



Mental Disorder or Neurodiversity?

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One of the most famous stories of H. G. Wells, “The Country of the Blind” (1904), depicts a society, enclosed in an isolated valley amid forbidding mountains, in which a strange and persistent epidemic has rendered its members blind from birth. Their whole culture is reshaped around this difference: their notion of beauty depends on the feel rather than the look of a face; no windows adorn their houses; they work at night, when it is cool, and sleep during the day, when it is hot. A mountain climber named Nunez stumbles upon this community and hopes that he will rule over it: “In the Country of the Blind the One-Eyed Man is King,” he repeats to himself. Yet he comes to find that his ability to see is not an asset but a burden. The houses are pitch-black inside, and he loses fights to local warriors who possess extraordinary senses of touch and hearing. The blind live with no knowledge of the sense of sight, and no need for it. They consider Nunez’s eyes to be diseased, and mock his love for a beautiful woman whose face feels unattractive to them. When he finally fails to defeat them, exhausted and beaten, he gives himself up. They ask him if he still thinks he can see: “No,” he

replies, “That was folly. The word means nothing—less than nothing!” They enslave him because of his apparently subhuman disability. But when they propose to remove his eyes to make him “normal,” he realizes the beauty of the mountains, the snow, the trees, the lines in the rocks, and the crispness of the sky—and he climbs a mountain, attempting to escape.

Wells’s eerie and unsettling story addresses how we understand differences that run deep into the mind and the brain. What one man thinks of as his heightened ability, another thinks of as a disability. This insight about the differences between ways of viewing the world runs back to the ancients: in Plato’s *Phaedrus*, Socrates discusses how insane people experience life, telling Phaedrus that madness is not “simply an evil.” Instead, “there is also a madness which is a divine gift, and the source of the chiefest blessings granted to men.” The insane, Socrates suggests, are granted a unique experience of the world, or perhaps even special access to its truths—seeing it in a prophetic or artistic way.

Today, some psychologists, journalists, and advocates explore and celebrate mental differences under the rubric

of *neurodiversity*. The term encompasses those with Attention Deficit/Hyperactivity Disorder (ADHD), autism, schizophrenia, depression, dyslexia, and other disorders affecting the mind and brain. People living with these conditions have written books, founded websites, and started groups to explain and praise the personal worlds of those with different neurological “wiring.” The proponents of neurodiversity argue that there are positive aspects to having brains that function differently; many, therefore, prefer that we see

these differences simply as differences rather than disorders. Why, they ask, should what makes them *them* need to be classified as a disability?

But other public figures, including many parents of affected children, focus on the difficulties and suffering brought on by these conditions. They warn of the dangers of normalizing mental disorders, potentially creating reluctance among parents to provide treatments to children—treatments that researchers are always seeking to improve. The National Institute of Mental Health, for example, has

Neurodiversity: Discovering the Extraordinary Gifts of Autism, ADHD, Dyslexia, and Other Brain Differences

By Thomas Armstrong
Da Capo ~ 2010 ~ 288 pp.
\$16 (paper)

Thinking in Pictures: My Life with Autism (Expanded Edition)

By Temple Grandin
Vintage ~ 2006 (orig. 1996) ~ 270 pp.
\$16 (paper)

In the Mind's Eye: Creative Visual Thinkers, Gifted Dyslexics, and the Rise of Visual Technologies

By Thomas G. West
Prometheus ~ 2009 (orig. 1991) ~ 516 pp.
\$25.98 (cloth)

ADHD and Me: What I Learned from Lighting Fires at the Dinner Table

By Blake E. S. Taylor
New Harbinger ~ 2008 ~ 192 pp.
\$14.95 (paper)

Touched with Fire: Manic-Depressive Illness and the Artistic Temperament

By Kay Redfield Jamison
Free Press ~ 1996 ~ 384 pp.
\$16 (paper)

Born on a Blue Day: Inside the Extraordinary Mind of an Autistic Savant

By Daniel Tammet
Free Press ~ 2007 ~ 256 pp.
\$14 (paper)

An Anthropologist on Mars: Seven Paradoxical Tales

By Oliver Sacks
Vintage ~ 1996 ~ 327 pp.
\$15.95 (paper)



been doing extensive research on the physical and genetic causes of various mental conditions, with the aim of controlling or eliminating them.

Disagreements, then, abound. What does it mean to see and experience the world in a different way? What does it mean to be a “normal” human being? What does it mean to be abnormal, disordered, or sick? And what exactly would a cure for these disorders look like? The answers to these questions may be as difficult to know as the minds of others. Learning how properly to treat or accommodate neurological differences means seeking answers to questions such as these—challenging our ideas about “normal” human biology, the purpose of medical innovation, and the uniqueness of each human being.

Not coincidentally, the neurodiversity movement accompanies an apparent boom in the number of people with mental disorders, especially children. In locations monitored by the Centers for Disease Control and Prevention (CDC), the number of children with diagnosed autism spectrum disorders nearly doubled between 2002 and 2008, from one in 156 to one in 88. Autism was not even included in the American Psychiatric Association’s *Diagnostic and Statistical Manual of Mental Disorders* (DSM) until its third edition was published in 1980. Similar stories are true of other disorders.

In the 1970s, ADHD was known as “Hyperkinetic Reaction of Childhood Disorder,” and was not well known. Following revisions to the DSM, diagnosis has become increasingly common, especially in children. Psychiatrists’ improved ability to identify and treat such conditions has much to do with their increased profile, though there is some question whether environmental factors may be responsible as well.

A diagnosis of autism, ADHD, dyslexia, or depression does not necessarily mean that a patient has some definite set of observable traits. Each disorder exists on a spectrum, such that some cases are more evident than others—which complicates diagnosis as well as judgment of the patient’s wellbeing. But as psychologist Thomas Armstrong writes in *Neurodiversity* (2010; title changed in paperback to *The Power of Neurodiversity*), there are generally at least a few characteristics of each disorder that hold across the spectrum and cause difficulty for those affected.

Autistics, writes Armstrong, tend to be much better at understanding systems than understanding people. Perhaps the most famous person with autism is Temple Grandin, an animal scientist at Colorado State University, who wrote an autobiography on growing up with autism called *Thinking in Pictures* (1995). To demonstrate the systematic thought process of autistics, Grandin

describes an experiment conducted by Uta Firth, a British researcher on cognition:

Joe, Dick, and a person with autism are sitting at a table. Joe places a candy bar in a box and shuts the lid. The telephone rings, and Dick leaves the room to answer the phone. While Dick is gone, Joe eats the candy bar and puts a pen in the box.

When the experimenter asks the autistic person what Dick thinks is in the box, the autistic person will say, “a pen.” Autistics do not know how to predict what others think.

Consequently, autistics have great difficulty socializing. In his book *An Anthropologist on Mars* (1995), neurologist Oliver Sacks describes this difficulty as a state of mental aloneness. Autistics cannot read emotions and do not know how to interact with other people, so they often make others uncomfortable. Grandin recounts that it has taken her years of practice and observation to learn how to introduce herself and converse, and that she still feels deeply uncomfortable doing it; the title of Sacks’s book comes from Grandin’s description of what it feels like to be around “normal” people.

For these reasons, autistics tend to enjoy working with computers and machines. The logic behind machines is simple; outcomes are consistent rather than dependent on the unpredictability of human emotions and

the incompleteness of human knowledge. Furthermore, autistics often think about the world in terms of images rather than words. Grandin writes, “my imagination works like the computer graphics programs that created the lifelike dinosaurs in *Jurassic Park*. When I do an equipment simulation in my imagination or work on an engineering problem, it is like seeing it on a videotape in my mind.” Grandin also describes the “video library in my imagination” that includes “video memories of every item I’ve ever worked with,” which she can retrieve and recombine with great precision.

The processing of visual imagery and verbal thought, as Grandin notes, occur in different areas of the brain. In autistics, the visual area may become more active as compensation for a verbal deficit. People with autism also largely rely on visualization to understand concepts that are not inherently visual. In his 2007 memoir *Born on a Blue Day*, Daniel Tammet, who is an autistic savant—someone with autism who possesses prodigious skills or capacities—describes the unusual way he experiences ideas:

I see numbers as shapes, colors, textures and motions. The number 1, for example, is a brilliant and bright white, like someone shining a flashlight into my eyes. Five is a clap of thunder or the sound of waves crashing against rocks. Thirty-seven is lumpy like

porridge, while 89 reminds me of falling snow.

Tammet, who has a remarkable talent for learning languages, also sees words as images: “when I read a word or phrase or sentence written down, I close my eyes, see it in my head and can remember it perfectly.” But his ability to remember chunks of words is very poor when he hears rather than sees them. This trait, common in autistics, often is a barrier to learning language, which most children acquire through listening. Their literal-mindedness also makes it difficult for autistics to understand idiomatic language: for instance, when Tammet first heard the phrase “under the weather,” he thought, “Isn’t everyone under the weather?”

One of the most common neurological diagnoses is Attention Deficit/Hyperactivity Disorder. As described by Thomas Armstrong, psychiatrists and psychologists classify the three major symptoms of ADHD as hyperactivity, generally defined as an inability to sit still; impulsivity, or an inability to control one’s actions; and inattention, or an inability to concentrate and a tendency to be easily distracted. As with autism, ADHD exists on a spectrum of severity and type. One type of ADHD manifests primarily as inattention; another primarily as impulsivity and hyperactivity; and

the third main type manifests as all three kinds of behavior.

Biologically, Armstrong explains, ADHD patients have disruptions within the neurological circuitry that connects the “restraint and planning areas of the brain (the prefrontal lobes) and the emotional and motor areas of the brain (the basal ganglia and the cerebellum).” The result is that people with ADHD suffer from impulsivity. Often, the parts of the brain that are disrupted in children with ADHD eventually develop normally, but lag behind the growth of children without ADHD by about three years.

Counterintuitively, people with ADHD also suffer from *under*-stimulation of the neurological system. They have a natural shortage of dopamine, a neurotransmitter that helps to control motor activity. It is this shortage of dopamine that creates a constant need for external stimulation; as Armstrong writes, “what stimulates the average person is not enough for them. They need a higher dose of thrills and chills.” This is why ADHD patients are often treated using psychostimulants, which increase dopamine in the brain and help stimulate the nervous system.

Dyslexia, which literally means “difficulty with words,” like ADHD is also fairly common. It affects between 5 and 20 percent of schoolchildren (depending on the diagnostic criteria) and seems to be caused by prob-

lems in the brain—specifically, in the left hemisphere, which is associated with logic, language, and arithmetic. According to Armstrong, the posterior left hemisphere is underactive in dyslexics, so that they tend to rely more on the anterior left hemisphere, which is associated with spoken language, and the right hemisphere, which is generally associated with visual-spatial skills, including facial and pattern recognition.

Dyslexics have basic difficulties with reading and writing even short letters or compositions. This impairment exacts a painful toll on the psyche: in a culture where reading and writing are integral to the education of children, dyslexics face enormous challenges in coping with the basic requirements of school. Thomas G. West, a writer who himself had learning difficulties in childhood that he did not recognize until later in life, describes the lives of dyslexics and creative visual thinkers in his book *In the Mind's Eye* (1991; not to be confused with Oliver Sacks's 2010 book *The Mind's Eye*). West notes that patients commonly hide their dyslexia—sometimes even from themselves. One woman, “on learning in college of the basis of the problems that had tortured her during her early educational experience, wept for weeks.”

Perhaps the most well-known mental disorder, but the one that is least often viewed in terms of cognitive impairment or difference, is depres-

sion. Though also strongly associated with problems in the brain, the characteristics of depression are markedly different from those of autism, ADHD, and dyslexia. Neurological theories of depression hold that it is caused by deficiencies or imbalances in neurotransmitters, such as serotonin, which is thought to stabilize moods. The most common class of antidepressant medications is that of the selective serotonin reuptake inhibitors, such as Prozac, Zoloft, and Paxil, which increase serotonin levels between neurons by keeping the cells from reabsorbing it. This helps to maintain the level of activity and firing between the neurons.

The symptoms of depression are all too familiar. Ludwig van Beethoven described the experience in an 1802 letter:

With joy I hasten towards death—if it comes before I shall have had an opportunity to show all my artistic capacities it will still come too early for me despite my hard fate and I shall probably wish it had come later—but even then I am satisfied, will it not free me from my state of endless suffering? Come when thou will I shall meet thee bravely.

Beethoven would live another twenty-five years, but wrote this while suffering from deep depression, and while losing his hearing. Armstrong notes that, over the course of their lifetimes, nearly 13 percent of

Americans experience major depressive disorders—classified as episodes of “low mood, negativity, insomnia, and other indicators” lasting for at least two weeks. Depression may last far longer than this, however, and often recurs for years or across a lifetime. Without psychotherapy or medication, people suffering from depression are at a high risk for harming themselves.

The disadvantages of autism, ADHD, dyslexia, and depression are very real, and are what lead them to be considered disorders. But what those clamoring for cures often neglect, and what the term “neurodiversity” seeks to recognize, is that these disorders often also bring unusual abilities. For example, people with Asperger’s syndrome (AS), a high-functioning type of autism, have an uncanny capacity to see details. They score higher than non-autistics on block-design tests, in which children are asked to use colored blocks to match a pattern given to them. They have better abilities to identify shapes, and are more likely to have prodigious talents, such as perfect pitch and highly accurate memories.

Temple Grandin, the accomplished animal scientist with AS, has heightened visual-spatial abilities that grant her both a knack for envisaging the workings of machinery and a keen insight into the way that animals perceive the world. As a consultant for McDonald’s, she has combined

these talents to revolutionize the way that slaughterhouses are run, designing them to minimize the pain and fear that animals feel during processing. (Her work in this area was the focus of HBO’s 2010 biographical movie *Temple Grandin*.)

Daniel Tammet, who also has AS, memorized over twenty thousand digits of pi and recited them in five hours. In his book, Tammet shows a diagram he used to memorize all of these digits. To most people, it would appear to just be a line graph with peaks and troughs, but Tammet associated these peaks and troughs with thousands of numbers. Many employers highly value such visual-spatial skills and orientation to detail. Thomas Armstrong describes Thorkil Sonne, the executive of a Danish software company, who searches for people with AS to serve as his software testers; Sonne’s company benefits from their fastidiousness, amazing memory, and ability to concentrate.

ADHD has potential benefits similar to those of autism. Although the notion is now perhaps too well-worn that our biological evolution lags behind our cultural development and our traits are best suited for an environment in which we no longer live, the idea is rather more plausible when it comes to ADHD. As Armstrong argues, people with what is now called ADHD would, in a hunter-gatherer setting, have been “always moving, always vigilant,”

making them more wary of potential threats. They may have been more likely to be explorers or to discover new sources of food.

The advantages ADHD might have had for our hunter-gatherer ancestors may seem ill-suited to an era that requires focus more than restlessness and vigilance. But in addition to the roving style of attention that often makes people with ADHD seem inattentive and restless, they also often possess an ability to focus for hours on specific activities or tasks that greatly stimulate or interest them. This “homing attention,” as Armstrong calls it, is evident in “rock climbers negotiating steep mountain cliffs” and “surgeons engaged in twelve-hour sessions in the operating room.” Certain professions actually demand characteristics that are much more prevalent in people with ADHD.

People with dyslexia also have certain impressive skills generally lacking in non-dyslexics. They can easily recognize patterns and anomalies in patterns. They sometimes also possess greater visual-spatial abilities, including ease with visualizing objects and systems in three dimensions. Similar to the abilities of autistics like Temple Grandin, they can sometimes visualize machines in their mind, and can tinker with these images—changing, adding to, and subtracting from them. Dyslexics also tend to be especially creative, for, as Thomas G. West notes, “one might

see visual thinking, spatial ability, pattern recognition, problem solving, and related forms of creativity as linked together in a continuum.”

The creativity of dyslexics can enable them to make groundbreaking discoveries and, sometimes, to compensate professionally for their disability. West tells of Susan Hampshire, a dyslexic and an actress, who could not read scripts for the stage. Instead, she “devised a personal system of pictures, symbols and other cues to help her.” Baruj Benacerraf, a dyslexic who is a former president of the Dana-Farber Cancer Institute and a Nobel laureate for his work in immunology, claims that his ability to visualize objects in three dimensions has greatly aided him in his research.

While depression may seem simply dysfunctional, even this condition has some advantages for those who suffer from it—although it is difficult to establish a biological connection between the symptoms of depression and the special abilities of those who suffer from it. These abilities seem to be tied to the closely related disorder of manic depression. Kay Redfield Jamison, a psychiatrist who has written extensively on this topic, claims that manic depression is correlated with artistic temperament. In *Touched with Fire* (1993), she recounts various studies showing that artists have far higher rates of manic depression than the general population. Jamison herself studied forty-seven British

writers and visual artists who were highly accomplished in their respective fields, and found that 38 percent of them had been treated for a mood disorder, with most of those requiring medication or hospitalization. In the 1970s, another researcher at the University of Iowa examined thirty creative writers and found that 80 percent had had at least one episode of major depression. Jamison also cites Harvard psychologist Ruth Richards, who found that manic depressives, as well as their relatives, showed higher creativity than those without such family histories. The state of mania apparently heightens performance on certain creative tests, like the ability to produce original responses on word-association tasks. People in manic states also have increased abilities to produce rhymes, puns, and sound associations.

Moreover, although many people assume that high creative production leads to elevated mood and low creative production leads to depression, studies seem to suggest that the order works in reverse: In what sounds like a clinical reformulation of the old notion of visitation from the Muses, Jamison found that “writers and artists...reported pronounced elevations in mood just prior to their periods of intense creative activity.” Describing in *Scientific American* the biological uniqueness of the manic-depressive mind, Jamison writes that it is “an alert, sensitive system that reacts strongly and swiftly.

It responds to the world with a wide range of emotional, perceptual, intellectual, behavioral, and energy changes.”

There is a risk, however, in romanticizing the advantages of neurological disorder, and forgetting how painful and difficult these disorders can be. Romanticizing the connection between depression and artistic creativity, for instance, is not only dubious but also dangerous. Those heightened creative capacities are mostly associated with mania—which occurs only in some depressives, and even for them only intermittently. Not all depressives can write poetry or music, and the suffering of the artists themselves is at least as great as the works that it inspires. Even if there are special advantages conferred to the depressive mind, it seems problematic, even cruel, to apply the term *neurodiversity* to those who need intensive therapy and medication simply to live and appreciate living.

Similar cautions apply to our understanding of other neurological disorders. For instance, while there are obvious advantages to the heightened visual-spatial cognition of autistics, they have other traits that are much less clearly beneficial. Their nervous systems are hypersensitive, so that a simple knock on the door, tolerable to a normal child, can send shock waves through autistic children, much as a high-pitched fire

alarm brings most people to plug their ears and recoil in pain. Temple Grandin tells of how, as a child, she was “scared to death” of balloons popping because the sound caused so much pain in her ears. Some autistic people, she says, can even sense the flicker of household fluorescent lights turning on and off sixty times every second.

This sensitivity also extends to touch. Grandin “wanted to experience the good feeling of being hugged, but it was just too overwhelming. It was like a great all-engulfing tidal wave of stimulation, and I reacted like a wild animal. Being touched triggered flight; it flipped my circuit breaker.” But autistics still need physical contact and pressure in order to relax. Ultimately, Grandin built a contraption that provides this to her on a regular basis: called a “squeeze machine,” it puts pressure on her body and calms her nervous system. Oliver Sacks writes of Grandin that this device opens a door “into an otherwise closed emotional world and allows her, almost teaches her, to feel empathy for others.”

The difficulties of cognitive disorders are much more pronounced for individuals at the lower-functioning ends of the spectrums of these conditions. They are also harder to see—for these are just the individuals who tend to be much less vocal and visible in public discussions. The kinds of autism, for example, that the public most often hears

about and sees depicted in media are usually the high-functioning ones, such as AS. Spokesmen like Temple Grandin or Daniel Tammet are able to write books about their condition; they adjust to society, find jobs, and learn to deal with people. The darker side of autism has few voices. Low-functioning autistics typically don’t have blogs, books, or jobs.

Many times, autistics grow up mute, rocking back and forth, flinging their hands up and down, unable to interact with others. Additionally, parents may shoulder great responsibilities when they have children with autism. Grandin writes that “young children with autism need at least twenty hours a week of intensive one to one teaching by an adult.” Parents must also pay for and participate in these sessions and deal with inexplicable temper tantrums, a child’s inability to speak, and a child’s social and emotional isolation, including difficulty in even hugging a parent. For many autistics, it seems condescending to label their conditions as cases to be appreciated under the rubric of neurodiversity rather than genuine disorder.

ADHD also causes great frustration, as Blake E.S. Taylor recounts in his memoir *ADHD and Me*, which he wrote during high school and published while a student at Berkeley. Taylor describes how, while taking a test on the *Odyssey*, he found his mind wandering: “I think about slalom racing down the packed powder,

cold dry air on my face....The distractions, like Circe, entice you and beckon you to daydream and enjoy yourself." Even during a test, which forces most young people to concentrate—and when concentration is most crucial—those with ADHD have little ability to control their thoughts and focus. Nor are these the kinds of distractions which most people would face for a fleeting moment when thinking about epic poetry; under many circumstances, they can be all-consuming.

Another scene in Taylor's book vividly illustrates how far the impulsivity of a patient with ADHD goes beyond that of a normal child. One evening, Taylor watched as his sister played with a lighter. Though he had been taught safety procedures and understood the consequences and hazards of fire, he could "only think of lighting something—anything—on fire to see what will happen." Taylor took a bottle of eyeglass cleaner and poured it on the flame—creating a blaze that nearly burned down his house. This is a classic story of ADHD: a child doesn't specifically want to cause mischief, but craves stimulation and lacks self-control.

ADHD is perhaps the neurological disorder most closely associated with childhood: according to the CDC, 7 percent of Americans between ages six and eleven have been diagnosed with it. But it is not just children who confront these difficulties. In the *Wall Street Journal*, adult ADHD

patient Ali Bauman writes, "I had a messy bedroom and a string of minor accidents that I could never explain. I couldn't keep the house clean, pay bills, get things done on time. It wasn't that I didn't want to do it, I just wasn't capable of doing it." Over 4 percent of U.S. adults have also been diagnosed with ADHD. Like children with the disorder, these adults often require medications like Ritalin to allow the focus required to keep their lives in order.

Dyslexics may face even greater difficulties because of the relative lack of understanding the general public has about their condition. People with dyslexia often hide their disability because of the stigma and misunderstanding surrounding it; many people consider dyslexia and its symptoms to be a sign of stupidity, even though dyslexics have the same range of intelligence as the average population. As Thomas G. West writes, "there are no rewards for revelation, and the penalties can take the most humiliating forms."

Though dyslexics sometimes find their niche in society because of their visual-spatial and creative abilities, their disorder makes it difficult for them to perform the linguistic tasks necessary for passing through even elementary school. West recounts the stories of children who are laughed at by their peers for being unable to stand up and read fluently in class. Worse yet, teachers can fail to understand why certain students

cannot read, and often end up putting dyslexics in special-education classes intended for children with below-average intelligence. All of these factors may take a heavy emotional toll, and can combine to keep dyslexic students from aspiring to greater goals—perhaps handicapping them for life.

The question of whether autism, ADHD, depression, and dyslexia should be considered disorders or appreciated as a matter of neurodiversity is not, as it might appear, simply a matter of terminology or political correctness. For at stake is not only how people with these conditions should be regarded—pitied or perhaps ennobled—but whether and how they should be included, treated, or cured.

For one group of advocates, the move to normalize neurological disorders is a form of gross medical irresponsibility—an ignorant act of cruelty rather than of toleration toward people who are suffering. Lenny Schafer, who has an adopted son with severe autism, in a recent issue of the online Schafer Autism Report notes research finding that boys with autism are more likely to be bullied, and that obesity, hypertension, and diabetes are linked to the risk of autism. Schafer told *New York* magazine that “it’s like stealing money from the tin cup of a blind man when you say that it’s not an illness.”

The difficulty, however, does not simply lie in whether to treat or not to treat. Even within the realm of treatment, the question remains whether to work *with* or *against* the unique traits of the individual. Thomas Armstrong, who has had years of teaching experience, including at the primary-school level, argues that this is a problem with special education under the current system. Special ed, he says, bases its approach “on deficit, damage, and dysfunction” rather than “strengths, talents, and aptitudes.” In other words, the purpose of special ed is to cater to the slower learners. But many of these “slow” learners actually have talents that should be nurtured by teachers. A primary goal for ameliorating the plight of children with neurological conditions, then, would be to change the perception of special ed as a place for people who are not smart. This means also changing the approach: the question should be less whether, say, autistics as a group are gifted or defective, and more how to recognize and work well with each individual’s weaknesses and strengths—as an effective educational program should for any child.

The questions of treatment, intended to benefit or change the lives of those already affected, are complicated by and easily confused with the more stark ethical questions of prevention and cures. Scientists have already identified many genes that contribute to neurological conditions, and are working to find more.

For example, some variations of the dopamine receptor D₄ gene may be one of the factors that contribute to ADHD; and there is strong evidence that other disorders are heritable. Studies on the heritability of autism show that it almost certainly has a genetic component—although researchers estimate that as many as a hundred genes may be involved. Thomas G. West claims that families share dyslexic traits. And genetic predisposition is believed to play a significant role in depression, too.

The ultimate goal of this research, of course, is not simply to learn the causes of these disorders but to help eliminate them. Mark Daly, an associate professor of medicine at Massachusetts General Hospital, argues that the “pieces are in place” to head in the direction of identifying gene variants and using that information to eventually develop more effective treatments—perhaps even by manipulating the genes in living patients. But pronouncements about such theoretical possibilities are prone to mislead about the immense pragmatic and ethical difficulties inherent in such an undertaking. And Armstrong, despite his sincere call for better understanding and appreciation of children with neurological disorders, scarcely explores in his book the practical difficulties and moral problems associated with manipulating human genetics.

In the first place, we do not necessarily know how a cure would

work for each individual person. The human body is not like a machine: tinkering with one part will not always have predictable consequences for the other parts. Because we are biologically distinct, subtle biological variations mean that every person’s body will respond differently to the same treatment. This is especially true for psychiatric conditions, which involve not only our bodies but our personalities as well; a drug that is considered successful in a psychiatric context may only work for some modest fraction of patients, and provide only modest improvements. Complicating factors and side effects are often not well understood, and treatments are often based not on definite diagnoses, as in more traditional disease models, but on an unsystematic trial-and-error approach. This is why there are many different kinds of medications for any given neurological disorder. For ADHD, for instance, doctors can prescribe Ritalin, Adderall, Dexedrine, Cylert, or various other stimulants or combinations of stimulants.

Treatment becomes even more complicated when it involves the manipulation of genes. Such treatment is still only hypothetical in human beings, and if it were to become possible would likely be extremely difficult and unpredictable. The role of individual genes in the development of traits and the functioning of an organism tends to be enormously complicated; one

can only imagine how unpredictable the effects of manipulating the nearly hundred genes associated with autism would be. We need to understand not only how this would affect the autistic traits of a patient, but the other traits as well, which are far from neatly independent from each other in the first place.

The likelihood that disordered traits are too enmeshed in the biological makeup of individuals to be targeted separately underscores the broader point made by many advocates that their disorders are integrated into who they are. Many of those who are born with these differences and are able to advocate for themselves are wary of research into eliminating their conditions, on the basis that it would eliminate much of what makes them *them*. To search for a “cure” denies their distinctiveness as human beings.

Disability rights advocate Ari Ne’eman, who has AS and was appointed by President Obama to the National Council on Disability, argues in a 2010 interview with Wired.com that the traditional focus of the autism community has been on “narrow questions of causation and cure.” And the focus of the national dialogue on matters like the vaccine controversy has led to the exclusion of “the voices of the people who should be at the center: those who are on the [autism] spectrum ourselves.” Rather than focusing on how to make

a world where autistic people “have the rights and support they deserve,” more traditional activism has aimed to “create a world where there aren’t any autistic people.”

When asked whether he would take a pill to cure his autism, Ne’eman replies that “that’s an intensely silly question . . . predicated on the strange idea that there was or is a normal person somewhere inside me, hidden by autism, and struggling to get out.” This response gets to the heart of the beliefs underlying the neurodiversity movement: these conditions are not simply disorders afflicting otherwise healthy individuals, but are integral parts of who these individuals are. These advocates hold that the way to address the problems they face is to change the world to make it more inclusive of them and their particular needs, not to change them to fit what the world sees as normal or appropriate.

This point becomes disturbingly concrete when one considers that the more likely application for knowledge of genetic causes of these disorders will not be to find cures through genetic manipulation for existing patients, but rather to test and screen fetuses and embryos so as to eliminate before birth those that have a mental disorder. There is a telling precedent in the case of Down syndrome, which is already widely tested for in the womb, resulting in abortion for over 90 percent of fetuses with positive diagnoses. As Ne’eman has written

in these pages, “To disability-rights advocates, this indicates a fundamental prejudice against the disabled” (see “Disability Politics,” Spring 2009).

Might the same thing happen with fetuses with autism? Despite the activities of the neurodiversity movement, the inclination to consider neurological differences to be disorders or defects still predominates. So it seems quite plausible that the trend we see against fetuses with Down syndrome could expand to include fetuses with other sorts of brain differences, if similar tests for them were to become available. How might we decide at what point a case of neurological disorder becomes too severe to be acceptable and who will get to make such decisions? The precedent would leave these choices in the hands of parents—but, as Ne’eman notes is already the case with parents who receive a prenatal diagnosis of Down syndrome, “many...are given patently false information about the characteristics of the people they are being encouraged to prevent.”

There is, of course, an immediate practical difficulty for such decision-making in the fact that, unlike the test for Down syndrome, new tests for other disorders are likely to provide far less certain results. The difficulty of predicting complex traits such as autism or depression based on genes or other biological factors easily detectable during pregnancy means that at best, such tests would likely only express a probability of certain neu-

rological disorders, and would be even worse at predicting severity. Individual decisions of whether to abort would be muddled from the start, unable to rely on solid information that a child will or will not have a certain set of defects. Parents who abort a potentially defective fetus would likely have to face the possibility that their child would have suffered only mild abnormalities or none at all, while parents who choose only to carry to term fetuses that test sufficiently normal might still end up having to raise a child suffering from disabilities due to inadequate test results—a child they would have aborted had they correctly known his or her condition—with disturbing ramifications for how the parents might feel about and care for that child.

Considered at the societal level, the question is: If we were able, would we move to eliminate large segments of the population and the different ways of experiencing the world that characterize them? Doing so would arise from a judgment that the lives of people with neurological differences are less worthy than the rest of ours—as is already clearly the judgment so many parents are making with respect to Down syndrome pregnancies.

The cases of people with autism, dyslexia, ADHD, and depression who are able to lead successful, productive and well-adapted lives speak powerfully. Advocates with autism and other neurological differences say

that they would never eliminate their singular traits—that those are much of what gives them their identity. Temple Grandin, Blake E. S. Taylor, Beethoven, and innumerable others show the kind of contributions such individuals are able to make to society. They show us how wrong we would have been were we to have tried to change them to be other than they are, or worse, never given these individuals a chance at life.

The heart of the matter of neurodiversity is not the hypothetical question of how we might use genetic testing in the future, but the very immediate question of how we are to regard and treat those who are already here. And important though the high-functioning individuals are as examples, the worth of a life should not have to be justified by extraordinary achievements. One of the lessons of H. G. Wells's story is that the narrowness of our vision easily obscures the value of the lives of others, especially when they seem to us impaired.

Every life has joy and triumph, pain and hardship, aspiration and frustration—all parceled out unequally, and this only in part because of the different biological hands we are dealt. In labeling certain individuals “defective” or “disordered,” we act in part to wall off some people as the unfortunate, tacitly claiming that the rest of us are whole, avoiding the truth that we are all flawed, struggling with deficiencies, working

with and against aspects of ourselves we would like to overcome. In labeling others as “disabled,” we must ask whether we are motivated by sympathy and compassion, or by fear and the difficulty of knowing the minds of others.

But even as we should not pass judgment on the value of the lives of others, neither should we presume to know their pain and difficulties. In a way, the neurodiversity movement shares a premise with the movement to eliminate individuals with neurological differences: namely, it says that individuals are to some extent identical with and defined by their nameable neurological traits. But in both cases, there is a danger of focusing on abstractions instead of the uniqueness of each individual.

We should celebrate the many treatments available for people who are suffering: anti-anxiety medications to help autistics, antidepressants for the depressed, Ritalin for people with ADHD, along with a wide variety of cognitive and behavioral therapies. The scientific community will and should continue to develop and improve these medications and therapies, especially for those who suffer on the extreme ends of the spectrums of neurological disorders.

The struggle remains one of understanding not only the causes of neurological disorders, but also to what extent prevention and treatment means valuing or devaluing the

lives of affected individuals. Perhaps progress in these areas will necessarily remain idiosyncratic—and we would do well to be wary of solutions presented as absolute “cures.” The line between difference, advantage, and suffering may not always be clear, and will be different for each individual, as will what counts as desirable treatment versus troubling manipulation.

In considering the question of how to deal with the diversity of neurological conditions, we would do well to remember H. G. Wells’s story, where “normal” is a fluid term. Nunez thinks of the blind as abnormal, but so do they of him. That each human being is biologically unique is, in fact, the norm. These biological differences are, in turn, inextricably

intertwined with the different ways we have of seeing and being in the world. Eliminating this rich biological and psychological diversity in the ostensible interests of ameliorating or preventing suffering would in the end diminish our humanity. It would make us less visibly like the country of the blind, but more like them in their prejudice. Rather than working to create another set of public labels, the real value of the neurodiversity movement may be in helping us to recognize that we each face challenges and opportunities—and that a decent society is one in which we are each able to strive to make the best of what we are given.

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