Understanding the relational causalities of a particular setting may not help us to predict the outcome of different or changed settings. New components may attend or some components may be missing. There may be variations in the number or quality of familiar components or the components may have different allocations. These factors may change

the outcome. Incomplete or unreliable data may require us to speculate on foundations of superficial perceptions and extrapolations. We may venture predictions of outcome according to the congruence of some components with settings we have already experienced. Yet remaining factors may disturb that assessment. The components whose demeanor we observed in a particular setting may perform differently in other settings. Our lack of insight into the causation of a particular new setting may prevent a sufficiently secure forecast of its effects.

We may identify changes in new settings by allowing them to play out and by repeating a procedure of analysis and reassembly with every changed context we meet. We may accumulate experiences and have them correlate and overlay to form a library of causes and effects. Such a library would allow us to narrow the deficiencies in our knowledge. But it still would not resolve our problems of predictability if we continue to encounter substantial variations of circumstances. Beyond that, creating a sufficient number of sample experiences can be cumbersome, dangerous, and costly. Even where deviations in the settings we encounter are limited, the threat or burden that particular settings and their variations present may render it unreasonable to go through their experience to understand them. Hence, the capacity to assess the effects of varied settings without permitting them to come to fruition seems to be of considerable benefit. We wish to predict the result of a change in a setting or an entirely new setting without having to experience it. Making such predictions correctly can be of vital importance for the effective and efficient fulfillment of our needs. Anticipating the behavior of our environment and of our body helps us in our efforts of avoidance, control, and use. To plan and implement the fulfillment of our needs competently, we have to build anticipatory knowledge. We must be able to project whether the effect of a setting falls within the range of our requirements, has no bearing, or is detrimental. We also must be able to forecast quantitative and qualitative specifics.

Achieving such authorities of prediction and related skills of assembly and deconstruction in a world of ever-changing circumstances presents a complex problem. However, we can begin to bring order into our comprehension of our world and rationalize our demeanor in it by focusing on the similarity of its phenomena. We must gain an understanding of attributes and reactions among components and their combinations that make them similar. By revealing similar attributes and reactions, we can build our knowledge of a common causative essence. The derivation of this common essence permits us to search for and to employ this essence in other contexts, to sustain it where it has already been achieved, or to destroy it and keep it from happening in

situations we seek to prevent. We can rationalize our activities by recognizing and exercising common themes, common denominators that we may be able to use to produce or address settings of a certain type. Understanding similarity can enormously expand our ability to obtain pleasure and avoid pain. It permits us to venture past the specific processes of our experiences and to expand our understanding to settings that, although different, share key similarities. To determine similarity, we have to be able to allow for variation from circumstances we already experienced. We may establish similarity on account of partial identity, our recognition of some ingredients, features, or occurrences that are the same. Yet deriving similarity from such a partial recognition still relies on the notion of identity, albeit to a smaller extent. Even such partial identity may be difficult to find and may restrict the utility of our inquiries about similarity. Moreover, inferring similarity from a finding of partly identical circumstances is imprecise because it ignores factors that are not the same. With this definition of similarity, we have not significantly advanced our capabilities and may have opened our pursuits to error under a false sense of security. It appears that we can only fully develop the potential of similarity assessments if we initially focus our attention on the similarity of effects.

The range of relevant deviations we examine is defined by their positive and negative effects on the fulfillment of our needs. The fundamental quality of being beneficial or damaging moves us to define effects as fundamentally similar. We may seek the determination of a range of effects to determine which allocations are better suited or optimized for the fulfillment of our needs. We may also review a range of effects because we may only have access to modes of fulfillment that are less than ideal or only such modes may be prudent at the time. We include effects as long as they bring about at least minimum requirements for advancement of a need or a step. Our goal for now is to find means that are sufficient to propel us to other means in a sequence to satisfy a particular need. In this respect, similarity is described by the ability of a circumstance to serve the fulfillment of a particular need or any of its steps. We may further seek to determine a range of effects to determine which damaging circumstances detract from the fulfillment of our needs more than others so that we can limit damage as much as possible. In that context, similarity is defined by the capacity of a circumstance to damage the fulfillment of a particular need or any of its steps. More particularly, we may define similarity by the capacity of a circumstance to serve or damage the fulfillment of a particular need or of particular steps with a distinctive quality or quantity of result. The shared utility or detriment for a particular need or a step in its pursuit

defines circumstances as similar. Depending on our needs and our circumstances, we may demand exactitude of a very specific quality and quantity or allow for a quantitative or qualitative range in our definitions. Our assessment of an acceptable range of similarity may change as our needs and circumstances change. Our acceptance of a range of effects as similar induces us to accept a range of causes and carriers of these causes that are responsible for these effects as similar as well.

The establishment of a definitional range of similarity is generally supported by our emotional mind through its relation of emotions for each need to our memory of emotionally registered factual experiences. When we recall or anticipate pain or pleasure concerning a particular need, we may recollect and refer to the factual experiences related to these emotions. This establishes involved facts as roughly similar. But this mechanism is too blunt to give us much useful guidance. The capability to recognize the relatedness of sensory experiences according to their type without these experiences being identical is not exclusive to our rational mind. Yet its combination with our rational capacity to recognize the relatedness of factual states enables us to be more focused and discerning in grouping phenomena. In our ability to relate similarities, we may be assisted by our shortcomings as much as by our skills. Such shortcomings may consist of limitations in our sensory capacities to perceive differences. They may also comprise limitations in the ensuing processing of sensory information. Our mind may not transport or translate sensory differentiations. It may process sensory perceptions within a range along the same or similar paths, store them in the same or related locations, or retrieve them as identical or related. It may tag and process our impressions according to one or a few aspects of apparent shared characteristics. Such inaccuracies and the consequential commingling or relating of matters of perception in our mind may produce an initial disability or disinterest to distinguish among components and their combinations in relation to their differences. The procedures by which we perceive, analyze, synthesize, categorize, store, and retrieve information may prompt us to group them together under imprecise criteria. When we process one occasion, we are therefore reminded of other incidents that possess some aspect of similarity. While this interrelation can lead to erroneous reactions, its inaccuracy in processing and marking deviations within a range of experiences as being the same or related can benefit us. It yields a natural basis to be mindful of shared characteristics and explore and define them further. As we examine such items of perception closer, we may become able to distinguish them in their dissimilarities and to quantify and qualify their similarities into a range of related properties.

Assessing the factual circumstances associated with appearances of similarity may permit us to better define ranges of circumstances and sequences we regard as similar and to subcategorize these ranges. Sensory distinctions within or surrounding similarities may lead us to describe more detailed experiential aspects by their singular attributes and by those that evidence themselves in correlations. Our experiences might not deliver sufficient information to define the entirety of an applicable similarity range in conditions or in ultimate effects on our needs because of the possible variation of circumstances and a lack of incidents. Additional investigation may be necessary. Still, our existing experiences can suggest possible areas for exploration. They may assist us in establishing a group of related data points as a basis for such exploration. Once we have defined the range of an effect in which we are interested, we have to look at the array of causes that combine to produce occurrences within such a range. These may consist of relatively simple variations. But we may also discover more deeply dissimilar sequences that may produce results within the same range. This implies the use of some of the same components or that different components or groups of components have the same or similar properties. Investigating the circumstances under which similar or even the same effects are produced may reveal the essence that causes them to concur.

Capturing the essence of similarity may initially appear to be an intimidating undertaking because of the apparently endless differentiation of settings. Nevertheless, as we engage in the procedures of deconstructing and rebuilding objects and events, we become aware that they are composed of a limited, more manageable number of components. By acquainting ourselves with these more fundamental components, we come to comprehend that they perform according to rational principles that also conduct their interaction and result in mechanisms of higher organization. We realize that our world is ordered and that it is functioning by apparently immutable elements of substance and standards specifically attached to these elements or even shared by all of them. We recognize that we can understand the great variety of objects and events as particularized combinations of more general components. In our undertaking to organize our world for purposes of our pursuits, we might forgo inquiries into more basic substances and principles. We might instead cast phenomena that have become eminent at higher levels of correlation into not further differentiated substances and principles to enhance their utility for our management of objects and events. That might provide us with adequate orientation regarding phenomena in which we are immediately interested. However, our lack of depth restricts our understanding of how the world is

structured and how these structures behave in relation to our objectives. It limits us to the use of superficial aspects of our world without accessing the authority of manipulating their constituents. To use nature's substances and principles comprehensively, we must systematically undertake observations and categorizations at all its levels of assembly. We might resolve to analyze nature into all its types of components and observe these during and after their separation, in isolation, and in correlation with one another or with other components or combinations. We might synthesize them into combinations and observe the results in isolation or in correlation with other components or combinations. We might replace components that we extract from a combination with other components. Through dissociations and associations of components and combinations of components, we learn about the ranges of relevant causes. We grasp what effects they have alone or in combination with a variety of allocations of the same or of another type of component or combination of components.

This method may originally appear to be indistinguishable from acquiring knowledge of specific settings by letting them play out and studying their particular constituents in their correlations. If anything, the scope of playing out settings would seem to increase by the systematic testing of their potential. But there is an important difference that emerges from our insight that the world is organized by a limited array of substances and principles. Although the work required by our systematic exploration might not be immediately useful, it is bound to eventually save us considerable effort. That the world consists of firmly defined substances and that it functions pursuant to properties that appear to be firmly attached to these substances makes the world predictable once we understand all relevant substances and principles involved in a setting. It permits us to formulate substantive and procedural laws of nature at elemental and higher levels. We must only become mindful of these substances, the basic laws represented by their properties, and the laws resulting from the interrelation of substances and their properties. After that, if we can identify substances and their positioning, we will be able to predict their behavior. Moreover, our knowledge of fundamental substances, their properties, and the consequential laws by which they behave and interact, and the manner in which these components compose objects and events allow us to create means for our pursuits. They empower us to use substances and their functions according to our insights of their typical behavior. We may call this approach that systematically tests the activity and interaction of components and combinations of components to understand the substances and principles of nature the scientific method.

The identification of a limited number of firm substances and principles rationalizes our pursuits. It makes our pursuits accessible to our rational mind in as far as our means and their detractions become rationally intelligible. It makes our command over nature a matter of discovering its substances and grasping and applying its organizational principles. Scientific exploration has then the potential to critically expand the effectiveness and efficiency of our ability to manage us and our environment. The detail and great variety of systematic investigations of correlations among components and their combinations may initially elevate the degree of perceived complexity. But the systematic exploration of interrelations by experiments, the consolidation of insights into principles, and the resulting identification and exploration of remaining areas that have not been scientifically ascertained seems unavoidable if we want to gain maximum control over the fulfillment of our needs. The comprehensive scope of scientific inquiry assists us to explore all accessible threats and means in the pursuit of our needs. Apart from that, systematic exploration seems to only be a temporary imposition until we complete the classification of all causes. We may recognize substances and principles long before we exhaust potential combinations and render additional experimentation superfluous. Research that may have initiated open-ended and may temporarily have led to redundant results therefore may soon be reined in leaving us to the acquisition of substance and its allocation in our pursuits.

Even in the beginning, our research is not likely to be aimless or random. It is likely to be focused on challenges to our pursuits that we would like to mend. To meet such challenges, we might engage in experiments without consideration of what might work to achieve our objective if we have no idea of what might be suitable. However, if we can recognize similarities with other challenges we have learned to resolve, we might be able to narrow the range of possible solutions from the start. Even if we are on a general quest to classify the world's substance and behavior, we are led by the initial similarity of phenomena and seek to expand initial experiences of similarity. Phenomena that already appear to us as similar may provide an easier opportunity to access the commonalities of their constituents. They may facilitate the stripping away of disturbances that cause deviations within a range of similarity and to identify shared substances and laws of nature. Where we cannot find similarity at higher levels of combination, we may still seek to establish sourcing from a limited set of substances and principles by dividing them until we reach levels at which such substances and principles become apparent. Our exploration may lead us to objects and events whose similarity we cannot translate into a common

source. We may further find that commonalities at a component level do not result in similar or identical objects and events. Barring known disturbances, we may look for other causes in these settings. We may have to discern that otherwise dissimilar components can carry similar attributes and that similarities do not always warrant the conclusion that components will behave similarly in other respects. Thus, we learn to define the scope and consequences of similarities. Where established substances and laws are not sufficient to provide an explanation of an observation, we may have to modify our impressions of such substances and related principles. Alternatively, we may have to identify additional substances that are responsible for or that contribute to such phenomena. Following such inquiries along criteria of similarity and distinguishing causes may eventually permit us to classify all aspects of our world into their constituent substances and principles.

The substances that scientific research uncovers are defined by their characteristic properties and the interactions of these properties. Both these properties and their interactions can be regarded as laws because they seem to be permanently attached to substances. Our notion of a law of nature arises from the concept of an identical outcome of repeated demonstrations with identical constellations. Its validity is based on the reliability of the cause-effect relationship. That reliability prompts us to pronounce laws of nature that are attached to certain or even all substances. A law of nature is proved by showing that single or multiple causes produce a certain quality or quantity of perception. To acknowledge the validity of a law, we may require unquestionable proof of its existence. If we can demonstrate that certain substances or their combinations by themselves or in relation to one another necessitate an observed effect, we may subsequently dispense with demonstrations of reiterations to acknowledge a law. Such trust is strengthened if it is supported by an insight into how a result is obtained. Although we may base our judgment that a law exists on the notion that a result has remained constant, we cannot predict its unwavering recurrence without knowing what causes that result. Our explanation of why an effect results becomes a guarantor that it reliably results.

The predictable qualities of substances and laws that appear attached to them may render additional practical proof of what they or their correlation will produce largely unnecessary once we have established that they fully explain a phenomenon. Still, a setting of known substances whose allocation or quantitative scaling has not yet been explored may introduce experiences that might not be covered by prior explanations. Our insight into the reasons why an effect results may allow us to securely forecast certain ranges of combinations or scaling.

But the omission of exploration beyond particular ranges leaves room for surprises. Previously unexplored regions may carry effects we were not able to discern at more familiar levels, even if that potential may diminish with advancements of detection. Further, as long as there is a possibility that undetected substances might be present, we cannot foreclose the possibility that settings and the substances and laws we consider establishing them might prove to be different or incomplete. Such undetected substances may consist of additional substances or of subcomponents whose properties and interactions compose what we previously deemed to be substances and their ordered derivatives. Undetected substances may uphold such concepts, or they may pose the actuality or potential of supplements, interferences, or deviations. We may be satisfied if we achieve a scientific explanation of all phenomena we can observe. But we may also want to control these phenomena in excess of what seems possible by the substances and laws we detect. Moreover, there might be phenomena that we cannot currently perceive. Even if we possess no information that unexplained phenomena influence our world, we might be able to make use of such phenomena. Hence, only if we can be certain that we have tested and explained all types of scale and allocation of substances and that we have detected all substances and the principles they bear might scientific exploration end. Arguably, our interest might abate once we have secured all knowledge and capabilities required to satisfy all our needs. However, we might not be able to determine that unless we have ascertained all that might assist us or detract from the fulfillment of our needs.

If the reliability of scientifically predicted events is less than total, we may not be able to designate the explanation of events a law. That may not only be the case if we encounter a failure of predictions. To assert that a law is reliable, even a standard of similarity may not suffice. A distinction of sameness and similarity does not matter much if we permit a range of similar effects as acceptable for the satisfaction of our needs. Yet, with increasing development of our knowledge and capabilities, we appear to tighten our requirements. As we explore nature, we become increasingly encouraged to insist on strict precision in the correlation of causes and effects because we increasingly experience that nature is organized in a precise manner. In addition, strict predictability may become markedly more important as we construct means with increasing complexity and interdependence. The behavior of our constructs may have to be fully predictable because only slight aberrations may cause extensive and potentially catastrophic damage. Even in areas where fluctuations remain acceptable, a decrease of variation will ascertain that effects remain within an acceptable range.

With the burgeoning exploration of the contents of our world and their categorization, it appears only a matter of time until we will be able to understand all of them in general terms. Our concept of similarity should increasingly be replaced by a concept of substances and principles, and our concept of possibility should be replaced by a concept of certainty. We may ultimately succeed in rendering the entirety of the world predictable if we can ascertain the presence and allocation of substances. Our ultimate problem in understanding what is and what will be may be a practical matter of adequate sensory impressions of all substances that are relevant for our pursuits and our coinciding consciousness of them in their dimensional placement and their movement. Nature seems to assist us greatly in solving this problem by presenting us with typical settings or states in which we can exclude or ignore the presence or movement of certain substances or take them for granted. Still, arriving at useful practical results for our pursuits in complex allocation conditions might be difficult. We may face settings that involve large amounts of substance of various types in a wide variety of allocations and directions. Even if we had general scientific knowledge of the nature of all of them, we might not know all relevant aspects in our environment by number, type, distribution, or bearing. It may be impossible or impractical to deconstruct and investigate all parts of a setting before we act in or react to it. We may not have the capability or luxury of exploring a setting to a level where we know all its aspects that are pertinent to our pursuits. Even if we knew or we could know the number, type, distribution, and bearing of substances and what laws apply to them, we might continue to suffer significant problems. The correlation of a multitude of parts and processes by which these parts behave may require computational capabilities that we may not possess. Practical certainty may therefore only be a limited possibility. Even if we could become aware of and understand all interactions, we might not be able to regulate them. Hence, we may be unable to secure results according to our plans. The complexity of circumstances may cause the general scientific method to be of limited use in our practical requirements unless we can devise machines that assist us with sufficient effectiveness and efficiency. In the absence of such assistance, we may have to supplement our tactics.

Our difficulty in comprehending and in addressing the detail of complex conglomerations may prompt us to handle them differently. Rather than trying to understand them through the behavior of their parts, we may endeavor to comprehend them through their combined systemic behavior. We may try to understand them by observing their correlation with their naturally occurring circumstances. Yet this may

not give us sufficient information. A multiplicity of possible relationships of factors within and beyond the system we are exploring might remain. To obtain improved information about causes and effects pertaining to systems that we cannot trace into their significant components, we may at least apply some scientific exploration by testing the reaction of systems if we subtract, substitute, or add components. Further, we may correlate a system with external components or systems. These correlations permit us to test such other components and systems at the same time. But we may obtain a better insight if we test a system in combination with aspects we already know and can control because this allows us to focus on the system and to identify its properties with reduced issues of attribution. The insights we derive from these manipulations may assist us in engineering systems by adding, subtracting, and substituting parts or by combining systems. We may also obtain better notions about the results particular systems yield or types of results that types of systems yield. Particularly if the systems we encounter vary so much that we cannot establish typicality among them, this research of systems may be viewed as an application of the topical mode in which we let single settings play out and observe their mechanisms. Depending on the importance of a system, that may be acceptable. But if we stop short of completely investigating the components of systems and their contributions, we may not possess adequate information to understand such systems entirely. We may identify properties that largely direct a system's demeanor and establish a registry of them. Still, working with systems under a condition of limited knowledge exposes us to a risk that they might contain unknown features that may cause them to act or to react in variation to explored aspects. Our absence of knowledge may translate into lacking control that threatens our use of such systems as well as other pursuits.

Our approach toward systems as entireties with insufficient exploration of their constituents then imparts a risk of unpredictability and is only of limited use. We may cast our notions of them as provisional assessments and may remain guarded against nontypical behavior from them. The detractions caused by such precautions and the residual threat of damage despite them inexorably depress our ability to pursue our needs. These effects may compound as we interact with an environment that comprises a multitude and a variety of systems with considerable complexity. Our body, external biological resources, and various nonbiological resources that we require for our individual and our species' existence are in the nature of, or the product of, complex systems. Many of these systems are connected. Historically, such systems were presented by nature. Our instinctive interaction with them,

limited knowledge about them, and limited ability to affect them provided us comparative stability. However, as we have become more numerous and knowledgeable, we have increasingly become capable of destabilizing preexisting systems. We may become initially rather astute in using systems based on their apparent attributes. But uses with such shallow knowledge may cause us to affect them in ways that we cannot foresee or control. Even a deeper research regarding such systems may concentrate on yielding immediate or easily foreseeable advantages or on averting immediate or easily foreseeable disadvantages while neglecting less direct or less obvious effects. We may make similar mistakes regarding systems we construct. We may create and use complex systems whose functions and effects are not sufficiently understood. Moreover, artificial systems could interact with natural systems in ways we do not anticipate or cannot control. With advancing development, we may become more effective and efficient in manipulating systems while still not understanding their entirety and their effects on circumstances we require for our pursuits. This may intensify the side effects of our endeavors even as our knowledge and aptitude increase. As these side effects become more dangerous to our pursuits, we may take notice of them and begin to address them. At that time, however, we may not be able to reverse these effects or may only succeed undoing them at a great expense. For that reason, it appears prudent to take a comprehensive, detailed scientific approach and to supplement that knowledge with a comprehensive awareness of our system settings if we are to become proficient in our pursuits. Until we understand systems and their interactions, we will have to develop arrangements in ourselves, with other humans, and with our nonhuman environment without the entire benefit of comprehending natural and artificial systems. Yet, because overstepping our boundaries of knowledge and control may cause significant damage, we must limit our interference to inevitable necessities until we possess secure knowledge how to interact with systems we need without unduly harming them.

The utility of a scientific approach and an environmental orientation for the pursuit of our needs and the amelioration of our competence in our endeavors demonstrates the objective value of our rational capabilities. They can contribute momentarily to the fulfillment of our needs. This may induce us to develop confidence that our rational functions might suffice to ascertain our survival individually and as a species. Fortified with a more extensive comprehension of our rational capacity and its potential for complete correspondence with the order of the world, we may ask whether our rational mind can or should replace our emotional governance. It might appear conceivable that our

rational understanding of the requirements of our individual and collective survival and thriving and how these can be met, together with rational assistance in their fulfillment, could engender states of mind approaching those we gain from our needs. Our rational awareness of deficiency and fulfillment seems to imply a capable parallel to a pain-pleasure mechanism that might induce us to redefine happiness. We might describe it as a state of mind that results from an observation of harmony between the rational concept of our existential requirements and the reality of their fulfillment. Our rational awareness of harmony seems sufficiently contrasted by our rational awareness of disharmony in a condition of deficiency. Accordingly, it might seem possible to replace emotional mechanisms that indicate deprivation and fulfillment of a need with rational mechanisms. Still, we seem to be missing a resounding reason for employing such mechanisms. Neither our rational awareness of a state of functional integrity nor our rational awareness of deficiencies by themselves or in combination appear to be able to give us motivation to be repelled by deficiency and attracted to integrity. While rationality can tell us how things were, are, or will be as a matter of causality, it cannot tell us how they ought to be. We may be able to explain what function a particular need and the collective of our needs serve in the advancement of our individual or our collective survival and wellbeing. But there exists no rational reason that we individually or collectively should continue to exist or thrive or that we should fulfill any requirements to accomplish these purposes. The sole reasons we should be interested in these endeavors are our current or anticipated impressions of pain and pleasure. We are attracted to the emotional reward of securing our and our species' survival and thriving and their subordinated requirements, and we are repulsed by the pain and fear related to deficiencies in that enterprise. The inability of our rational mind to supplant the motivational impulses issued by our emotional mind presents a terminal shortcoming that makes any ambitions to substitute our emotional mind illusory. In spite of any problems in registering and reacting to threats and opportunities appropriately with which our emotional mind might be afflicted, its exclusive capacity to motivate us leaves it matchless for leadership of us.

Because the emotional aspects of our mind govern our pursuits, we are in search of emotional gratification in pursuing them. Our supreme wish implied in all our needs is to experience satisfaction. This supremacy of emotion leads us to the conclusion that our rational and tangible capabilities, while necessary, are subordinated. They seem to be instruments that serve the more exalted objective of happiness. Yet this conclusion of supremacy may be only correct if we examine needs

from a subjective viewpoint. Objectively, needs are utensils that motivate us to secure individual and collective survival and thriving. Since survival and thriving are the result of their functions, we may conclude that they serve that mission. In the context of that mission, the emotional heights that we experience with the fulfillment of our needs constitute a lure. The pain-pleasure mechanism can be regarded as a means to steer our behavior. Emotional rewards are the result of a collateral mechanism that serves our, and through us and our assistance our species', survival and thriving. Consequently, our emotional satisfaction is objectively not the supreme purpose of our pursuits. We do not know why we and apparently all other life forms follow the mission of survival and thriving, where this mission came from, where it leads us or life in general, what its purpose is, or even whether there is a purpose to the mission. Although we fail to find answers in reason to which we could emotionally relate, our needs advance it regardless.

Our needs seem to incorporate proficient emotional detection, guidance, and propulsive capabilities for the fulfillment of such a mission. They seem to capably support the mission by differentiated emotional motivations that concentrate on the entire assortment of necessary existential support functions. But our emotional mind appears to engage our rational mind to assist its purposes. This warrants a closer inspection of the cooperation between the emotional and rational divisions of our mind. It might not be easy to discern our rational from our emotional mind because both involve parallel, apparently similar processes of relating, categorizing, storing, and retrieving information. More than that, our impressions of our mind's functions are frequently amalgamated products of the emotional and rational aspects of our mind. Our emotional mind identifies actual and anticipated menaces and opportunities for the fulfillment of our needs by generating from perceptive impressions emotions of pain and fear, and of pleasure and desire, respectively. It also forms reactive motivations for activities to avoid, prevent, or remedy threats and to take advantage of opportunities. The corresponding function of our rational mind is to investigate and correctly reflect anticipated or actual deprivation and fulfillment and their causes and consequences for our emotional mind's consideration. It must further recall, learn, or imagine means and strategies, consider alternatives, and gauge and rate the relative effectiveness and efficiency of different reactions in consideration of our needs. It must devise and supervise the acquisition, creation, and management of resources and assist with the coordination of pursuits with the pursuit of other wishes of the same and other needs. These tasks are not confined to antecedent planning because our circumstances develop. Our

plans may change with changes in our needs and their relative satisfaction status. Our abilities may increase or diminish. New opportunities may arise or existing avenues may transform or close. We may not have completely thought our pursuits through. Our approaches may be ineffective or less effective because of our mistakes and limitations. We may encounter independent intervening causes that distort, delay, detour, aggravate, or block our progress. Not all countervailing forces can be forecasted. Even if their potential is foreseeable, modalities of their occurrence may not be predictable. Even if these are known, we may not be able to brace against them sufficiently in advance. Even if we had that aptitude, the expenditure of resources might detract from the protected or other pursuits. Considering such possibilities, we may only be able to optimize our efforts if we maintain awareness, flexibility, skills, and other resources that allow us to react to challenges and opportunities as they arise or as we become aware of them.

Practical responses to impressions of threat or of opportunity could also come to fruition under the sole guidance by our emotional mind. Our instincts might control them through automatic reflexes. Still, without a rational identification of causes, means, and circumstances we want to reach, we would be dependent on whether our instincts recognize these. Our emotional mind may be able to broaden its recognition of threats or opportunities and to fashion a more articulated response in direction and intensity by drawing on samples of emotional experiences and related facts it has gathered. Hence, our emotional mind may already resort to experiential assistance within its own facilities. But the experiential capacity of our emotional mind appears to be confined to a relatively rough detection of similarities to experienced or instinctively stored facts and an emotional reaction according to existing emotional associations. That may result in insufficient or in incorrect information about the relevance of facts or their causative context. We remain reactive according to approximations to instincts and memories. Our emotional mind alone may therefore not be very effective in reacting to environmental circumstances, particularly as they transform. However, it may recognize the similarity of rational processes of relating, categorizing, storing, and retrieving information and decide to incorporate them into its deliberations. That decision may be solidified by its experiences of finding rational characterizations and recommendations emotionally confirmed.

Rational processing of our internal and external circumstances and its devising of paths to fulfillment focuses our emotional mind. It enables our emotional mind to dramatically improve effectiveness and efficiency of pursuits by rendering more and better instruments avail-

able for detection, decisional processing, and remediation. It also amplifies the capacity of our emotional mind to track conditions with regard to multiple needs and to put together appropriate emotional and practical responses that include the coordination of responses among needs to devise the most promising combined strategies. To assist our emotional mind in its modifications of instinctive responses for optimized fulfillment, our rational mind must translate the nonemotional quality of its results. It can achieve this by presenting comparisons between its results and factual situations to which our emotional mind can already relate based on its prior experiences or instinctive content. This work requires intimate knowledge of genetically entrenched and acquired emotional memories. Additionally, the derivation of competent results necessitates close awareness of our needs and of their requirements in factual terms, as well as of our environment's workings. The capacity of our rational mind to understand us in correlation with our environment, to increase utility, and to curb damaging effects situates rational discovery in the center of our efforts for advancement.

The apparently superior capacities of our rational facilities may make us wonder how much our needs remain or should remain based on genetic predispositions and on emotional experiences that encircle them. The ubiquitous backing by more insightful and flexible rational functions appears to suggest that they have and should have extensive influence on our conduct. Humanity might be approaching a stage in its development where it can take charge of its affairs by adjusting and possibly substituting the content of emotional instincts with rationally investigated determinations that might be better positioned to secure our needs. The adjustment capabilities of our emotional mind indicate that humanity has already developed past a state where its behavior is exclusively directed by genetic programming. We may not give much credit to the modification of our genetic instincts by emotional experiences. But their influence appears to be central for our success. By itself, our rational mind would only represent a second, unrelated manner of awareness. We can solely relate rational concepts to our emotional mind because it has undergone a transformation that enables it to deviate from genetic instincts and relate and become open to experience-based assistance. Our needs appear to not only permit but demand rational processing of our external and internal world and assistance in addressing threats and opportunities. It is the insight by our needs, not their preemption that enables rational facilities admittance to their processes. Our emotional mind can become aware by its experiences that the rigidity of genetic programming may prompt us to ignore more accurate interpretations of factual circumstances and avail-

able, better-suited responses. It can recognize limitations in its capacities to supersede these rigidities and may therefore invite and accommodate rational participation. Then again, experiences may also confirm and thereby strengthen the rigidity of genetic instincts or modify them to a result that can reach similar levels of stringency as our genetic programming. While solely our emotional mind can motivate us, and our rational mind cannot replace that function because of its fundamentally different character, we might wish we could overcome ill-considered impulses that arise from such rigidities. Our rational mind might be able to devise and impart experiences that might modify our emotional mind, or it might devise technologies that permit more direct alterations of our instincts. But such alterations would have to be motivated by our emotional mind. We might suspect that such a motivation could not develop if emotional features have attained a high level of rigidity. However, we would be incorrect to think of our emotional mind as an undifferentiated entity. It is composed by our needs. Emotional experiences are also placed in relation to distinctive needs. Needs therefore experience and possess emotional and correlated factual awareness of other needs and experiences and demands of these needs. Needs that are negatively impressed by other needs may recognize the sources of such disturbances and react to them. They may enlist the assistance of yet other needs that are negatively affected by the same needs, as well as of our rational mind, to stand their ground. If it should be impossible to change the rigidity in the attitudes of adverse needs, they may build an opposition to their demands and insist that we curb or refuse activities pursuant to needs that damage them.

Rivalries among our needs may naturally happen because they each have a different objective. Yet it appears that these would be limited among our genetic instincts based on the fact that they are part of an existential totality in which the pursuit and fulfillment of all other existential needs is necessary. That attitude should be strengthened by experiential awareness of our emotional mind. But experiential influences may also change that considerate attitude and give us reasons to change it. Our emotional mind is being exposed to information and to other, more immediate influences that may not coincide with its genetic programming. Although that seems to be desirable if it broadens the decisional horizon of our instincts, it may engender perversions in our instincts or noninstinctive reactions that are not optimized. Even if our reactions are adjusted to the settings from which they arise, they may form inflexibilities that are not optimized for our overall setting. Such influences may accrue as a result of our engagements or of independent occurrences. While forming impressions may emanate by the

actions and reactions of any features in or surrounding our mind, they may also be aimed at us by forces that possess and act upon their own needs. Frequently, influences may not alter our instincts but only generate principled adjuncts to them in various grades of stability. Nonetheless, we diagnose that our needs are being or have been exposed to voluntary and involuntary adjustment. Our rational mind seems to be indispensable to reveal and assist us in addressing these influences.

We may wonder how much maneuvering room our genetic and acquired conditioning permits in connection with these remedial undertakings. That conditioning may not only affect our emotional mind but our perceptive and rational mind as well. Because the information processed by our mind primarily originates in impressions of circumstances external to our mind, our environment may have considerable influence over our mental functions. However, our perceptions, emotional and rational awareness, and motivations to react to stimuli are produced by the reflection of information in mental mechanisms that are at least initially the creation of genetic dispositions. These genetic foundations may only permit the acquisition and processing of information to sharpen or adjust our genetically based processing but not to fundamentally change it. As a conduit, perceptive facilities seem to be least affected by environmental circumstances. Our rational mind appears to be relatively flexible compared to our emotional mind. The malleability of our emotional mind seems to be located between these mental facilities. The programmed character of genetic instincts causes them to persist in trying to impose their notions of reality on us.

The genetic foundations of our mind seem to have an inherent tendency of reinforcing themselves even if environmental factors can influence them. Initially, genetic mental dispositions direct us in the acquisition of experiences through perceptions. Although these might subsequently influence our initiating mental patterns, the contingency of such revisions on a fit with preexisting mental dispositions and the processing they tolerate may also strengthen our dispositions. The result molds our subsequent capacity to change mental patterns. Hence, all our mental facilities may develop in genetically predisposed rigidities. In addition, the correlations between our rational and emotional mind may impose each other's persistence on the other, although an opposite effect is conceivable as well. Even to the extent acquired influences can alter our mind, they may contribute to an entrenchment of emotional and rational patterns that do not allow us to change our mind or only allow changes with a great amount or intensity of diverging experiences. These patterns may affect the collection and further processing of perceptions to a degree that makes the consideration or

reflection of contradictory evidence difficult or impossible and has us continue in established modes of thought and emotion. These considerations suggest that our rational and emotional dispositions and environmental influences generate programming that seems to make us entirely products and continuing subjects of genetic and environmental indoctrination. This appears to shape and rule our mind in a way that does not seem to leave us free and in charge of our mind.

This conclusion is being contravened by our direct impressions in which our mind appears overwhelmingly as an independent, self-controlling authority that allows us to consider circumstances freely and to act and react appropriately in both its rational and emotional aspects. We seem to be able to refer to incidents where we successfully fought the formation of or domination by mental patterns or where we adjusted previously approved mental patterns in light of new circumstances. However, when we look closer, we have to admit that in most instances we only reluctantly change our mind. Adjustments are regularly maneuvers to arrange our genetic and acquired emotional or rational dispositions because previous positions that we regarded applicable do not adequately secure the fulfillment of our needs. Before we change our mind, we will try to change the circumstances to which we apply its programming. If that fails, we may initially attempt to restrict our mental adjustments to rational conditions because they are most easily changed. We may seek to increase our experiences or improve our rational processing of them. If we are pressured further, we may be prepared to address the arrangement among our needs. Only if we cannot find adequate fulfillment for our needs this way may we consider adjusting our needs. We reserve that option to the end because we understand that changing a need is difficult and may be impossible. But even if we could change our mind, our actions would be dictated by our emotional and our rational conditions as they present themselves at that point. They would also be conditioned by our surrounding circumstances that dictate the setting in which we must apply our emotional and our rational facilities although these may have stopped forming these facilities. We then appear to merely coordinate among our needs, our rational abilities, and their surrounding circumstances. Still, we may insist that this represents an important measure of sovereignty. We may argue that no matter how much we have been conditioned, pain, fear, and desire motivate us to investigate and possibly alter our impositions and to engage our rational mind for these purposes if such a conditioning does not keep us sufficiently satisfied. Even needs afflicted with a high degree of rigidity might not become comfortable by themselves if their instructions do not satisfy them.

While we may then hope that our emotional mind will defend its integrity, we may also fear that the obstinacy of its patterns might prove to be insurmountable. We may further anticipate that our needs might become corrupted to a point where they deem themselves satisfied even if they fail to benefit our individual or collective survival and thriving, although such a state might require a comprehensive perversion of our needs to remain unopposed. More generally, we may view our emotional mind as an unreliable authority on our welfare. Its susceptibility to error contrasted by the scientific rigor that applies to our rational mind may render it difficult to recognize the supremacy and leadership of our needs. We may instead attempt to derive guidance for our happiness from rational considerations measured by how well they serve our individual and collective survival and thriving. We may think that rational constructs and the physical aspects they reflect can give us independence from emotional dictates against our interests.

Even if we submit to the rule by our emotions, as we ultimately must, rational concerns and the physical aspects that they reflect may appear dominant in our mind. Much of our attention is occupied with producing rational and, through them, physical means for which they stand. This practical preoccupation is supplemented by our growing insight that our world is organized and functions by substances and derivative rational principles. This scientific notion appears to confirm physical concerns and their rational reflections as the only sound features of reality. Emotions are revealed as programming compelling us to act in prescribed ways. Because emotions are constituted and organized by substances and laws of nature, they only seem to superficially present a different challenge and can be resolved into substantive and rational concerns. While we may understand the essential function of emotional constructs in our existence, we may also deem it necessary and possible to optimize them by replacing or at least supplementing natural programming and controlling environmental programming.

Our rising capability to affect us and our surroundings encourages confidence. Although we may acknowledge the possible existence of limitations set by the substances and principles of nature and our dispositions, we may believe that there is much potential left for growing and possibly perfecting the fulfillment of our needs. The only conspicuous exemptions to this optimistic outlook appear to be posed by the inaccessible character of the past and by our mortality. Even if we trust that these problems might be resolved by future generations, our awareness that we are foreclosed from accessing our past and will be eventually barred from admittance to the future can fill us with a deep pain. The next chapter explores these obstacles to our happiness.