

## 5. Shedding Light on the Riddle

A few hundred thousand years ago, the dynamic of biological life on Earth would have had a familiar and predictable quality to it. All organisms were earnestly engaged in the struggle for survival and procreation, as had been the case for many hundreds of millions of years, and other than the usually slow-moving drift afforded by geological change and genetic alteration, each species would have found itself proceeding with a remarkable similarity and an unyielding regularity. Birth and death, eating and drinking, fighting and fleeing, procreating and nurturing—day after day, generation after generation, millennium after millennium. Much like today's TV nature shows, the plot line was always the same. Caught in a vice grip of evolutionary constraint, each member of each species remained locked inside the same general set of rigid behaviors, behaviors absolutely essential for biological continuation, but also utterly tyrannical towards any alternative.

At the heart of these rigid behaviors was to be found a set of sensory and perceptual characteristics just as constrained as the activities they engendered. Each organism was keenly focused on those evolutionarily essential features to be found in the surrounding environment—food, water, predators, rivals, sexual targets—and this intense sensory focus included the notion of conspecific perception, the tendency for each organism to have an enhanced and preferential awareness for the other members of its own species. The upshot of these sensory and perceptual characteristics was a constant reinforcement of a universal consistency. Cognizant of only those environmental features satisfying biological demand, and taking its cues from and copying the behaviors of the other similarly constrained members of the species population, each organism was experiencing its world in nearly the exact same way. Each organism was perceiving its surrounding environment through the same biologically filtered lens, a lens helping to enforce the strict regularity and unrelenting continuity that can be observed across nearly every animal species. And note what was *not* being perceived. The non-biological structure contained in the surrounding environment, those many instances of symmetry, pattern, repetition, etc.—the regulative impact of gravity, the recurrent cycles of celestial bodies, the logical causation of meteorological events—it would appear that these many instances of non-biological structure were seldom reaching any organism's ken, certainly not to the degree to have any significant impact on either organism or species behavior. Thus, whatever useful information the non-biological structural world might have had to impart to biological life on Earth, that information was remaining entirely shrouded within an undiscerned sensory background.

It is important to remember that a few hundred thousand years ago, these statements would have applied just as equally to humans as to every other animal species. For nearly seven million years by then, the hominin lines had been living a purely animal existence, with no indication their behavioral or perceptual experience was fundamentally different from that of the other creatures. Biologically captivated, and corralled into a generational constancy via conspecific perception, humans found themselves tightly ensnared inside a familiar cycle. Birth and death, eating and drinking, fighting and fleeing, procreating and nurturing—day after day, generation after generation, millennium after millennium. And at a few hundred thousand years ago, all that could have been anticipated for humans would have been a continuation along this same path, a continuation for perhaps many more millions of years, with only the subtlest of change being allowed through evolutionary means. Nothing else could have been anticipated because evolutionary constraint had never allowed a significant deviation even once, not for hominins over millions of years, and not for any other species since the beginning of life itself.

That humans did not continue along this same path is biologically extraordinary. That humans freed themselves from evolution's behavioral and perceptual constraints is biologically radical. And that humans, in such a short period of time, managed to reconstruct their environment into the artificial dominion we live within today is nothing short of biologically

shocking. Whatever sparked humanity's radical deviation, it could not have been subtle, and it was almost certainly not evolutionary. Whatever sparked humanity's radical deviation could have only been atypical and subversive—atypical and subversive enough to smash evolution's formidable chains.

What I would propose is this. Humans became the first species to sustain a significant percentage of autistic individuals within its population, significant enough to allow the perceptual characteristics of those individuals to begin to influence the perceptual characteristics of the population as a whole.

Without an autistic influence, it can be expected that human perception would have remained tightly and biologically constrained, just as it had been for quite some time, with each individual's sensory focus directed almost exclusively towards the biological features contained within the surrounding environment and towards the other members of the species. Humans still experience the impact of this form of perception to this very day—it is the reason so much of our current attention is still given over to food, danger, sex and the like, and also to other people. What has changed today is that humans now also perceive so much more—symmetry, pattern, repetition, number, logic, etc.—all the structural scaffolding that underlies the artificial construction that has been accumulating all around us. But where could this supplemental form of perception have come from, how did it originate? Biologically typical humans are not prone to perceiving the non-biological structure contained within the surrounding environment, because the restrictive power of biological and conspecific perception is such that it has always relegated alternative forms of structure to the sensory background. Thus, on their own, biologically typical humans do not naturally perceive underlying symmetry, pattern, repetition, number, logic, etc.

But autistic individuals do naturally perceive this underlying non-biological structure. The ironic cunning of the nature of autism, a condition that presents significant survival-and-procreative challenges, is that it also attacks evolutionary constraint right at its very core. Weakened in their degree of conspecific perception and needing somehow to organize their sensory world, autistic individuals end up evading the usual sensory constraints, and instead become naturally drawn to perceiving the non-biological structure in their surrounding environment. Furthermore, autistic individuals do more than just perceive this surrounding structure, they are also driven to recreate it, through their so-called repetitive behaviors and interests. If we could see back to the beginning, we might witness the effects of gravity being mirrored in straight lines drawn upon the ground, or the repetition of dripping water being echoed by rhythmically clapping hands—perhaps the first instances of artificial construction to be introduced into the human environment. It is of course not possible to say for certain just exactly how the first instances of autistic influence manifested within the population, a process that was likely slow and halting at first. But if we are looking for the subversive spark that sent humans cascading down this alternative perceptual path, it cannot be to the biologically typical population that we turn our gaze, a population that had been enjoined from any alternative form of perception for millions of years. Instead, we must turn to the autistic population, where we find exactly the characteristic we are looking for, namely an inherent compulsion towards non-biological perception and towards artificially structured behavior, a compulsion we can witness with our own eyes today.

Although autistic individuals are almost certainly the originators of non-biological perception in humanity, it is also important to recognize that autistic influence is such that it catalyzes non-biological perception in the population as a whole. That is, given a large enough and stable enough presence of autistic individuals, the non-autistic members of the population will also over time begin to perceive underlying non-biological structure and to adopt many of the autism-inspired artificially structured behaviors.

There are two major factors driving this non-autistic adoption of autistic perceptions and behaviors. The first factor is conspecific perception. Biologically typical humans have a keen eye for noticing what other humans do. Of course when every human is biologically typical, then what each observes is the same set of restricted biological and evolutionary behaviors, and nothing generally changes over time. But if there is a significant presence of autistic individuals within the population, those individuals will be providing something entirely new to observe. Thus, when an autistic individual draws a symmetrical figure upon the ground, or claps his hands with staccato, or pantomimes the motions to spark a fire, or points incessantly in the same direction as the wind, there will be other humans standing nearby and paying rapt attention, perhaps preparing themselves to imitate the behavior. Furthermore, if some of these new behaviors suggest the opportunity for better eating or for better shelter or for better sexual and nurturing result, the biologically typical humans, ever alert for survival-and-procreative advantage, will find themselves paying even more attention, with an even greater incentive to copy the behavior. The strength of conspecific perception in biologically typical humans means that autistic behaviors will seldom go unobserved. Neither will go unobserved the products of those autistic behaviors, the many varieties and instances of artificial construction.

The second major factor driving non-autistic adoption of autistic perceptions and behaviors is that the artificial construction created thereby tends to be more or less permanent, meaning that it can serve as an ongoing and accumulating signpost for present and future generations. For instance, a tool or weapon honed into a more symmetrical point or patterned shape becomes itself an enduring fixture in the surrounding environment, with its underlying structure now continuously on display for anyone who uses the artifact or observes its use by others. Therefore, over time, these examples of underlying non-biological structure begin to amass within the human world, with each generation becoming increasingly practiced at both seeing and mastering this structure. Note how different this is from the passing along of biological and evolutionary perceptions and behaviors. Very little about biological behavior is actually etched with any permanency into the surrounding environment; most biological behavior is either instinctive or is learned via the mechanism of conspecific perception, meaning that each generation essentially starts afresh, with no accretive changes over time. In contrast, the enduring nature of artificial construction means that each new generation is born into a world with a larger amount of non-biological structure than was available to previous generations, and this has the persistent impact of nudging the population to greater perception and greater mastery of this structure. We should in fact recognize the concept—this is exactly the process identified previously as the essence of human intelligence, and in the very early days of autistic influence, these first instances of increased recognition and expanding mastery of accumulating artificial construction would have marked the very beginning of the Flynn effect.

The result of these two factors is that over time overall human perception becomes more and more a blend of its two separate sources of influence. Biological perception of course remains strong, as it must for a species that still needs to survive and procreate. But alongside biological perception there now grows a new way of perceiving the world, a way that focuses more on non-biological structure and leans heavily upon accumulating artificial construction, each the consequence of autistic influence. Today, in the modern world, these two forms of perception have become so thoroughly blended that we might easily mistake them for one, and it is only in the extremely young that we still encounter a purer form of each source of influence. It is only around the age of two or three that it is still relatively easy to separate the biologically typical, who are naturally fascinated with other humans and what other humans do, from the autistically atypical, who are less attentive to other humans but more comfortably engaged with the structural aspects of their surrounding world. But as each individual matures and comes under the influence of a human world mixing both autistic and non-autistic characteristics, each individual becomes increasingly dexterous with each type of perception and each type of behavior, making it more and more difficult to tease the influences apart. In today's world, it is extremely rare to find a human adult that can be described as being

purely autistic or purely non-autistic; most humans today display perceptual and behavioral characteristics that combine the traits of both, even when it remains obvious which of these traits is the more natural bent.

This might be a good time to remind ourselves that the consequence of this blended form of perception has not been trivial. No longer locked into just a biological/evolutionary way of perceiving its world, humanity has unleashed upon the planet Earth the most stunning of revolutions, a revolution on par with the formation of the chemical elements, the coming together of galactic systems, and the origination of life itself. The products of this revolution are all unprecedented: freedom from evolutionary constraint, an immense landscape of artificial construction, an ongoing growth in human intelligence—all the result of unveiling and making use of the non-biological structure contained within the surrounding environment, an ability sparked at the very moment humanity began to experience the autistic way of perceiving its surrounding world.

As intriguing as it is to consider the earliest days of autistic influence, it is still more illuminating to recognize that this influence has remained ongoing ever since and continues unabated through the present day. Artificial construction continues to accumulate rapidly in the current environment, human intelligence advances measurably with each new generation, and human freedom from evolutionary constraint becomes more and more established with each passing day. The same catalyst that introduced non-biological perception into the species and sparked a remarkable population-wide behavioral revolution is still driving innovation and progress in the modern world. Therefore, the most straightforward way to assess the role autism must be playing in this ongoing revolution is to observe autism's impact on human perceptual and behavioral change today.

In my opinion, one of the more fruitful ways in which to observe recent autistic influence can be found in the distinction to be made between the two concepts of intelligence and genius, the latter of which has an inherent association to autism. It is commonly said that genius is the product of greater intelligence, but in fact these two concepts are not equivalent at all. From prior discussion, intelligence can be described as the ability to understand and to master the artificial construction contained within the environment, as measured by performance on an IQ exam, the contents of which serve as a proxy for environmental artificial construction. With this in mind, the phrase *greater intelligence* can be taken in two different ways. Within a generational cohort, a person demonstrating more mastery of the existing artificial construction, by scoring better on that cohort's IQ exam, can be described as displaying greater intelligence than his or her peers. And in cohorts separated by time, the later generations, by mastering larger amounts of extant artificial construction—reflected in the additional complexity and variety of later IQ exams—can be described as displaying greater intelligence overall than the earlier generations. But both of these instances of greater intelligence correspond only to greater mastery of the artificial construction *already contained* within the human environment, they do not touch in any way upon the question of how does artificial construction get *inserted* into that environment. For instance, an individual could achieve a better IQ performance than any of his or her peers, and yet contribute nothing further to the environment that would boost later generations. And any generational cohort, while displaying greater overall intelligence than each prior cohort, could then in theory neglect to insert any additional artificial construction into the existing environment, effectively plateauing growth in human intelligence. Therefore, greater intelligence does not account for how new artificial construction gets added into the human environment. For that operation, we must turn to the word *genius*.

Genius does not require greater intelligence. Although an ability to master existing artificial construction certainly can help, the essential requirement for adding new types of artificial construction into the surrounding environment is an ability to discern formations that do not already exist, to perceive structure that no one has perceived before. Over the course of

human history, those occasions where humanity's understanding and mastery of its surrounding environment has taken a quantum leap—control of fire, development of agriculture, the Copernican revolution, Newton's laws of motion and gravity, evolutionary theory, the Turing machine, etc.—all these occasions have served to increase the scope and range of humanity's non-biological perception, paving the way to massive advancement in new types of artificial construction. *Genius* is the correct word for describing this process. Genius opens a vista onto a previously unseen world, it breaks the existing mold, it shifts the paradigm. Genius therefore is all about perception, and in particular, all about *atypical* perception. And this is the reason genius has an inherent association to autism.

It is not that biologically typical individuals cannot create products of genius. As stated previously, most human adults today display combined autistic and non-autistic perceptual and behavioral characteristics, and thus a biologically typical individual would have access to the type of perception that can give rise to genius (just as, in the same way, an autistic individual would have access to the type of perception that can give rise to social success). Nonetheless, those individuals who are born autistic have something of a head start and a natural advantage when it comes to producing genius. From their very first days, autistic individuals are continuously perceiving their surroundings in a way that differs from that of most other individuals—that differs, sometimes greatly, from the existing norm—and autistic individuals must often organize their sensory world in a way that can only be described as novel. Thus, atypical perception is the essence of the autistic way of being, and defying the norm is the cornerstone of autistic habit. So when a new vista is to be opened onto the surrounding environment, when the existing mold needs to be broken, when the paradigm has to shift, it can be expected that this process will occur more frequently under an autistically minded influence.

History would appear to provide evidence that this is in fact the case. Those individuals responsible for many of the more famous instances of human genius constitute what can only be described as a rather curious list: Socrates, Archimedes, Newton, Kant, Beethoven, Darwin, Dostoyevsky, Einstein, Turing, and many others. Autism of course was not yet even a concept when most of these individuals lived, and so it would be with some peril and difficulty that we might attempt to apply the term *autism* retroactively to any of these historical figures, an attempt made even more perilous by how poorly we still understand autism today. Nonetheless, the biographies of these individuals have a surprisingly similar character, they are often filled with behavioral terms and descriptions that suggest a degree of separation from the human behavioral norm—eccentric, iconoclastic, awkward, misanthropic, single-minded, odd, isolated—terms and descriptions that in the twenty-first century are frequently associated with autism. This does not constitute definitive proof that autism has been at the heart of these prior instances of human genius, but it does appear to be more than mere coincidence that so many of these influential and genius-producing individuals have also possessed an assortment of autistic-like traits. And at any rate, the hypothesis can still be put to a present and future test. Over the course of the twenty-first century there will be new instances of innovation, new vistas to be opened onto the non-biological structural world, new paradigm shifts. And it will be worth some observation to see how many of these new occasions of genius come also with autism lingering somewhere nearby.

Whether it is looking for evidence of autism's connection to genius, or whether it is attempting to assess autism's impact on the other aspects of human endeavor, an honest and dispassionate observation of autistic individuals and their influence upon the human species would be certainly worth some merit. And yet the greatest current obstacle to actually making these observations is the autism research community itself, which in fact has made very few attempts at such observations over the many years. The autism research community has been too busy, too busy to take time to understand autistic individuals for who they actually are, too busy treating autism as a medical condition, even to the point of cure and eradication. This is the ultimate irony in my opinion, since in my way of perceiving the situation, the entire notion of

research itself would be utterly inconceivable without the presence of autistic individuals and the legacy of autistic influence.

The one remaining question is, why humans? Why has the species *Homo sapiens* gained a significant presence of autistic individuals within its population, thereby realizing the impact of that presence, when it would appear no other species has ever experienced a similar circumstance? For that matter, how did humans first gain their own autistic presence, given that such presence seemed to be lacking for quite some time? This is not an easy question to answer, in part because we still do not understand exactly what it is that produces autism. The little that we do know suggests there is a hereditary component to the condition, but whatever the genetic underpinning is, it appears to be general and not at all specific—there is no such thing as an autism gene. So trying to figure out why autism has taken hold in *Homo sapiens*, but in no other species, feels somewhat akin to stumbling about in the dark.

Here would be my suggestion, although I freely admit it to be speculative. It begins with the notion of conspecific distance, a theoretical measure of the amount of separation between two organisms with respect to their ability to achieve conspecific perception for the other. That is, two organisms that have a large conspecific distance between them would also likely have no mutual conspecific perception, whereas two organisms who have a short conspecific distance between them would probably experience a strong degree of conspecific perception. Although there are perhaps many different traits that could contribute to increasing conspecific distance in either or both directions—blindness or deafness in one of the organisms, for instance—I suspect the predominant influence on conspecific distance is the amount of similarity or dissimilarity in each organism's respective genetic makeup. A lion and a leopard, for example, because of their genetic dissimilarity, would have a large amount of conspecific distance between them and therefore no mutual conspecific perception, whereas a lion and a lion would have a small amount of conspecific distance, because the two lions are nearly genetically alike.

But note that even within the same species, there is still going to be a certain amount of conspecific distance between all the members of the population—it is almost never the case that two organisms are genetically the same. So when it comes to achieving a strong degree of conspecific perception, such as that commonly experienced within a given species, a certain amount of conspecific distance can apparently be tolerated. But if conspecific perception remains strong when the conspecific distance is small and yet becomes nonexistent when the conspecific distance is large, this implies that somewhere in between can be found a threshold, an amount of conspecific distance that goes just beyond the toleration limit and begins to produce significant impact upon the ability to achieve conspecific perception. And if we consider the circumstance of an organism being genetically different enough from the other members of its own species to find itself somewhere near or on the other side of that distance threshold, then the consequences are going to be predictable. Such an organism would almost certainly have a weakened sense of conspecific perception relative to the other members of its own species, and this is precisely the circumstance we identified as the primary characteristic of autism.

Assuming that the above description is accurate, it also strongly implies that autism is not unique to humans. It can be expected that any species would at times, due to genetic churn, have members within its population that are conspecifically distant from the others, even to the point of inducing autistic characteristics. Thus, the question becomes not how does autism get introduced into a population—this would appear to be possible for almost any species—but instead, how is it that autism can *take hold* within a population, how does it remain persistent, so that a significant autistic presence can be maintained over time. Autism presents an assortment of survival-and-procreative challenges. Having a weakened sense of conspecific perception means that an organism would have diminished ability to participate successfully in many crucial population activities, activities such as group defense and group

hunting. Furthermore, assuming that survival still remains possible despite these many handicaps, an organism with a weakened sense of conspecific perception would then face increased challenges in making a successful sexual connection, decreasing the odds for procreation. Therefore, whatever genetic makeup is responsible for an organism's increased conspecific distance from the other members of its species, the resulting weakening of conspecific perception makes it extremely difficult, if not downright impossible, to propagate those traits. This would explain why autism, although individually possible within almost any species population, nonetheless has almost no chance of obtaining significant and persistent presence within that population.

And this brings us back to the original question—why humans? Why has it been that only in humans, and only quite recently, that autism has managed to gain for itself a significant and persistent presence?

Most animal species produce a large number of offspring. It is a common evolutionary mechanism that each generation will produce a large brood, of which only a small fraction will survive and go on to propagate the next generation. Thus, biologically speaking, for most species, offspring are cheap—their generational value is not with any one individual but is instead with the collective potential of the cohort as a whole. If any one organism finds itself facing an increased survival-and-procreative challenge, there is no population incentive to provide extra care and attention to help that organism along. If it fails to survive and procreate, then so be it, this is nothing more than the expected evolutionary outcome, as it is for so many others.

Also, most types of offspring are born or hatched near the end of their gestational or incubational needs, and come into this world fully ready, or nearly so, to begin fending for themselves. Thus, for most species, relatively little investment is made in the early rearing of helpless young, dampening the loss to be experienced when any one of these offspring turns out to be less viable. So here too, there exists no population incentive to come to the extra aid of any biologically atypical member.

But for hominins the situation is quite different. For hominins, biologically speaking, offspring are expensive, and they have become more expensive over time. Humans generally give birth to only one child at a time, and the total number is limited to only about a dozen over the course of a female's lifespan. So there is already additional incentive to provide extra care and attention to each individual—any one loss can be significant. And furthermore, because of the transition to bipedalism and the resulting narrowing of the birth canal, human children are born quite early relative to their gestational needs, and they come into this world quite helpless, showing first indications of being able to fend for themselves only after the first year or two. Thus, humans make considerable investment in the early rearing of their helpless young, an investment not to be let go of lightly. For these reasons, a *Homo sapiens* child is more likely to be provided with extra support and care so that it might survive and become a participating member of the population, and this remains true no matter what that child's particular situation might happen to be, including the possibility of finding itself conspecifically distanced from the others. It may be that it has been this extra support and care that has provided the initial boost to allow autism to gain its human foothold and to begin consistently propagating its traits. That initial foothold is what is crucial. Once the initial foothold has been achieved, continuation of autism becomes easier over time. One of the more obvious effects of increased artificial construction is that survival and procreation increases greatly for the entire population, so much so that it has vaulted the human count from maybe a hundred thousand not that long ago to a whopping eight billion today. Such an increase in overall survival-and-procreative success helps perpetuate nearly every subpopulation to be found within the species, including the autistic subpopulation.

Whether it has happened by the mechanism as outlined above, or whether it has occurred by some other process, the one thing that is not in doubt is that autistic individuals now constitute a significant and ongoing presence within the human population—at least two percent according to the most recent autism prevalence studies. And there is no reason to

think that autistic presence has not been near or at that level for quite some time, meaning there has been ample opportunity over the years for autistic individuals to convey their atypical influence to the remainder of the population.

To summarize the journey we have made:

It began with the observation that the human species is extraordinary. Using Big History for context and perspective, we explored just how unprecedented and large scale the human transformation has been, leading to the remarkable circumstances humanity finds itself in today. But we also noted that much about the human transformation has remained insufficiently explained, and we dubbed these unanswered questions the riddle of humanity.

To begin examining these unanswered questions, we investigated first the concept of biological evolution, the process cited most often when attempting to explain the human transformation. But in fact we found the reality to be just the opposite, that instead of undergoing alteration to fit to a given environment, humanity has reconfigured the evolutionary process, making use of artificial construction to mutate the surroundings to better fit the species' needs—a unique and radical instance of evolution being turned inside out.

Next, we studied artificial construction in greater detail, linking it via the contents of an IQ exam to the topic of human intelligence. A historical investigation further revealed that human intelligence has been consistently increasing as a consequence of the growth in environmental artificial construction, meaning that the Flynn effect has been with humanity for a very long time and is not the result of any neurological alteration, but is instead due entirely to the accumulative environmental construction of intelligence.

We then returned to the question of what has sparked the events of the human transformation—what is it that has catalyzed artificial construction, freedom from evolutionary constraint, and the growth in human intelligence. It was proposed that the answer to this question is the condition known as autism. Because autism is a new concept for humanity and not yet well understood, we took time to explore the condition more deeply. Characterizing autistic individuals as possessing a weakened sense of conspecific perception, weak enough to compel such individuals to adopt a non-biological form of perception to organize their otherwise chaotic sensory world, we settled on this description as being the true nature of autism.

Finally, it was proposed that the significant presence of autistic individuals within the human population has had the impact of bringing non-biological perception to the species as a whole, thereby unleashing all the unprecedented consequences of the human transformation. It was further suggested that the validity of this proposal could be assessed by making careful observation of the impact autistic individuals have upon human perception and human behavior today. These proposals have been offered in the hope of shedding light on the riddle of humanity.