

The Underpinnings of Human Behavior & the Impact on Education

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Before I can begin to address the brain and learning, it is important to step back and put into perspective the larger picture. Learning, broken down to its simplest equation, is **change**; the brain must make a chemical transformation in the process of learning and a specific series of structural modifications to produce a new behavior. Therefore, it is rational to conclude that understanding how the brain changes is the key to education. It is not only the key to the specific question of how to improve learning but also to the broader question of how to accomplish systems change. Systems change is merely collective learning designed to produce long-term behavioral change. Understanding this leads us to realize that effective systems change must implement advanced learning strategies designed to produce long-term behavioral change. It is broadly accepted that for any truly significant change to take place in an educational program, 80 percent of the staff must be in agreement with the change and willing to commit to some new behavioral practices. Just as it is impossible to master the complexities of learning without first understanding how the brain produces behavioral change, it is difficult to achieve true systems change unless we understand how to influence behavioral change. In order to understand how humans change, we must begin with a sound basic understanding of human development: the four underpinnings of human behaviors.

The first underpinning of human development is genetics: *where we start*. Genetics in this case is used to describe the ability of the human brain to produce predictable change on schedule. Like most mammals, the human brain is born only half developed. At birth the brain weighs about 350 grams; at six months it is 50 percent of its adult weight; at one year it is at 60 percent of its adult weight; at two-and-a-half years it is at 75 percent of its adult weight; at six years it is at 90 percent of its adult weight; and at 10 years it is at 95 percent of its adult weight. The dance of nature and nurture has already been intricately involved from the first moment of development.¹ Babies born with normal to advanced brain functions will develop according to a genetically pre-ordained pattern that is indicative of the capacity present at birth and the exposure to safe and nurturing environments. When both of these factors are operating as they should, one can predict when certain pre-ordained changes will take place: these changes are called *milestones*. Understanding this genetic predisposition begins to explain why milestones are so predictive. Milestones are indicative of appropriate regional brain development. They also indicate that certain brain cells are

¹ Rose, Steven, *The Future of the Brain*, Oxford University Press, Oxford, 2005.

capable of producing their pre-ordained function, as well as possessing the ability to respond appropriately and even adapt to external stimuli. That is why a child with a slight delay in meeting a major milestone is not too disturbing; however, significant delays are representative of substantial cell impairment in the brain.

When significant delay is present, one cannot assume genetic impairment alone. A healthy child still requires safe, predictable environments, appropriate nurturing, and appropriate exposure to the required stimuli to meet most milestones. Children born with regional brain impairments are often the same infants who are not receiving predictable, nurturing, and appropriately stimulating environments. This pattern is predictable because many altered brain functions have hereditary features. Thus, children struggling to meet milestones are often being parented by individuals who might not have the capacity to provide the infant with the structure, nurturing, and consistency he or she needs. Schools can accept this science or continue to blame the victim and be ill-prepared to deal with cognitive and behavioral variance.

Ultimately, inferior genetics impacts not only the ability of brain cells to produce preprogrammed patterns but also the ability of cells to respond appropriately to external stimuli. These issues are further complicated whenever the environment fails to provide safety, nurturance, and appropriate stimuli. Therefore, students with inferior genetics not only suffer from the inability to do certain functions but also from the inability to adapt well to the ever-changing world. That is why adaptability is the layman's test of mental health. The healthier the brain, the more easily a person is capable of change.

The second underpinning of human behavior is temperament. Temperament is best defined as *how you react to stimuli*. A stimulus can be anything, or more precisely, everything. Temperament can be understood easily through a simple visual. Imagine the world on a slide rule; on the far left are those individuals with easy temperament; on the far right are those individuals with difficult temperament, and disbursed between the two extreme points are the rest of the world's population.

Those individuals on the far left of the continuum, with easy temperament, are born with the unique ability to establish eating and sleeping patterns easily without much external support; more precisely, they are the children who are born with the cell capacity to adapt quickly. In addition, these individuals do not overact to stimuli, they quickly adjust to change, and they have a remarkable ability to read human nonverbal cues very early in life. Some people refer to this advanced ability to read nonverbal cues as high emotional intelligence. From the beginning of life, these individuals excel in the most important aspect of life, human interaction. They have wonderful affect that seems to draw others to them. Individuals with easy temperament represent only 5 to 10 percent of the population.

On the far right of our continuum are those with difficult temperament. These individuals also represent only 5 to 10 percent of the population. Individuals with difficult temperament struggle to establish healthy eating and sleeping patterns. Not only are they slow to read, but they also are prone to misreading the nonverbal cues of others. This lack of ability will place them at a disadvantage with interpersonal relationships throughout their lives. Because individuals with difficult temperament are slow to adjust to stimuli, they will be more sensitive to any changes in their environment. This sensitivity to stimuli makes them chemically more volatile, and as a result, more at risk for impulsive reactions. This level of constant agitation under which they live will make childcare challenging and frustrating.

Often it is the healthier parents, living well above middle income, whose difficult-temperament children will benefit from child care support in sufficient amounts to help manage their deficiencies. However, parents who are less prepared might become emotional, frustrated, and even abusive. It is important to note that the child who is most sensitive to stimuli and least capable of understanding his or her environment is the same child who is most at risk for being abused by the childcare providers. If these children are exposed to trauma, the nature of the impulsive behavior becomes more severe. Those with difficult temperament not only have poor response to nonverbal cues, but also have very flat affect. This flat affect makes it difficult for others to read and understand them, thus adding to their difficulty in developing relationships. Individuals with difficult temperaments have trouble bonding to others and maintaining relationships. The list of reasons is substantial: they seem always agitated, their nonverbal behaviors appear to be threatening, they constantly misread the intentions of others, and they demonstrate extreme behaviors when they are overly stimulated.

It is individuals with difficult or closer to difficult temperaments, coming from unstructured environments, who have the greatest problems adjusting to school. They struggle with the change and with the level of stimulation. Most importantly, since learning is change, the chemical impact of learning can itself cause impulsive and even negative behavior. As a result, there exist portions of the student population that can be negatively impacted by the mere act of being taught something new. That is why teachers must become more adept at introducing the more challenging materials in the context of information that these students already know and are comfortable with.

In order to accomplish this, teachers must take the time to find out what students know, spend time doing, and feel that they are good at.

The majority of individuals on the temperament slide rule are in the middle. If these individuals are chemically healthy, they require a short period to adjust to change. And since most individuals are not victims of trauma, they are less likely to exhibit extreme behaviors, even during periods of transition. Because of sheer numbers, schools are often unmotivated to help at-risk students transition with ease since a significant portion of the school population adjusts in a short period

of time. However, to conclude that the learning environment is sufficiently structured and that most students are fine is erroneous. The reality is that in many schools across the nation, students struggle with the social, academic, and even unseen dangers present at most schools. Many students who seem on the surface to be fine suffer from low-grade anxiety. This will not necessarily produce an epidemic of negative behavior, but it does consistently contribute to lower test scores and increased behavioral incidents. There is enough evidence on how the brain functions to know that even low levels of anxiety reduce cortical function and increase impulsivity. Therefore, it is logical to establish environments that make all students perform at their optimal level. Environments that allow the unhealthiest students to thrive are actually the same environments that allow for optimal achievement by ALL students.

It is crucial for schools to understand that a significant portion of the student population requires educational environments that are highly ritualized. A ritualized setting is not the same as an environment that has a set of clearly defined rules that are consistently enforced. Ritualized environments do not place the primary emphasis on rules and enforcement. By not focusing on rules and violations, these ritualized settings avoid some of the predictable compulsions to violate rules that are a feature of certain emotional disorders. For example, individuals suffering from either Oppositional Defiant Disorder or Conduct Disorder cannot help violating rules. These two disorders make up the majority of individuals with behavioral problems. Ritualized environments focus on teaching what they want students to do and establishing times when the behavior will be practiced, monitored and reinforced. Students come to believe that the practice exists for their benefit rather than as a control mechanism. Over time the practice itself becomes familiar and therefore comforting. Highly ritualized settings allow struggling individuals the opportunity to become accustomed to the environment more quickly because it is so predictable.

Once the student becomes accustomed to the rituals that occur throughout the school day, the practices act as an anchor. When participating in the routines, the body and mind grow so accustomed to the occurrence that it actually improves chemical imbalance. Imagine a student who struggles to adjust, entering school and immediately participating in a very familiar ritual that helps him or her better transition into the school day. Think of the possibilities if the school anchored the educational day with rituals at the beginning, middle, and at the end of the day. Admission, lunch, and dismissal are highly stimulating unstructured transitions that have always proven problematic for the unhealthy student and even for the healthy student who is experiencing temporary chemical imbalance. It is important to note that the human brain undergoes many periods of dramatic change that create temporary chemical imbalances. According to some neuroscientists, the brain undergoes some fundamental restructuring during adolescence, just as it does during the earliest years of childhood.² At

² McCrone , John, *Rebels with a Cause*, NewScientist.com news service, 22 January 2000. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, whether electronic, mechanical, photocopying, recording, or otherwise without the prior written consent of the copyright holder Resiliency Inc.

this time, students need the familiarity of rituals to anchor them while they become accustomed to new stimuli.

At the moment a school begins to see the importance of establishing rituals that improve the educational climate, the concept of systems change begins to take shape. Any valued ritual or practice takes consistent modeling, practice, and even reinforcement. It is the adults in every school setting who must change their behavior in order to achieve educational reform. The initial problem is that school staff reflect a wide range of genetic profiles and temperaments themselves. Staff who are closer to the right-- or the difficult temperament-- will resist all changes because the transition causes them chemical discomfort. This is not a villainous act, but rather a conditioned response pattern that was established early in life. Whenever these individuals' experiences change, they feel the chemical imbalance in their bodies. The chemical imbalance causes anxiety and produces many of the co-occurring features associated with the condition. Over time, these individuals have learned to protect themselves by resisting change. If a systems change is not supported by a sufficient number of staff, it will not be modeled and reinforced correctly to take hold. That is why understanding how behavior change occurs is the cornerstone of effective systems change. Administrators must learn how to institute change in a manner that allows staff right of center to accept and be willing to attempt change.

Establishing the correct rituals will allow individuals with difficult or closer to difficult temperaments the opportunity for better daily transition to the educational setting. In addition, since learning is change, teaching must place emphasis on shaping new information in the context with what students already know. This requires that teachers find out what information students actually know and are comfortable with. Unfortunately, most teachers assume they know what their students have previously learned. Often times this assumption leads to the inability of the difficult- temperament student to learn new material because that student does not have the knowledge base held by others. A lack of understanding of this profile student will lead to frustration, poor academic performance, and eventually negative behaviors.

It is important to reconcile genetics and temperament before going any farther. By reconciling genetics and temperament, one can begin to explain some inconsistencies that puzzle the casual observer of human behavior. For example, why do certain people with outstanding potential become such consistent failures? A person can be born with superior genetics and with a difficult temperament. This combination will reduce this individual's ability to take full advantage of his or her capacity. Although this individual will have an accelerated capacity to learn, the chemical reaction caused by new experiences will slow the learning process until he or she can become familiar enough not to

experience anxiety. If this person does not come from a supportive and structured environment, it will take him/her even longer to adjust. That is because the home fails to provide a setting that improves chemical functioning, therefore compounding their problems. This series of events explains how someone with great capacity can struggle to achieve full potential. Now begin to configure all the possibilities of genetics and temperaments and one can begin to see clusters of different individual profiles: average genetics and easy temperament, inferior genetics and difficult temperament, superior genetics and easy temperament, and so on. Education must focus on ways to maximize the productivity of all the configurations in every school. A universal starting point is creating highly routine and nurturing environments. These structured educational settings assist all the different genetic and temperament configurations in excelling. Educational settings that do not teach routines to help individuals better transition have already swung the pendulum toward those students in the center and to the left of the slide rule and away from those students who need help the most.

I have always said, tongue-in-cheek, that it is healthy students who have ruined the educational system. As long as educators can point to those students achieving and being successful in less structured settings, there will not be enough motivation to invest the time and energy needed to create optimum educational settings for all students. This simple conclusion might provide profound insight into the age-old question of who is education designed for? Although western education mandates the participation of everyone under the age of 16, the system is clearly designed for people with average to superior genetics possessing normal to easy temperament.

The third underpinning of human behavior is exposure: *what we have already adjusted to*. Adjustment to new stimuli requires a sufficient level of exposure to reduce significant levels of chemical reaction. Those who navigate life more adeptly have had a greater level of exposure, increasing their ability to adapt to new experiences. Individuals who have a breadth of exposure can draw from a wide range of experiences to help understand new situations without becoming overly stimulated. Individuals with difficult temperament will adjust better to everyday life if they have been carefully exposed to experiences that will help them navigate common situations. That kind of exposure before entering school will make many of the activities required in early education familiar or at least more understandable. However, consider the student who has average genetics, is closer to difficult temperament, and is born into poverty. One of the consistent products of poverty is the lack of life exposure. It is now commonly known that individuals in poverty can spend a lifetime within a 5- to 10- mile radius of their homes. Recent studies have shown that 66 percent of trips taken by individuals living in poverty are 3 miles or less.³ Such limited exposure predisposes these

³ Murakami, Elaine and Young, Jennifer, *Daily Travel by Persons with Low Income*, Federal Highway Administration University of Tennessee, Washington, DC Knoxville, TN, 1997

individuals to become overly stimulated by the most mundane of new situations, thus producing chemical imbalance.

Let us now put together genetics, temperament, and exposure to help understand clusters of individual profiles. For example, take a person with superior genetics, closer to difficult temperament, and limited life exposure. Although this individual possesses outstanding genetic capacity, he or she will struggle in two ways. First, because of temperament, he or she will take longer to adjust to new stimuli. Then, due to his or her lack of exposure, more stimuli will be new, less of it will be appropriately comprehended, and more of it will be viewed as threatening, causing over-arousal. The sad fact is that many students with this very profile are even more at risk for school failure because they often come from unstructured homes that do not model or teach skills that teachers expect students already to possess. Schools can begin to better manage these students' transition into school by having preschool programs focus on the daily practice of skills and behaviors needed to better manage transition into school. It is not enough to briefly teach and practice these skills; they have to become ritualized practices that become so familiar that they do not produce chemical arousal but instead, improve chemical disposition.

The fourth underpinning of human behavior concerns highly emotional experiences: *how you react when chemically aroused*. The human brain stores highly emotional experiences differently from other information learned or experienced. The *amygdala* is the part of the brain most involved in highly emotional behavior. It stores highly emotional experiences, configures the chemical responses, and remembers the chemical responses forever. By remembering each previous response, it can reproduce that response even faster in the future. Most importantly, when significantly aroused, the amygdala secretes chemicals that reduce interference from the cortex. The cortex is in charge of storing what has been learned long-term, and for producing reasonable and rational behavior. When an individual is overly aroused, he or she will be prone to produce behaviors that are based on past emotional experiences. This begins to explain why individuals exposed to abuse or neglect are more prone to negative behaviors that produce detrimental consequences.

In addition, many of the students who are subjected to repetitive trauma are prone to misperceiving benign situations as threatening whenever they become too aroused. It is this unpredictable volatility that places this profile student at greater risk for behaviors that result in school separation and failure. That is because most school administrators cannot comprehend why the student demonstrated such extreme behaviors in response to a given situation. However, this student is responding to the situation that just happened based on a certain level of arousal reaching back into past occurrences. Therefore, the most important intervention for this student is to create an environment that lowers chemical arousal and helps the student feel safe. Sadly, most schools continue to manage this profile student by resolving each incident through countless hours of meeting, planning, and interventions. Measures that fail to reduce the primary triggers in the school environment that produce higher levels

of arousal. The result will be many unsuccessful attempts to resolve each individual incident rather than understanding the cause of the behavior, followed by the determination that the student requires more supervision than the educational setting is capable of providing.

In reconciling all four underpinnings of human behavior, one can begin to understand the full range of human behavior and the variables that are always involved. For example, a person with superior genetics, difficult temperament, and poor exposure will struggle to adjust in spite of genetic capacity. If the child was exposed to abuse and neglect, he or she will be constantly prone to extreme behaviors. On the other hand, an individual with average to inferior genetics with easy temperament and wide ranges of life exposure will be more prone to maximizing potential. If that person has not been exposed to abuse and neglect, he or she will cope with highly stimulating situations better and when overwhelmed, will be less likely to resort to extreme negative actions.

With the above-mentioned information, it is now easy to understand the convergence of circumstances that produce the most difficult-to-educate students. Imagine an individual born with inferior genetics. The inability to produce pre-ordained patterns, respond appropriately to external stimuli, and deal constantly with chemical imbalance radically reduces his or her ability to cope with life. Let's say that this individual is also born with difficult temperament, making everything experienced and learned result in increased chemical imbalance. Over time, individuals with this profile will begin to avoid new experiences and information because they are keenly aware of how anxious newness makes them feel. In addition, the inability to maintain good sleeping and eating patterns only further compounds their chemical imbalance. These children are not helped but are indeed hurt by an unstructured, abusive environment that hinders their chemical improvement, thus producing extreme behaviors when chemically aroused. In addition, the chemical imbalance leads to the students' easily being aroused in new situations, even if they are benign. Finally, these children will have limited life exposure, making every new experience only more difficult because they have little past information to draw upon to navigate change.

If education better prepares to manage the profile described above, then it will have established the exact educational climate and culture that will help maximize every student's academic achievement and behavioral development.