

4. The Nature of Autism

Our description and expanded definition of intelligence marks it as the most fundamental human quality underlying the human transformation. The intimate linkage of intelligence to artificial environmental reconstruction, and to the human behavioral responsiveness to that reconstruction, means that the human transformation is in essence the equivalent of the growth in human intelligence. Other human qualities, such as language skills or collective learning, are important because of their leveraging effect, but they are not fundamental. These other qualities are themselves built up out of the constructed artifacts contained within or introduced into the environment, and are thus less basic to the transformative process than intelligence itself. Intelligence essentially *describes* the process, and thus human intelligence, correctly defined, lies at the core of the human transformation.

Nonetheless, intelligence does not explain *why* there has been a human transformation — intelligence is simply part of the description and does not serve as its own cause. And nothing that has been said so far gives an indication of what has prompted humanity to head down this transformative intelligence path, and given that Earth's long biological history has not been witness to any similar transformation before humanity came along, it would seem there must be something unique that has spurred this species to head off in this unusual direction. Intelligence therefore is the *consequence* of something, it is a resultant effect, and thus to discover what has catalyzed, and continues to catalyze, human intelligence and the human transformation, we are going to need to search in an entirely different direction.

To summarize what has been discussed so far, recall first that humans were once pure animals, with the same restrictive survival-and-procreative focus that is experienced by every organism that falls under evolution's domain. As with the other animals, human perception was once tightly constrained, targeted almost entirely towards objects such as food, water, rivals, sexual targets and conspecifics, and thus human perception would have been almost entirely blinded to objects and concepts not serving immediate survival-and-procreative demand. But sometime within the last few hundred thousand years, and accelerating beginning around fifty to one hundred thousand years ago, humans began to break free of evolution's constraints, by turning evolution's process inside out and by reconstructing the human surroundings entirely for human benefit. These reconstructions can be characterized almost entirely by the word *artificial*, they rely heavily upon the structural concepts of pattern, symmetry, repetition, logic, number and form. If you look deeply into any human artifact—a building, a word, a computer chip—what you will discover is an innovative use of pattern, structure and form not typically seen in the biological world. Humans can now make these innovations because humans now *perceive* the structure that underlies them; humans have become adept at visualizing their world in a way that goes beyond just the biological and the evolutionary, that goes beyond just a restrictive focus on food, water, rivals, etc. So the question to be asked is, what has sparked this broadened perceptual awareness? Is there some feature, some characteristic, unique to the human population and observable within that population, that has prompted humanity to enlarge its perceptual boundaries, to break free of evolution's perceptual constraints, to see much further than just survival-and-procreative demand?

The answer to that question is yes. There is indeed an observable and significantly present feature within the human population that has had the impact, and continues to have the impact, of broadening human perception. Furthermore, this feature's perceptual characteristics are exactly those one would expect in accounting for the characteristics of the human transformation, namely a heightened awareness of underlying pattern, structure and form, accompanied by a diminished awareness of the survival-and-procreative world. This feature can be denoted with just one word, but I hesitate to mention that word. I suspect if every word in the English language were to be ranked in the order of its likelihood for being the underlying impetus behind the human transformation, nearly everyone would put this word somewhere near the bottom of their list. It is a word that is poorly understood. It is a word that

has been mostly mischaracterized. So our first order of business will be to examine this word more carefully, to dig more deeply into its true nature, and to discover why this word is the key for explaining the perceptual changes that have been catalyzing the human transformation.

That one word is *autism*.

Autism as a word did not come into existence until the twentieth century. It was first used in the early 1900s by the German psychiatrist Eugene Bleuler in describing the more withdrawn characteristics of schizophrenic patients. Then nearly simultaneously in the 1940s, American psychiatrist Leo Kanner and Austrian pediatrician Hans Asperger employed the adjective *autistic* in their published case studies of children who were displaying a distinct set of behavioral features—namely language peculiarities, social difficulties, and obsessive engagement with unusual activities and interests. This set of behavioral features became the basis for the definition of what was thereafter recognized to be a distinct and lifelong condition, the condition now known as autism.

Although the case studies of Kanner and Asperger did include instances where the prognosis and outcome were not all that dire, during the 1950s and 1960s autism was recognized, studied and regarded almost invariably as a devastating medical condition. Outcomes were assumed to be poor, with institutionalization often regarded as inevitable, and treatments could be draconian. Autism at that time was assumed to be an extremely rare occurrence, with prevalence estimates running as low as one in ten thousand (0.01%).

These estimates would change greatly throughout the final three decades of the twentieth century, with autism becoming more and more frequently recognized and diagnosed. By the year 2000, prevalence studies were estimating that the incidence of autism was somewhere around 1 in 150 (0.67%). The main driver in this increased recognition of autism was a growing awareness that not every instance had to be severe and not every outcome had to be poor. Children were being diagnosed as having all the telltale characteristics of autism but with those characteristics ranging widely in both detail and intensity, and often easing, sometimes dramatically, with time. Terms such as *high-functioning autism* and *Asperger's Syndrome* were invented to delineate the more promising cases from those considered to be more “classic,” although the distinction between these terms was never clearly defined. Indeed, it was a confusing era for autism, with large disagreement over the meaning of the condition. The increased prevalence, combined with a lingering attitude that autism was something to be regarded as both medical and tragic, induced general fear that autism had become an epidemic within the population. Funding and research were exponentially increased, targeted almost always towards discovering both a cause and a cure. At the same time, countering voices were growing louder—including voices from autistic individuals—saying that autism was being unfairly demonized and grossly misunderstood.

Since the year 2000, attitudes and prevalence have continued to undergo major revision. Some consensus has formed around the notion that autism should be described as a spectrum, meaning that although every autistic individual exhibits to an observable degree the defining features of the condition, there is an extremely broad range of variation in both presentation and outcome. Some autistic individuals will experience more intensely the characteristics associated with autism, and will struggle to achieve independent lives, although this outcome still appears to be relatively rare. Many autistic individuals will manage to achieve some level of acclimation to their condition and will become participating members within the population, sometimes with additional support and sometimes with complete independence. There are now many examples of autistic individuals having succeeded in college, having gone on to marry and to raise families, having gained successful careers, and so on. Recently there has even been a movement in some industries, such as computer software development, to actively seek out autistic individuals for the work value of their particular characteristics. Recent prevalence studies have indicated that nearly 1 in 50 children (2.0%) are being identified as autistic by the age of eight. This high level of prevalence, combined with a growing

recognition that many autistic individuals lead successful and productive lives, has helped bolster an understanding that autism likely did not spring up out of nowhere during the twentieth century, but instead that autistic individuals have been a significant presence within the human population for quite some time. Individuals once commonly described as quirky, eccentric, isolated, etc., they are now being more frequently recognized as autistic.

Despite these ongoing changes in both prevalence estimates and how autism is being generally regarded, the medical and academic communities still seem to be struggling to catch up. Research and funding have continued to be focused almost exclusively on autism as a medical condition, with treatment and cure still frequently promulgated as the ultimate goal. These attempts to uncover the medical root cause of autism have branched off into several different avenues of pursuit. One line of research has focused on autism as being a hereditary disorder, a hypothesis suggested by the fact that identical twin and other family studies have indicated a genetic underpinning for the condition. A second line of research has targeted autism as a neurological aberration, a thesis being tested through an assortment of neuroimaging studies, mostly centered around detecting atypical brain signatures in autistic individuals. Finally, autism as a metabolic condition has also received a great deal of attention and effort, as have theories suggesting a variety of environmental insults, with everything from vaccines to highway pollution being put forth as the primary trigger of disease.

The persistence of these efforts is reflected in the growing autism research literature, which has expanded by at least an order of magnitude in the last two decades alone. A recent listing of such efforts would include the following titles: *Autism spectrum disorder symptom expression in individuals with 3q29 deletion syndrome*; *Cortical thickness abnormalities in autism spectrum disorder*; and *Metabolomic Signatures of Autism Spectrum Disorder*. These and other representative articles demonstrate the degree to which the current research continues to focus on genetics, neurons and metabolic pathways, as well as on the pursuit of treatment and cure. But there is a growing irony haunting these many efforts, an irony that can be recognized by considering a sampling of research articles from the early 2000s: *Examination of AVPR1a as an autism susceptibility gene*; *Neuroanatomic variation in monozygotic twin pairs discordant for the narrow phenotype for autism*; and *Mercury exposure in children with autistic spectrum disorder*. That is to say, not much has changed in autism research over the last several decades, other than a great expansion in volume and a constant shifting of the targeted culprits. Each year new candidate genes, new neural pathways, new metabolic mechanisms and new environmental triggers are put forth with great fanfare and considerable promise, which are then followed by years in which their mention gradually declines. New therapies and new drugs are frequently introduced and promoted, but then fail to deliver any significant results in any unbiased trial. Watching this futile cycle play out again and again, year after year, decade after decade, one eventually gets the sense that when it comes to autism, the medical and academic communities are essentially spinning their wheels. And if there is to be any conclusion drawn from the autism research to date, it is that we have every reason to suspect that autism is *not* a medical condition.

In my opinion, one of the more effective ways to achieve a greater understanding of autism is to begin by exploring what it means to be non-autistic, which is to say, what it means to be biologically typical. This is not exactly an unfamiliar topic to this discussion, because in a certain sense humans were most biologically typical when they were in the state of being pure animals, with both their behaviors and their perceptions shaped almost exclusively by survival-and-procreative demand; the biological norm is to have all of one's effort and attention directed towards the immediate essentials—food, water, rivals, sex, etc. Of course this biologically pure state no longer entirely pertains for modern humans, including non-autistic modern humans, but it is nonetheless important to recognize how the carryover from this animal past continues

to influence behavior and perception in modern times. For most humans today, despite finding themselves nearly fully immersed in an artificially constructed environment, and despite having nearly all their biological needs easily and abundantly met, they nonetheless still find themselves giving a great deal of attention and effort to the familiar targets—food, water, rivals, sex, etc. Many of us can confirm this proclivity simply by examining our own thoughts and actions, and in addition, a general look at some of the more popular human activities and interests will further reveal the extent to which humans have remained strongly preoccupied with their more primitive and natural selves. Everything from soap operas to scatological humor to crosstown sports rivalries betrays the degree to which humans have continued to be fascinated with the animal aspect of humankind. There is nothing surprising or maladjusted about any of these tendencies, they are in fact entirely to be expected. They are the natural consequence of humans being not all that far removed from a former purely animal state.

One of the more intriguing components of humanity's carryover from its animal past is the notion of conspecific perception. Conspecific perception is the natural tendency for organisms to possess a heightened perceptual awareness for the other members of their own species. For instance, lions perceive first and foremost other lions, honeybees perceive first and foremost other honeybees, etc. And of course humans perceive first and foremost other humans. When one walks into a conference room, despite one's visual field being almost entirely filled with various non-human artifacts, one's attention is nonetheless drawn immediately and naturally to the other humans already in the room. This intensified intra-species recognition is evolutionarily fundamental and essential for a number of reasons. First, successful mating requires a physical connection with another member of the same species, an occurrence that would be haphazard at best without an enhanced perception for one's own kind. Also, the rearing of young would be utterly ineffective if either parent or offspring could not easily identify and perceptually foreground the other—imagine the consequences of a mother unable to distinguish her own brood from the broods of other species, or a litter unable to discern and to imitate its elders. In addition, many species coalesce into physical and geographical groups for warmth, for effective pack hunting, for more tenacious defense and so on, with these groupings themselves the evidence of how each member is more greatly attuned to the presence and activities of the others in the species. Conspecific perception is crucial to successful survival and procreation, so much so that it should probably be included within the definition of what it means to be a species.

In humans, conspecific perception is quite strong, as would be the case for almost any species considered to be social, and the strength of this human form of conspecific perception is most apparent when considering the developmental activities of the very young. Human newborns come into this world quite early and quite helpless, and their first year or two of development is essentially an ongoing scramble to gain a functional foothold. Careful observation of these early years reveals the extent to which human newborns both rely upon and are deeply attuned to the presence and activities of other humans: a mother's soothing voice, a father's reassuring touch, the smiling gestures of familiar faces. Nearly every child responds immediately, favorably and naturally to these intra-species impressions. And note how critical this process must be in giving the newborn his or her sensory grounding, because without a strong dose of conspecific perception the surrounding environment would most likely emerge as nothing but a cacophony of random sensations: a wild mix of colors and shapes in the visual field, a buzzing range of tones and intensities inside the ear, a chaos of temperatures and impressions upon the skin, and a kaleidoscope of haphazard tastes and smells. Which of these impressions are to be latched upon as important, and which of them can be ignored? Which sensations should be promoted to the perceptual foreground, and which can be discarded into the undiscerned remainder? It is primarily conspecific perception that provides the organizational grounding around which a newborn's sensory world can be arranged. From out of the chaos of countless sensations there emerges a human-forward world: human faces, human laughter, human touch, human smells, human activities. Everything associable to the

human species gets a natural preference in the newborn's sensory field, thereby guaranteeing that the newborn's burgeoning perceptual world will become first and foremost a *human* world.

In addition to conspecific perception's primary impact of providing sensory and developmental grounding, an impact shared in common with almost every other animal species, conspecific perception in humans now also serves a secondary purpose, that of providing a species-wide awareness of the new features and behaviors being brought forth by the human transformation. When one thinks of the many structured artifacts and exploits that now dominate the human landscape—a rattle, a book, a university lecture—one might wonder at first why humans would give any attention at all to these artificial impressions, given that there is no natural incentive to do so. These objects and activities are not food, they are not water, they are not sex, etc., and thus in the natural world, in the world of pure animals, these objects and activities would seem destined to become part of the undistinguished perceptual background. But of course the reason these strange artifacts and behaviors end up garnering a great deal of human attention, including the attention of humans of a very young age, is that these artifacts and behaviors have become intimately connected to the human species itself. Humans touch these artifacts, humans point at these artifacts, humans put these artifacts into other people's hands. Thus, once an artificial object or behavior has gained sufficient foothold to become part of the fabric of human experience, that object or behavior gets promoted to the human perceptual foreground, because conspecific perception gives humans the natural inclination to pay attention to what other humans do.

Therefore, a large part of what it means to be biologically typical is to participate in an immense and shared perceptual network of human-centric features and behaviors, some of which date back to the species' purely animal past, and some of which correspond to the changes of modern times. Humans eat what other humans eat, humans fear what other humans fear, and humans gather where other humans are. And furthermore, when one human makes a gesture, or utters a word, or scribbles something down, there will be other humans standing nearby and paying the closest of attention, supporting the entire range of constructed artifacts and behaviors that fall under the heading of human language. And when one human points to the heavenly bodies, or narrates the tribe's origin story, or demonstrates the workings of the newest innovation, there will be other humans avidly watching and listening, reinforcing a broad array of structured behaviors that constitute collective learning. The continuity of human behavior, as well as the continuity of the human environment—including those activities and features arising out of the human transformation—all ride on a sea of conspecific perception, the natural glue holding together the species and its actions.

Since conspecific perception is so clearly crucial to both human development and to the species-wide awareness supporting the many features defining the human transformation, it raises an interesting question about what would happen if a member of the species did not possess a strong sense of conspecific perception. What would be the developmental consequence of a newborn coming into this world less able than other humans to perceptually foreground the human aspects of the surrounding environment, and what would be the overall ramifications of an individual not able to obtain his or her sensory grounding from a human-forward world? This is not really a theoretical question, because I believe we already know the answer. Any member of the human species possessing a weakened sense of conspecific perception, any human less able than other humans to perceptually foreground the human aspects of the surrounding environment, any individual unable to obtain his or her sensory grounding from a human-forward world, that individual would be most accurately described as autistic.

One of the chief defining characteristics of autism is that autistic individuals experience a broad assortment of what are usually described as social difficulties: lack of eye contact,

unwillingness to participate in reciprocal play or sharing, failure to point or to follow the pointing of others, reluctance to engage in small talk and in other forms of social interaction, etc. The autism research literature has tended to blame these difficulties on presumed deficits in some proposed biological or neurological mechanism, but I would suggest that these long-standing conjectures are incorrect on two different fronts—one, these conjectures are mischaracterizing the conduct, and two, they are understating its cause. When one observes carefully the actual activities of autistic individuals, and especially the activities of very young autistic individuals, it becomes quickly apparent that these individuals are to a significant degree *disengaged* from the other humans around them. Whereas most children will readily interact with other people—laugh with them, play with them, follow enthusiastically their every gesture, touch and sound—autistic individuals by contrast seem largely unattuned to the presence of other humans. Autistic toddlers often do not respond to their name being called, and can be seen as being reluctant and awkward with such things as hugs and coos. Young autistic children attend less to other people than to favorite objects and interests. Autistic adolescents seldom pursue the range of friendships and relationships that other adolescents usually do. And even autistic adults, many of whom have become reasonably acclimated by then to various social customs and expectations, will nonetheless often describe their inner experience as one of extreme isolation and alienation. Thus, autistic individuals are not demonstrating specific social deficits so much as they are demonstrating a broad-scale disinclination towards the members of their own species, and it is this broad-scale disinclination that accounts for the various social difficulties. But a broad-scale disinclination towards the members of one's own species is the same thing as saying that an autistic individual is experiencing a weakened sense of conspecific perception. Unlike biologically typical humans, who will quite naturally perceive first and foremost other people, autistic individuals do not possess this natural tendency, and thus theirs is not first and foremost a *human world*.

That autistic individuals are dealing with a weakened sense of conspecific perception is evidenced also by the frequency with which these individuals experience an assortment of sensory issues. Many autistic individuals report a wide and non-specific range of sensory symptoms: for instance, being overwhelmed by the intensity of various textures, noises and smells (hypersensitivity); or being oblivious to extreme sensations, such as a shouted name or the sudden onset of hot and cold (hyposensitivity); or a commingling of the senses, such as “seeing” tones or “feeling” colors (synesthesia). The motley nature of these sensory symptoms suggests that they are not the result of any specific physical defect but are instead the consequence of a more general difficulty in obtaining sensory grounding. Biologically typical children rely upon conspecific perception to organize their otherwise chaotic array of sensory impressions, favoring and foregrounding those experiences that are in some way connected to the human species. But autistic individuals, not very aware of other people and not naturally favoring human-associated impressions, find themselves dealing with what must seem to be an overwhelming cascade of random and chaotic sensations, with no clearcut means for achieving sensory organization or cementing a sensory grounding, resulting in the many observed sensory issues as well as in a delay of perceptual development.

This weakness in conspecific perception can vary greatly from individual to individual, and this is perhaps one of the reasons that autism presents as a spectrum. Some autistic individuals appear to be almost entirely lacking in perceptual attachment to human presence, and these individuals can be seen as facing the greater challenge in achieving developmental gains. Other autistic individuals do seem to retain some level of connection and perceptual awareness for other humans—albeit much less than that of their biologically typical peers—and these individuals would appear to have the better chance of reaching independence and well-being. But despite the variation, there is nonetheless a threshold that would appear to be critical in determining the autistic/non-autistic divide. Any human individual with a strong enough sense of conspecific perception to be able to make use of that perception to achieve his or her sensory grounding, that individual is to be classified as non-autistic. Such an

individual will strongly attach to the human species itself and will begin to see the surrounding world in much the same way as other humans do. And in the modern world, such an individual will be able to leverage this human connection into the realms of language and collective learning, where conspecific perception plays such an important role, and the individual will by these means begin to easily follow the same developmental path being traveled by the large majority of the population.

In contrast, any individual with a sense of conspecific perception so weak as to be unable to use that perception to achieve a strong sensory grounding, that individual is to be classified as autistic. Such individuals will find themselves dealing at first with something akin to a sensory chaos, since there will be few prominent features, such as other humans, naturally standing out from the manifold of sensory impressions. Such individuals will thus be cut off from the typical form of sensory organization and will not be able to easily follow the same developmental path as their biologically typical peers. Such individuals will not be able to perceive their surrounding environment in the same way as other humans do.

And this at last gets us to the heart of the matter, the key to why autism is so critical for understanding the spark underlying the human transformation. Biologically typical humans experience a world that is organized primarily around the human species and its members, biologically typical humans perceive first and foremost a species-centric world. Autistic individuals do not primarily perceive this species-centric world, and thus what they tend to perceive is something entirely different. And that is the critical question: what exactly is it that autistic individuals tend to perceive?

Another chief defining characteristic of autism is that autistic individuals frequently engage in what are usually described as restricted and repetitive behaviors and interests. In young autistic children, examples of these behaviors and interests cover a broad range of curious activities: hand flapping, lining up toys, eating the same food for every meal, obsession with certain objects such as ceiling fans and light switches, resistance to furniture rearrangement or to changes in a geographical route, strict adherence to ritual and to order in activities such as dressing, and so on. Later on in life, autistic adolescents will commonly focus much of their time and energy on a limited set of particular interests, such as sports statistics or dinosaurs or the weather, and will often perseverate (talk constantly) about a favorite topic. Autistic adults can sometimes be seen as leveraging their interests into studies and careers, with the stereotypical target of these efforts being those activities known for their rigid structure and rules: mathematics, physics, chess, computer programming, etc. A large amount of autism treatment is aimed at suppressing these various behaviors and interests, because much of the autism research community still regards these activities as anti-productive and harmful. But in a manner ranging all the way from screaming tantrums to the most eloquent of postings placed online, autistic individuals can be observed forcefully resisting these many attempts at suppression. And indeed, when one watches carefully the so-called restricted and repetitive behaviors and interests of autistic individuals, it is hard not to come away with the impression that for such individuals these behaviors and interests are utterly necessary, as though serving an essential purpose.

That essential purpose is the obtaining of a sensory grounding. When one considers the circumstance of an autistic individual not possessing a strong sense of conspecific perception, and in particular not able to make use of conspecific perception to help with sensory organization, one recognizes that this individual is facing the most precarious of outcomes. As has been described previously, unfiltered sensory impressions are apt to be experienced as both chaotic and overwhelming: the wild mix of colors and shapes in the visual field, the buzzing range of tones and intensities inside the ear, the chaos of temperatures and impressions upon the skin, and the kaleidoscope of haphazard tastes and smells. If these sensory circumstances were to remain unresolved, the autistic individual would be unable to obtain any perceptual signal from the sensory environment and would be left with only sensory noise. In turn this would mean that the barriers to developmental progress would be set

impossibly high. But most autistic individuals do not end up experiencing this extreme outcome. We know that most autistic individuals do manage to make significant developmental progress, even if somewhat delayed compared to their non-autistic peers, and many autistic individuals do go on to become participating and productive members within the general population, navigating quite successfully the features of a modern human world. So these individuals have not become stuck inside a sensory chaos and must therefore be achieving a functional degree of sensory organization. But if that sensory organization has not been built around conspecific perception, then what has it been built around?

The trick here is to recognize that I have not been exactly forthcoming by characterizing the sensory field as entirely random. On the planet Earth, the sensory field, although indeed wildly multivariate, still possesses within itself a great deal of inherent structure and form. In addition to the biological structure imparted by the evolutionary propensity towards food, water, conspecifics and the like—the structural organization that most organisms latch onto quite naturally—there is also a great deal of structure that arises from such influences as gravity, chemistry, thermodynamics, celestial cycles, etc. Trees grow tall in a straight line, mountain peaks have a particular shape, water drips in a rhythm, the moon cycles through regular phases, and of course in the modern world artificial structure can be found practically everywhere. These non-biological instances of environmental structure and form are captured in a variety of words and concepts: symmetry, pattern, repetition, logic, number. These concepts possess one characteristic in common, they are all chaos-defying features. In the sensory world, these are the elements that serve to break the background noise.

The interesting thing is, for most biological organisms, they never seem to become aware of these non-biological structural features, never become aware of the many instances of symmetry, pattern, repetition and so on. It can be surmised that the reason for this lack of awareness of non-biological structure is that it is not strictly necessary for survival and procreation. Having successfully organized their sensory experience into a biologically and conspecifically guided form of perception, and having had their fitness greatly boosted by this particular form of perception, most organisms then find themselves locked into that way of perceiving their world, remaining almost entirely blind to any other type of structure their world might happen to contain.

But for autistic individuals, less able to organize their sensory experience around the usual biological concepts—including most particularly around the notion of conspecific perception—and at risk for the dire developmental consequence that would result from a persistent sensory chaos, they will latch onto any alternative means of sensory organization that happens to be available. Therefore, autistic individuals, unlike their biologically typical peers, will find themselves becoming directly aware of non-biological structure and form, will find themselves becoming directly aware of symmetry, pattern, repetition, logic, number and so on. From the pressing need to resolve their potential sensory chaos, autistic individuals will begin to hone in on those environmental features that serve to break the background noise.

That autistic individuals are embracing this alternative perceptual path is most evident from their so-called restricted and repetitive behaviors and interests. These activities are not arbitrary, but indeed have a requisite quality to them—all promote and enhance the non-biological structure that an autistic individual has begun to crave. Hand flapping is rhythmic to both sight and touch, every routine is a repetition. Ceiling fans encompass both symmetrical shape and regular motion, light switches capture a logic. And note the distinction in the use of toys, for instance in a set of dolls and dishes. The biologically typical child might easily be found sharing such toys with other children, setting out perhaps the scenario of an afternoon tea party, the type of interactive play that rides so firmly upon the shoulders of conspecific perception. But the autistic child is much more likely to line up these toys, or form them into a circle or some other patterned shape, carving out yet one more instance of non-biological structure in the child's sensory field. The restricted and repetitive behaviors and interests of autistic individuals serve an essential purpose, they bring forward the non-biological structure inherently contained in the surrounding environment, they enhance the perceptual experience

of symmetry, pattern, repetition, logic, number and so on. They bring organization to the autistic individual's sensory world.

These days, biologically typical children chart a developmental path that begins, via the mechanism of conspecific perception, with a strong association to humankind. And because the many humans they encounter and observe along the way are also engaged with the artifacts and behaviors of a complex structural world—a world that has gone far beyond just the immediate needs of survival and procreation—these biologically typical children, naturally curious about what other humans do, soon begin to participate in this complex structural world too. Suppression of this developmental path would be predictably disastrous. If a biologically typical child were to be cut off entirely from human contact and were to be given no opportunity to leverage conspecific perception, then not only would this child be deprived of his or her preferred and natural way of perceiving the environment, this child would also be deprived of his or her most straightforward connection to the expanded structural aspects of the modern world. Fortunately, very few biologically typical children encounter such cruelty, with most today making excellent developmental progress, eventually transitioning to becoming fully contributing members of a complex human society.

By way of comparison, autistic children employ the same developmental path as do biologically typical children, but autistic children traverse this path in the opposite direction. Autistic children gain their sensory grounding first through an awareness and manipulation of the non-biological and structural aspects of their surrounding world. And because much of this structural world has been integrated to humankind, and because this structural world depends in many ways upon human interaction, autistic individuals—perhaps reluctantly at first—eventually progress to that awkward but helpful moment when they begin to attach themselves to the members of their own species. Here too, suppression of this developmental path would be predictably disastrous. If an autistic child were to be cut off from his or her structured behaviors and interests, then not only would this child be deprived of his or her preferred and natural way of perceiving the environment, this child would also be deprived of his or her most straightforward connection to a human-centric world. Unfortunately, far too many autistic children are actually subjected to this kind of cruelty. Many of the so-called treatments and therapies for autism are designed specifically to force the autistic child to abandon his or her preferred way of perceiving the environment, attempting to substitute instead the perceptual preferences of biologically typical children. And this is such a shame. The developmental path from autistic perception to eventual engagement with a human-centric world can be traversed successfully and yield productive results. It is the reason many autistic individuals end up making excellent developmental progress, eventually transitioning to becoming fully contributing members of a complex human society.

This then is the nature of autism. It begins with a weakened sense of conspecific perception, weak enough that it will stymie the autistic individual from organizing his or her sensory experience around other humans and what other humans do. This circumstance often results in developmental delays, it often results in sensory issues. But in compensation, the autistic individual will find himself or herself latching onto the inherent structure contained within the surrounding environment, latching onto the many examples of symmetry, pattern, repetition, logic, number and form. And where have we heard those words before, what role have they been playing in the discussion? Were these not the words considered critical for understanding the human transformation?

Autism is a variable path—some autistic individuals will struggle mightily to make developmental progress, others will do remarkably well. But all autistic individuals have an important influence on humankind, because all help bring to the species *Homo sapiens* a new and revolutionary form of perception.