

5-15-2013

# How we understand intelligence and why it makes a difference : a literature review

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## Recommended Citation

Golden, M. (2013). How we understand intelligence and why it makes a difference : a literature review. *New York : Bank Street College of Education*. Retrieved from <http://educate.bankstreet.edu/independent-studies/81>

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**How We Understand Intelligence and Why it Makes a Difference:  
A Literature Review**

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Submitted in partial fulfillment of the requirements of the degree of

Master of Science in Education

Bank Street College of Education

2013

# **How We Understand Intelligence and Why it Makes a Difference:**

## **A Literature Review**

**By: Maya Golden**

### **Abstract**

This study investigates theories of intelligence and examines the educational implications of contrasting views. Following a personal reflection on the subject, the author conducts an extensive review of the related literature. Building on a historical analysis of intelligence research and providing an understanding of the current state of the field, it is demonstrated that conflicting theories justify profoundly different practices in schools. The author indicates that the quality of a student's educational experience is greatly impacted by the view to which his or her teacher subscribes. The IQ based model is demonstrated to be most prevalent in schools today and the damaging effects of this view suggests an imperative for broader conceptions of intelligence amongst teachers, school leaders, and policy makers towards creating more democratic and productive practices that allow students to access their full potential and contribute most meaningfully to society.

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## Personal Reflections

My journey with this topic began shortly after I joined the Master's Degree Program in Early Childhood Leadership at Bank Street College. Not coming from as strong an academic background as many of my fellow students, from the first day of classes I felt intimidated by their apparent intellectual abilities and broad general knowledge. I was extremely quiet in class because I rarely felt that I had anything substantial to contribute to discussions. Many of my classmates used academic jargon with which I was not familiar. As well, they were extremely articulate and comfortable speaking in front of groups, a skill that had always eluded me. Further, I quickly realized that my classmates were much better read than I was and knew a great deal more about educational theory and the American educational system. My intense feelings of inadequacy led me to question the quality of my earlier education and ultimately my own intelligence. I felt very discouraged.

I spent the first summer soaking up everything I read in my textbooks and all that I heard in class from my teachers and peers, while trying hard to hide my ignorance by speaking as little as possible. However, I had one class with students who were not in any of the leadership programs and seemed less academically based and accomplished. The class also involved subject matter that was more familiar. I felt more confident and participated enthusiastically in the group discussions. It was at this point that I decided to make an appointment to speak with the professor of a class I was taking on adult development, Dr. Mayra Bloom. I

shared my feelings of reluctance to speak in certain classes, admitting that it was because I felt worried about revealing my intellectual inferiority to my peers and teachers. Dr. Bloom's response was revelatory. In the course of our conversation, she explained that she believed my feelings are actually a pervasive issue amongst many adults and she asked me to consider an important question; "What do my judgments about myself compared to my peers reveal about my underlying beliefs regarding the nature of intelligence?"

The following summer, having spent time during the year reflecting on this question, I returned for the second year of the program. When classes began again, and sparked by my past conversations with Dr. Bloom, I started to pay more attention to what kind of intellectual standard I was holding myself and my classmates to, becoming more aware of my assumptions about who is or isn't intelligent. I worked on being more attentive in conversations as to how others used the words "smart" or "stupid" or similar terms and what these references revealed about people's implicit theories about intelligence. I was particularly intrigued about how my fellow teachers and I used evaluative terms regarding the intellectual capacities of our students. I became aware of some themes in the way we were all thinking about intelligence that I found deeply disturbing. I continued the discussions I had started with Dr. Bloom the year before. In sharing some of my observations and reflections from the preceding year, she asked me to reflect on another question: "How did these beliefs about intelligence develop?"

Dr. Bloom and I discussed how beliefs about intelligence can become part of an individual's thinking and even the thinking of a society in general. We also considered the ways a person's development could be affected by these beliefs. Dr. Bloom opened my eyes to some of the issues that surround concepts of intelligence and she told me that she wrote her doctoral dissertation on the process many adults have to go through to recover their own sense of intelligence. I decided to research the topic for my own thesis in an effort to learn more about how to instill and preserve the feeling of intellectual competence in my young students so they would grow up feeling confident in their abilities, a sure requisite to achieving their full potentials in life.

As I began to think about the experiences that lead to either diminishing or cultivating a person's feelings of intellectual competence, I reflected on my own history and the aspects of my school and home life that contributed to my ensuing outlook. When I think back to my years in elementary and high school, I can see how my parents and many of my teachers held the view that academic ability was synonymous with intelligence. Since most aspects of school were a struggle for me, I often felt "stupid." These observations were an important insight as I developed a greater understanding of the ways students can be influenced to view intellectual capacity in themselves and others. Reading Dr. Bloom's thesis, *The Reclamation of Intelligence: A Task for Adult Learners* (1993), was nothing short of a life altering experience for me. The ideas in her study resonated deeply within me. Through Dr. Bloom's brilliant review of the literature surrounding this topic and her remarkable

research project with a group of adult students, she has made a strong case for her claim that we are too often raised with a concept of intelligence that alienates so many of us and thus we grow up thinking of ourselves as “stupid.” She asserts that a broader and more inclusive view of intelligence is more accurate, more just, and more empowering to all people. She demonstrates that a sense of one’s strengths is essential to living a productive life.

I am still on the journey of reclaiming and embracing my own intellectual abilities. I am learning to acknowledge, accept and appreciate my strengths as well as considering the intellect of others with greater respect and attentiveness. Although I am not totally rid of the seeds of doubt that are still ready to germinate when I am in an academic setting, I am more able to accept some of my limitations without feeling so deeply inadequate. I realize we all have different ways of approaching the world and different experiences that contribute to our knowledge bases and affect our achievements. I strongly believe in our capacity to develop ourselves further and reach beyond our existing abilities and to achieve at levels not thought possible. I also believe we need all kinds of talents in the world and it is important to appreciate the wide range of ways in which people can demonstrate ability.

I am impassioned by a life-long goal to guide children in ways that allows them to discover and appreciate their unique gifts and feel empowered to learn and grow. I think an essential part of this goal is to advise teachers and other adults in



children's lives to examine their ideas about intelligence and consider how these ideas are affecting the children in their care. Becoming aware of the flaws in holding everyone to one narrow concept of intelligence and discovering the power there is in appreciating the many different aspects of intelligence has been so instrumental in my work as a teacher and a parent and to my own growth as a person. I am so grateful for the opportunity I have to gain this knowledge from the work I have done on my thesis.

My thesis will concentrate on beliefs about intelligence and the implications these beliefs have on the way children are educated. I will examine the tendency in our society to minimize certain types of intelligence while glorifying others, gravely diminishing the power of our human resources. The goal of my thesis is to highlight the urgent message that an understanding and appreciation of broader views of intelligence amongst educators will profoundly impact their students. My sincere hope is that my thesis will, in some small way, add to the body of work written to inspire teachers and educational leaders to help children access their full potential so they are able to use the best of their abilities to contribute meaningfully to the world.

Part One will review the history of intelligence theory and will argue that while there is still no consensus amongst scholars today about the real nature of human intelligence, the concept of a unitary, fixed, and measurable intelligence remains most accepted in the field and by the general public. Despite the growing

popularity and increasing application of progressive intelligence theories that promote more pluralistic approaches, the traditional view is still the most dominant in our schools. Part Two will examine the educational consequences of traditional concepts versus the implications of alternative views. It will be argued that traditional views are damaging, limiting and do not bring to fruition the true capacities of many students and that alternative concepts are more democratic and more productive. Part Three will focus on solutions that will lead to a more equitable and successful education system for students in America as well as the promotion of the idea that the subject of human intelligence must be a central aspect of teacher training.

## **PART ONE: How We Understand Intelligence**

The nature of human intelligence has been a subject of interest and study amongst theorists in many fields dating back centuries. Examining the history of these endeavors to describe, organize, and measure the complex array of mental capacities in people is important toward understanding how our conceptions of intelligence have developed and the way these ideas have impacted our lives. Present perspectives, both within the research community and amongst the general public, are largely influenced by earlier ideas and have profound implications in many areas of life; especially regarding the way we educate children in American society today.

### **Historical Perspectives**

In 1996 the American Psychological Association formed a panel of experts in the field of intelligence research with the task of summarizing the state of findings in the field. The task force outlined what had been established, what was still disputed and what questions remained to be answered in an unbiased report titled *Intelligence: Knowns and Unknowns* (1996). The report acknowledges that there have been many important approaches to studying intelligence, but identifies the psychometric testing movement, which became popular during the 20<sup>th</sup> century, as being the most studied and the most widely applied in practical settings and it continues to be a very influential movement. Psychometric testing involves

measuring performance on mental tasks to determine levels of intelligence in people.

In 1981, Stephen Gould published an extensive historical analysis of intelligence theory, in a book titled, *The Mismeasure of Man* (a later edition was published in 1996). He explains how the psychometrics approach was based on ideas from the earlier movement of craniometry that dominated the 19<sup>th</sup> century and involves physical measurements of the head as an indication of intelligence levels. Gould describes the way both theories make use of a core principal that he calls biological determinism; the idea that we are all born with a set amount of intelligence, which is mostly impossible to change, and can be measured as a single number then ranked along a linear scale. He traces thinking on this subject back to the days before the theory of evolution was proposed, when scholars were influenced by religious ideals in the justification of a biological origin for intelligence. Gould relates how views then changed toward a more scientific orientation after Charles Darwin's discoveries and there was a growing focus on numbers for their assumed objectivity and precision.

Gould calls Francis Galton the "apostle of quantification" and "pioneer of modern statistics" for his obsession with measurement and his belief in the absolute truth in numbers (1996, p. 107). Galton was a cousin of Charles Darwin and was influenced by his strong belief that there was a genetic basis for almost all human traits. Galton created the term "eugenics" and promoted the idea that reproduction

should be regulated according to genetic endowment in order to manipulate the population by creating the most ideal citizens. Galton strongly believed in the inheritance of intelligence and developed an interest in craniometry, a domain of phrenology that differed in an important way. Phrenologists believed that different physical attributes of the head corresponded to independent mental functions that could be summarized by a series of measurements. They believed these various measurements reflected a mental profile of intellectual function and personality traits. Craniometrists differed by emphasizing that brain volume and skull shape were indicative of a general level of intelligence. Gould describes this view as, “the first biological theory supported by extensive quantitative data (1996, p. 63).” He says that from the creation of craniometry developed two notions that carried over to future theories of intelligence. The first was that intelligence is a reified entity, meaning; theorists took the abstract concept of intelligence and made it into a single thing of physical substance with a specific location in the brain (1996, p. 56). The second was that there is a quantifiable way to measure intelligence, which also created a way to rank people according to mental worth (1996, p. 57). Thus the underlying assumption is that people possess a certain inherent level of intelligence, which is a unitary entity and can be assigned a numerical value. Gould describes the way craniometry became very popular and its hereditarian views were often used as a rationale for discrimination against non-whites, women, and those of lower social rank, by the claim of a relationship between brain volume and intellectual superiority according to race, sex and class. He points out that although phrenologists weren’t innocent of prejudice against those deemed to be of less

intelligence, traditionally they were more often against the hereditarian idea that intelligence is fixed and many argued the belief that change and potential is possible for all people and particularly those who were identified as having below average intelligence. Though both theories have since been discredited, many authors point out that the ideas of each formed a foundation for the divergent future theories that supported either more pluralistic or more overall views of intelligence (Sternberg, 1988, Gardner, 1993, Gould, 1996).

Gould (1996) identifies Paul Broca and Samuel George Morton as being famed figures in the field of craniometry and he notes they were both convinced of the inherent inferiority of certain groups of people. Morton's work was pre evolution and being motivated by religious thought at the time, he believed that people were created unequal. Morton attempted to use what he assumed was the objective scientific data of skull measurement to prove this idea. He was known as one of the first people to look for real scientific evidence for the biases that already existed against specific groups thereby proving the legitimacy of their status in society and the rationalization for religious ideals of the time (Gould, 1996). Broca's work was done post evolution and he was influenced by the idea of intelligence being a function of human progression. Simply put, in his view, less evolved meant less intelligent and this level of intelligence would be passed on genetically. Broca collected most data on the, so-called, inferior brains of women and Morton focused mostly on the theory of white superiority over Native Americans. However, both of their work was characterized by the basic idea that people were born with a specific

cranial capacity that determined their level of intelligence, which could be summarized by a numeric evaluation. They also both looked at skull shape for indications of inherent intelligence levels, believing that white males were most advanced in all measures. Broca and Morton used these theories to suggest various practical applications, such as segregation between races for the purposes of education and procreation (Gould, 1996).

Gould (1996) also mentions two other influential theories of the time that made use of evolutionary premises and biological arguments for human inferiorities. Recapitulation involved identifying anatomical signs to explain less evolved versus more evolved groups, meaning the adults of inferior groups were like the children of superior groups. Criminal anthropology posited that criminals were born with pre-determined tendencies toward crime, evidenced by their physical signs of apishness. Both involved the search for anatomical signs that some groups are less evolved than others to explain the existing societal position of certain groups. These ideas had specific impacts in society; they provoked law reforms, were used as evidence in trials, and worked to bolster arguments for capital punishment because criminals were assumed unable to be rehabilitated. Gould writes, "These theorists believed that evolution is a tale of unilinear progress, and that a single scale ascending from primitive to advanced represents the best way of ordering variation (1996, p. 189)."

The field of craniometry with its emphasis on physical measurements eventually gave way to the mental testing movement, which emphasized psychological processes and became popular in the 20<sup>th</sup> century. It continued in the same vein as craniometry regarding the belief that people could be arranged in a hierarchal manner on a linear scale of biological value and general potential (Gould, 1996). But rather than studying the brain as a physical source of intelligence the focus was on examining the more abstract mental faculties exhibited through performance on mental tasks. At this time, psychology was developing into it's own field apart from natural sciences and became disconnected from studies of the brain and focused more on behavior. Gould (1996) relates the way determinists switched their allegiance from craniometry to intelligence testing, but points out that it made use of the same goal of ranking people according to mental worth and mostly ignoring questions about the effects of environment.

French psychologist, Alfred Binet, developed the first intelligence test in 1904 and many authors describe his research as foundational to the psychometrics movement (Sternberg, 1998, Gardner, 1993, Gould, 1996, Sacks, 1999, Robinson, 2011). Binet was commissioned by the French Ministry of Education to design a method of identifying students who would likely experience difficulty in the regular school system and who would benefit from a special education program. Binet created a series of tests that included a diverse range of tasks, which he hoped would reveal the overall intellectual level of children and, therefore, was an indication of how well they would fare in school. The scores earned on Binet's test



were calculated by subtracting a child's mental age, which was determined by the level of tasks completed on the test, from the child's chronological age. However, Binet didn't believe that intelligence was a distinct capacity but a quality too complex to be depicted by a single number and he also did not believe these scores defined a child's fixed intellectual potential. In fact, he was an advocate for the disadvantaged student and believed that intellectual levels could be changed with the right kind of education. Gould (1996) studied Binet's work in depth and says it is obvious that his aim was to help students improve and get them the help they needed, rather than to label them in any way. However, many of the theorists who built on Binet's work and the policy makers who used his research, distorted his original intent in the interests of their own social views and political agendas (Gould, 1996). In 1912, German psychologist, William Stern, proposed a different way to score Binet's tests, dividing mental age by chronological age to reach a mental quotient, which became the established way to calculate scores on future intelligence tests and later became known as an Intelligence Quotient (IQ). Stern too believed in the plural nature of intelligence and declared it much too complicated to be captured by any kind of test. The psychologists who built on the contributions of Stern and Binet had different approaches to mental testing.

Gould (1996) credits three American psychologists with being the most responsible for inventing the hereditarian theory of IQ, namely, that test scores or IQ was a measure of inherent intelligence that could be positioned on a scale of mental worth. Once more, the assumptions of reification and rank revealed

themselves in the work of H.H. Godard, L.M. Terman, and R.M. Yenkes. They all labeled entire groups of people as superior or inferior, primarily discriminating by race, class and gender and glorifying white males as most supreme. Henry Goddard was responsible for translating Binet's test into English and for taking it to America and he identified intelligence as an inherited entity that could be calculated for the purpose of organizing society accordingly. Goddard wanted to identify intelligence levels not to help people but to segregate and limit them, so lower scores meant some people were innately incapable and thus unable to contribute positively to society. At the time, Goddard was working with what he termed the "feeble-minded" and believed that people who scored below a certain number on Binet's test should be prevented from reproducing. He proposed that those who earned the label of "feeble-minded" should be separated and housed in institutions. He was a eugenicist and believed in implementing measures that would create a superior race and he was concerned about the effect that the influx of immigrants coming into America would have on the population and recommended that they be given tests of mental capacity upon entry to the country in order to be deported or separated from the population and given menial labor jobs. Gould (1996) notes that in later life, Goddard changed his mind about some of these ideas. He lowered the score that earned people his classification of "feeble-minded" and he also acknowledged the role of environment on heredity, saying that these people could be educated to live useful lives.

Lewis Terman is credited with popularizing the Binet scale and he revised the original test, calling it the Stanford-Binet. It became the standard for nearly all of the written tests that have since been developed (Sacks, 1999). Terman is credited with coining the term intelligence quotient (IQ) and even though tests are scored differently now, this term is still widely used today. Terman believed that his test measured innate intelligence and he too was a eugenicist who advocated universal testing so that people with low scores could be separated from the rest of the population and prevented from reproducing. He also encouraged the use of IQ scores to sort people into appropriate professions, those with higher scores should be educated and placed in what he believed were superior occupations and those with lower scores should be relegated to menial labor. He saw this sorting of people as a way to eliminate crime and poverty and create a more efficient and moral society. He conducted extensive research in mental testing involving children and was adamant about the certainty of test scores in predicting success in life. He believed that innate intelligence creates a person's station in life, thus class boundaries were naturally established according to intelligence levels (Sacks, 1999). In studying Terman's later work, Gould (1996) observes that Terman also came to admit that environment plays a greater role than he originally thought and he was not as convinced about the predictive quality of IQ scores.

Robert Yerkes was motivated in his research to build the establishment of psychology as a legitimate science. He believed the key to this was in the objective numbers of mental testing. He was also a eugenicist and led a committee, which

included Goddard and Terman, to develop mental tests for army recruits for the purpose of sorting them into military positions. This was the first time psychometricians had a large number of people on which to collect data about intelligence, allowing them to theorize about patterns among groups. Yerkes and many of the other psychologists interpreted the data to reveal serious conclusions about racial inferiority and superiority. The army data resulted in mounting respect for IQ tests and had multiple social consequences, such as, racial segregation, immigration restriction, and the increasing prevalence of testing and ranking of children (Sacks, 1999).

English psychologist, Charles Spearman, studied mathematical correlations between intelligence test scores and his ideas are discussed at length in many historical accounts of the psychometric movement (Sternberg, 1998, Gardner, 1993, Gould, 1996, Sacks, 1999). Spearman developed a theory that argued the existence of two common factors that he called general intelligence (g), which underlies all mental tasks, and specific information (s), which varies randomly between test performances. Although people rarely perform equally across all areas of testing, statistical analysis has proven a high correlation between subtests, which means that strength in one area tends to predict strength in other areas. Spearman believed this indicated the operation of an essential dominant mechanism; innate intelligence, which could be measured by the scores earned on the tests. He attributed the remaining variance to particular factors that were influenced by environmental circumstances. Spearman's explanation worked to solidify in many

people's minds the idea that intelligence is reflected in the score on a test (Gould, 1996). But Spearman's conclusions have been challenged extensively. Sacks (1999) and Gould (1996) both point out that numbers themselves do not represent absolute truths. They explain that correlations do not prove causation, so while factor analysis does reveal a common pattern, what causes this relationship can be interpreted in different ways. Thus, the same mathematical model can be used to justify theories that are in opposition with each other. Spearman emphasized the g factor as a common general ability that is in use during all mental tasks, others have emphasized the s factors for what they reveal about specific competencies and a belief that heredity causes the correlation or that environment causes the correlation are both possibilities. Spearman saw g as a unitary quality that could be encapsulate by a single number and then used to position people on a scale of mental level. Gould (1996) purports that science never operates independently of culture and rather than being the objective reality that Spearman promoted, he says this actually reflects a "prejudice of thought" that has been around for a long time (p. 282). Sacks (1999) goes further and suggests that "Perhaps most responsible for the grip that mental testing holds on America is that it is a highly effective means of social control, predominantly serving the interests of the nations elites... [They] perpetuate their class privilege with rules of their own making that have persisted for several decades, rules legitimized and protected by a pseudoscientific objectivity (p. 15)." Sternberg (1988) also discusses the politicization of the science of intelligence and says it has often "colored the research as well as the research topics (p. 8)."

These authors also discuss the work of two prominent psychometric theorists during this time that did use the same mathematical calculations to indicate a variety of independent faculties that summarized intelligence more pluralistically. L.L. Thurstone and J.P. Guilford believed that intelligence could not be summarized in the overall way Spearman suggested. Thurstone theorized that  $g$  was simply the average of all the specific abilities called on by the test and he identified seven different capacities, which he called “primary mental abilities.” Guilford extended Thurstone’s idea of numerous primary abilities and used factor analysis to indicate one hundred and twenty primary mental abilities. So, Gould (1996) points out, while these theorists didn’t dispute the deeper assumptions of the unitary view of intelligence (reification and heredity), they did create an important argument against Spearman’s  $g$  by demonstrating the fallacy of using factor analysis to draw any conclusions about intelligence. However, he points out that this also discredits their personal theories. Sternberg (1988) notes that these theorists also contributed important evidence to support a much more complex definition of intelligence than Spearman proposed.

Thus, there were psychometricians who did emphasize individual profiles of strength and weakness, but most authors agree that generally there was much stronger support for a common underlying factor that varies in level between individuals (Gould, 1996). The APA report states, “Psychometricians have successfully measured a wide range of abilities, distinct from one another and yet intercorrelated. The complex relations among those abilities can be described in

many ways. Some theorists focus on the variance that all such abilities have in common, which Spearman termed *g* (“general intelligence”); others prefer to describe the same manifold with a set of partially independent factors; still others opt for a multifactorial description with factors hierarchically arranged and something like *g* at the top (1996, p. 95-96).” Another way that theories diverge is over the emphasis on a hereditary and fixed intelligence versus an emphasis on the effect of environmental influences on intelligence. Gould (1996) relates that although there are a few exceptions, historically most theorists have believed in the effects of both, but focused much more on one or the other. So, while some theorists believe intelligence is genetic and unalterable in people, others assert the flexibility of intelligence and its ability to change according to experience.

Sternberg (1988) also discusses the contributions of theorists outside the psychometrics movement who had an impact on the field of intelligence research. He names Jean Piaget and Lev Vygotsky as two of the most influential, saying their ideas “forced theorists to consider the roles of maturation and experience in intelligence and its development (p. 50).” Piaget proposed that a focus on the process of thought and how people approach mental tasks was much more revealing of intellectual function than their actual achievement on a test and he focused on the way children assimilated and accommodated new information into their cognitive structures. He believed that all children progress through a series of stages of increasingly complex cognitive function in their intellectual development (p. 50). Vygotsky also believed in a focus on process but stressed that the sociocultural

environment was the key to understanding intellectual ability. An important part of his theory is what Vygotsky termed “the zone of proximal development”, which Sternberg describes as the “distance between an individual’s realized and latent potential (p. 50),” meaning what a child can do and what he will be able to do with some outside guidance. The APA task force (1996) also discusses the ideas of Piaget and Vygotsky, identifying them as two of the more prominent theorists amongst those who rejected the psychometrics approach and explored alternative theories.

Sacks (1999), Sternberg (1996), and Gardner (2011), all observe that during the later part of the twentieth century, support for broader views of intelligence grew stronger and many theorists began to acknowledge the limitations of IQ and g based theories. As well, Gould (1996) relates the way many of the theorists who did continue to support the more traditional concepts of intelligence became less rigid and expanded their perceptions to some extent. However, there is a definite consensus amongst authors that the combined unitary-fixed view has been most dominant amongst theorists and has long permeated thinking amongst the public as well.

### **Current Views**

More recent and notorious examples of the resurgence of this old thinking can be found in the work of Arthur Jensen, Charles Murray and Richard Herrnstein, as discussed by the APA taskforce (1996), Gould (1996), Sacks (1999) and many



other authors. Jensen maintained Spearman's claims, positing that IQ is the most successful measure of intelligence because it reveals *g* so strongly in factor analysis of mental tests. He believed in the entrenched quality of one's designated level of intelligence and also in the tradition of most of his predecessors, he argued the innate intellectual inferiority of specific groups, mainly emphasizing inequality between white and black people (Sacks, 1999 & Sternberg, 1996). Herrnstein and Murray reiterate the argument that a single, genetic, immutable, and rankable intelligence exists in every person. They advocate cognitive stratification by racial differences, based on IQ, with those of African descent on the bottom and Caucasians on the top (Sacks, 1999 & Sternberg, 1996). Gould (1996) contends that theoretically and scientifically there is not much that is novel about either of these arguments. In fact, he points out in the introduction to a later edition of his book, that his ideas perfectly refute both arguments even though the book was written many years before either of these events. Gould (1996) argues that new theories tend to be recycled versions of older ideas because they are developed along the same one or two original veins of thinking. He identifies the concept of biological determinism, evident in both craniometry and psychometric, as the most enduring concept behind dominant views of intelligence and he says it is still very much a part of our thinking as a society today. He says, "The chimerical nature of *g* is the rotten core of Jensen's work, *The Bell Curve*, and of the entire hereditarian school (Gould, 1996, p. 350)." He believes this theory is deeply damaging for its focus on social rank and inherent inferiority and superiority and he is particularly concerned with the social and political consequences of such thinking. Gould labels the whole

enterprise of setting a biological value upon groups as, “irrelevant, intellectually unsound, and highly injurious (1996, p. 139).

Like Gould, The APA task force refutes much of the conversation that has come up over the years about group differences in IQ. They report that despite evidence of a gap between the performances of certain groups on intelligence tests, there is no appropriate generalization to explain it because causation has not been established. They say; “...There is certainly no such support for a genetic interpretation. At present, no one knows what causes this differential (p. 97).” Further, the APA concludes; “Group means have no direct implications for individuals. What matters for the next person you meet (to the extent that test scores matter at all) is that person’s own particular score, not the mean of some reference group to which he or she happens to belong. The commitment to evaluate people on their own individual merit is central to a democratic society. It also makes quantitative sense (p. 90).” They conclude that it is very hard to predict much of anything based on IQ and using it as a means for discrimination is not scientifically based (APA, 1996).

Two of the more well-know, progressive theories that depart from the traditional thinking criticized by Gould and the APA are Robert Sternberg’s Triarchic Theory of Successful Intelligence and Howard Gardner’s Multiple Intelligences. Their broader views of intelligence include the belief that only certain aspects of intelligence can be captured by intelligence tests. Although their theories are

different, both share the essential premise that intelligence is not a unitary ability, but is comprised of multiple facets. Neither scholar disputes the validity of IQ tests in revealing a specific area of aptitude, but they disagree however, in the premise that the results of these tests summarize general intelligence. They believe that a more comprehensive understanding of human ability better portrays the full scope of human capacity. They propose theories that don't discredit the research of traditional theories but posit that these ideas are simply one aspect of intelligence rather than the whole picture. Both authors also stress the social or environmental effects on intelligence and while they don't argue a definite genetic component to intelligence, they strongly assert its ability to be developed. Both authors identify traditional intelligence theory as originating hundreds of years ago and perpetuating in different ways until today and echo Gould's sentiments about the unfortunate influence of culture on science.

Robert Sternberg (1996) is widely recognized as an expert in intelligence research and he has developed a theory of intelligence based on years of authoritative research and a strong foundation of scientific support. Sternberg's triarchic theory of successful intelligence suggests three related facets of intelligence that he says are most successful when balanced effectively. He describes their individual functions as follows: "Analytical thinking is required to solve problems and to judge the quality of ideas. Creative intelligence is required to formulate good problems and ideas in the first place. Practical intelligence is needed to use the ideas and their analysis in an effective way in one's everyday life

(1996, p. 128).” But he stresses that it is in knowing when and how to use these abilities that creates truly successfully intelligent people. The three aspects were previously called the componential, the experiential, and the contextual. He is highly critical of traditional psychometric tests and believes that these tests measure only a small portion of what actually comprises intelligence. He says that his category of analytical thinking is most closely related to the items on IQ tests but argues that even still IQ tests only partially capture this facet of intelligence.

Sternberg (1996) calls the intelligence measured by mental tests “inert intelligence” because it doesn’t lead to any kind of goal-directed action. He says that a high IQ score doesn’t guarantee accomplishment in life or preclude failure and often the only thing that people who score well on mental tests achieve is good grades in school. Like many other theorists, Sternberg points out the research on IQ testing shows a statistical relationship, not a causal relationship and that researchers who conclude that test results predict later success or failure are misguided and not scientifically justified. The author uses himself as an example; no one would argue that he is a very successful person as a renowned expert in his field, and yet as a child he failed IQ tests. Sternberg also points out that “In some cases behavior that would be smart in a testing situation would not be considered smart outside that situation (1988, p. 22).” His theory of successful intelligence is concerned with intelligence that is used to achieve significant goals. He laments that schools place a high value on inert intelligence as well, which is likely the reason

that this is the only area in which mental tests have some predictive ability (Sternberg, 1996).

Sternberg (1996) reanalyzes classical data and provides ample evidence to refute all the major assumptions of IQ based theories of intelligence, namely; that being quick is equated with being intelligent; that high linguistic scores imply greater absorption and comprehension of material; that greater vocabulary size indicates higher levels of intelligence; that people solve problems the same way, just better or worse than each other. Sternberg (1996) combats the IQ theory of intelligence with five important modifications to the basic flaws in thinking; Firstly, he advocates a focus on intelligence as people use it in their everyday lives versus the artificial concepts that are removed from reality, which characterize most IQ tests and many strongly academic settings. Secondly, he emphasizes that science be developed and employed independent of politics. He believes that much damage has been done in research of group differences for the way theorists have used faulty scientific reasoning to justify racial discrimination. Thirdly, he suggests that science propel practical application versus the reverse. He says the multi-million dollar business of intelligence testing was launched prematurely with inadequate evidence for the endorsement that these tests accurately measure general intelligence. For many years people have been analyzed and classified according to test scores that measure only a small percentage of their actual mental capacity. Fourthly, he argues a pluralistic versus Unitarian perspective on intelligence. He stresses that investigating the specific versus the general aspects of intelligence will

give us more useful information about individual intelligence than the focus on averages that is so extensive among theorists. Fifthly, he asserts the flexible nature of intelligence, contending that people can indeed increase their level of intelligence, contrary to what advocates of IQ testing would have us believe (1996, p. 4-10).

Howard Gardner (2011) differentiates between two views of the mind that have been most in competition: the unitary, fixed view of intelligence and the multi-faceted, flexible view of intelligence. He situates his view in the group that sees intelligence as comprised of several components, which relates to the more pluralistic views of psychometricians Thurstone and Guilford and has a long tradition dating back to phrenology. Gardner proposes a broader way of viewing intelligence that recognizes a range of cognitive styles and abilities (2011). In developing his theory, he looked at the vast array of ways people demonstrate talent and aptitude and sought to answer the crucial question, "Why does the contemporary construct of intelligence fail to take into account large areas of human endeavor (2006, p. 6)?" His theory explains cognitive competence in terms of a set of intelligences that all people possess in different degrees of proficiency and in varying combinations. Towards a definition, Gardner writes, "An intelligence is a computational capacity – a capacity to process a certain kind of information – that originates in human biology and human psychology... An intelligence entails the ability to solve problems or fashion products that are of consequence in a particular cultural setting or community (2006, p. 6)." He further explains, "The problem-solving skill allows one to approach a situation in which a goal is to be obtained and

to locate the appropriate route to that goal. The creation of a cultural product allows one to capture and transmit knowledge or to express one's conclusions, beliefs, or feelings. The problems to be solved range from creating an end for a story to anticipating a mating move in chess to repairing a quilt. Products range from scientific theories to musical compositions to successful political campaigns (2006, p. 6-7)." Gardner's investigation thus began with a consideration of the end states of skill and ability and he worked back to discover the intelligences that were responsible. Gardner claims that going about his investigation this way "...focused on meaningful roles in a society rather than on abstract competencies; and it harbored a culturally relative perspective (2006, p. 44)." He indicates that the focus of IQ tests on knowledge that is gained from experiences in specific social or educational environments, so called, "crystallized intelligence," versus a focus on assessing the ability to solve novel problems or absorb new information, so called "fluid intelligence" (2011, p. 19). He also points out that the way tests are structured reveals nothing about the process a person uses to solve problems but focuses simply on correct answers. Like Sternberg, he argues that in most cases tasks are also remote from everyday life, also not indicating much about how a student would function in a real-life situation. Although Gardner recognizes that IQ has "some predictive power about success in school (2011, p. 19)," he says there is very little information that can be gleaned from these types of tests that will actually help a person develop himself or herself any further or achieve success outside of school.

Gardner (2011) suggests that there are multiple ways a person can approach cognitive tasks and there are multiple ways to demonstrate intelligence. The criteria he used to identify the intelligences were based on research that indicates isolated areas of ability. Amongst other areas of investigation, he studied people with localized brain damage to see if their disabilities in one area affected their abilities in other areas and in various types of gifted people to see if their exceptionalities were also above average in other areas. He believes that the way these core abilities are highly developed in isolation in some people and absent in isolation in others is testament to their independent nature. Gardner also studied typically developing children and adults to examine the many ways people demonstrate competency and he also conducted training of certain aspects of intelligence to see if it raised intelligence in other areas as well. Gardner also looked at how people around the world demonstrate skills that are important to their ways of life to be sure that he was including as wide a scope as possible in his survey of working intelligence. Gardner's work led him to identify eight different kinds of minds that, although independent of one another, work in concert with each other in approaching cognitive tasks: musical intelligence, bodily-kinesthetic intelligence, logical-mathematical intelligence, linguistic intelligence, spatial intelligence, interpersonal intelligence, intrapersonal Intelligence, and naturalistic Intelligence (he originally conceived of seven but later added the eighth). Gardner contends that every person has a particular combination of strengths in each of these areas comprising an intelligence profile that influences how each of us approaches life. He writes that, "Inasmuch as nearly every cultural role of any degree of sophistication



requires a combination of intelligences, it becomes important to consider individuals as a collection of aptitudes rather than as having a singular problem-solving faculty that can be measured directly by pencil-and-paper-tests. Even given a relatively small number of such intelligences, the diversity of human ability is created through the differences in these profiles (2006, p. 22).” He also stresses that this profile is not set for life, people can change based on their life experiences, and we are capable of developing each area of intelligence to greater proficiency.

Gardner emphasizes the importance of recognizing and nurturing all of these forms of intelligence and their unique combinations for it will lead people to feel more competent and more empowered to use their gifts constructively, making meaningful contributions toward the broader good (2006, p. 24). He believes all of them to be equally important but writes about the way our society values some more than others (1993, p. 8). Gardner examines the research that is said to support the claims of psychologists who assert the power of g and IQ based models and although he doesn’t contest the science behind IQ tests, he argues it is faulty reasoning to conclude these theories explain the totality of intelligence. He believes that the professed evidence is subject to interpretation and he explains these tests measure only one aspect of intelligence (p. 18). Gardner is also an advocate of the flexibility of intelligence and does a thorough refutation of the arguments that stress intelligence as a static capacity. Although he believes that intelligence has a genetic foundation, he also stresses that it is subject to both improvement and deterioration based on our experiences.

There are many compatible aspects between Gardner's and Sternberg's theories, but they differ most fundamentally regarding specific content orientation. While nevertheless asserting the multiple aspects of intelligence in operation during mental tasks, Gardner's theory focuses on content-related intelligences that are evaluated independently and Sternberg's theory assumes that intelligences function no matter what the content. Sternberg's sees his triarchic intelligences as functioning horizontally across different types of tasks whereas Gardner refers to his multiple intelligences as vertically geared to activation by particular types of tasks. Gardner critiques Sternberg for being too closely tied to the psychometric assumption that a general problem-solving facility is in action during the full range of mental tasks (2011, p. 24). Sternberg criticizes Gardner's claim that his intelligences are independent, citing positive correlations as proof of their interdependence. He considers many of Gardner's intelligences to be learning styles or talents and although he has written extensively about the significance of the different ways people approach tasks, he does not consider either of these to be expressions of intelligences (1988, p. 73). These theorists do, however, align themselves in the mission to bring greater awareness to the world of the many ways there are to be smart and get smarter. As well, in their more recent examinations of the field, Gardner and Sternberg observe that many of the assumptions underlying the mental testing movement have been undermined by research conducted both within the field of psychology and in other disciplines during the last few decades (Sternberg, 1996 & Gardner, 2011). A quick appraisal of the many publications

available on topics of intelligence are also revealing of this shift in thinking toward alternative perspectives.

The APA task force also recognizes that things are changing slowly and that alternative notions are gaining popularity and reputability. The authors report that some theorists within the field of psychometrics are developing broader theories, such as, information processing branches of study. Additionally, they say that many theories outside of traditional psychometrics have been developed as well, such as, multiple intelligence theories, socio-cultural theories, and work being done by developmental psychologists and neurobiologists. The task force also accounts that there are many theorists who believe the theory of g-based intelligence is misleading (APA, 1996). Most critics don't dispute the accuracy of results but contend that they can be interpreted differently; they dispute the utility of IQ and g (APA, 1996, p.78). They don't argue the mathematical correlations on which IQ arguments are built, but they say that just because the items show a relationship doesn't prove g and could be attributed to other reasons, such as, the effects of education. The authors identify two main points that are argued for alternative understandings of intelligence; the limitations of IQ in revealing the full range of human intelligence (1996, p. 81); and the influence of environmental factors and personal attributes on the acquisition of intelligence (1996, p. 82). In fact, the authors conclude themselves that, "...a wide range of human abilities, including many that seem to have intellectual components, are outside the domain of standard psychometric tests (APA, 1996, p. 78)." In the final section of the report, they say

that, "It is widely agreed that standardized tests do not sample all forms of intelligence. Obvious examples include creativity, wisdom, practical sense, and social sensitivity; there are surely others. Despite the importance of these abilities we know very little about them: how they develop, what factors influence that development, how they are related to more traditional measures (1996, p. 97)." The authors observe that there is much evidence to indicate that IQ doesn't accurately predict achievement in school (1996, p. 86). They say, "Successful school learning depends on many personal characteristics other than intelligence, such as persistence, interest in school, and willingness to study (1996, p. 81)." They stress that it is obvious, "both genes and environment, in complex interplay, is essential to intellectual competence (1996, p. 84-86)." The authors point out that it is a misconception to think heritable traits are unchangeable. They say that social, biological, and environmental factors must be taken into account because personal circumstances have the ability to modify inherited attributes. Further, theorists who stress the influence of environment believe that, often, cultural differences are confused with innate properties because these can be hereditary in a non-biological way. Researchers, who support the theory that genetics alone influence human capacity, believe that it is extremely difficult if not impossible to affect the true nature of a person. The task force calls for theorists to be less concerned with testing and sorting and more concerned with developing ability because, "What children learn in school depends not only on their individual abilities but also on teaching practices and on what is actually taught... In principle it is quite possible to

improve the school learning of American children even very substantially without changing their intelligence test scores at all (1996, p. 82).”

Intelligence has been studied in so many ways and so many different definitions have been put forward with no consensus on the matter. However, the two different viewpoints that emerge most strongly from these discussions are; the belief that intelligence is inherent in people, meaning we are genetically bestowed with a set amount of intellectual ability that can be measured by IQ tests and only minimally changed; and the belief that intelligence is more diverse and dynamic and unable to be fully captured by standard IQ tests. A review of the early theories of intelligence demonstrates that many of the underlying ideas continue to influence our current understanding of the nature of intelligence. The concept that people possess a singular, measurable, fixed, genetic intelligence has long dominated theories of intelligence and while many theorists have argued against this idea, it is still dominant in many ways. Viewing intelligence this way has led to many instances of grave discrimination because it inevitably means that some individuals or groups are intrinsically inferior to others. But Gould (1996) says that of the many social and cultural implications, the acceptance of this theory has “fundamental consequences for the practice of education (p. 334).” If you subscribe to the theory of g, then children can be bestowed a number that translates their basic mental worth, allowing them to be sorted according to their innate potential. But, if you subscribe to broader notions, children are recognized for their individual intellectual profiles of strength and weakness and they are supported to develop

themselves further (Gould, 1996, p. 335). Unfortunately, many of our educational policies and school environments tend to reflect the latter position and thus many students are still being subjected to the biased views of traditional intelligence theory. There are many voices that call for a more fair and inclusive definition of mental capacity; one that acknowledges the many ways there are to demonstrate intellectual accomplishment. The next section will discuss the implications for students of each kind of thinking.

## **PART TWO: Comparing Educational Implications**

The way intelligence is understood in the realm of education and the assumptions that are held about human ability can have profound consequences on children's lives. In a few words, it follows from the belief that intelligence is a unitary and fixed capacity that some children are inherently smart or not smart, superior or inferior in mental worth. This way of thinking deeply limits children in realizing their true potential and it creates the conditions for discrimination. Conversely, a belief in the plurality and flexibility of intelligence presumes that there are many equally valuable ways to demonstrate intellectual capacity and this way of thinking advocates both allowing children to discover and develop their natural affinities and affording them the opportunity to improve in weaker areas. Awareness amongst educators, school leaders, and policy makers of the way these competing assumptions can affect student success is key to attaining the essential goals of education. The way a school is structured is revealing of the theory under which it operates.

Examining the literature on the subject reveals that, increasingly, schools are adopting practices that meet the needs of students on a more individualized level, valuing a wider range of competencies, and reflecting a more pluralistic view of mental capacity. However, many authors agree, that most schools are still largely standardized in nature with it being common to find instructional styles, curriculum content, and assessment practices that are largely the same for all students. This

necessarily conveys a narrower view of what it means to be intellectually competent because, invariably, all students are being measured by a greatly limited set of criteria. The vastly different implications of these two kinds of educations for students will be explored in the following sections.

### **Unitary View in Schools**

There is a definite consensus amongst authors that an obvious hierarchy of subjects exists in most schools, with linguistic, logical and mathematical skills being held in highest regard. The children who perform the best at these subjects are then considered the most intelligent. Thus, not only has IQ become synonymous with intelligence, so has academic ability. In his book, *Out of Our Minds* (2011), Ken Robinson examines the rise of IQ and the way it contributed to a division between the arts and the sciences, with the sciences becoming emphasized most in schools. He describes this system, saying, "At the top are mathematics, languages and sciences; some way down are the humanities – history, geography and social studies – and physical education; at the bottom are the arts (2011, p. 60)." Robinson writes that, "The hierarchy shows itself in the amounts of time that are given to different disciplines; whether they are compulsory or optional and for whom; whether they are in the mainstream curriculum or afterschool; whether they are included in standardized tests and how much they feature in political polemics about raising standards (2011, p. 60)." Robinson protests our society's current view of academic ability as being superior to all other kinds of ability and the way it has come to



dominate general education. He says that when schools are structured according to this view, the same unjust biases of the IQ theory are at work. It leaves out so many students who don't think in the ways favored by this theory and the resulting educational practices and their talents are ignored and undeveloped. School can become an alienating, meaningless, and frustrating experience for so many children while they are made to feel unintelligent and deficient amongst their peers. This system marginalizes certain subjects, styles of learning, talents, and people. It also creates a hierarchy amongst students because they are ranked according to the way they conform to the favored styles of thinking and those who excel in school receive the most prestige while students with gifts in other areas are at a disadvantage.

In his book, *Standardized Minds* (1999), Peter Sacks writes about our culture of standardized testing in America being directly linked to IQ testing and unitary theories of intelligence. Sacks says, "Modern mental testing, and its principal prescription to allocate opportunity based on the designation of the cognitively deserving and undeserving, is hardly a recent invention (1999, p. 17)." These tests are used rampantly in our schools as the major way to evaluate student ability and schools are also held accountable largely through the use of standardized test results. It follows that what is on these tests are the skills that schools hold in highest regard and the results of these tests have come to indicate not only a student's academic standing but also their level of intelligence. Therefore, automatically, what isn't or can't be measured by these tests isn't seen as having much worth and if your strengths lie in one of those areas, you aren't very smart.

Sacks warns that discrimination becomes an obvious bi-product of this type of thinking. He says, "Indeed, the very same kinds of measures that sorted individuals by some correlate of intelligence in America's past remain a steady fact of institutional and social policy today, however abhorrent one may find eugenics views of history (1999, p. 34)." Many other authors concur and are dissatisfied with the emphasis on IQ related testing in schools and with the way test scores have come to define levels of intelligence.

The educational practices that are developed on the foundations of this theory work well for anyone who excels in the areas that are measured by traditional standardized testing. But it is an undisputed fact that there is much diversity amongst the brains of human beings and for the children who don't think in the favored ways, school can be a miserable experience. Robinson (2011) believes that the emphasis on this narrow set of abilities causes people to grow up dislocated from their natural talents, never developing themselves to their truest potential. Robinson says, "Ironically, one of the main reasons for this massive waste of talent is the very process that is meant to develop it: education (2011, p. 7)." He adds that "Current approaches to education and training are hobbled by assumptions about intelligence and creativity that have squandered the talents and stifled the creative confidence of untold numbers of people. This waste stems partly from an obsession with certain types of academic ability and from a preoccupation with standardized testing (2011, p. 8)."

Robinson also cautions us about the danger in not discovering and making use of our capacities, as they are harder to access as we grow. He writes about brain plasticity and says, “As children grow, their brains are customized around the uses they make or do not make of them. If the language capacity is not used it may fade as the brain’s neural capacities are turned to other uses. The same can be true of music or mathematics or any other capacities (2011, p. 132).” Students who do excel in academic areas suffer too, as Robinson points out, as they too are not able to explore the other sides of themselves. Neuroscientist John Medina writes about the same thing in his book, *Brain Rules* (2008), warning that schools are wasting human talent because when it is ignored, it become latent. He says that people will actually lose access to their abilities if they are not given the chance to use them. “You cannot change the fact that the human brain is individually wired. Every student’s brain...is wired differently. That’s the brain rule. You can either accede it or ignore it. The current system of education chooses the latter, to our detriment (Medina, 2008, p. 69).” Another “brain rule” that Medina identifies is about the increased amount of learning that happens when people are motivated and interested by a topic. When children are excited and invested in their learning, they gain so much more. This further underscores the importance of ensuring that the curriculum represents the interests of all students in a classroom.

In his book, *Thinking Styles* (1997), Robert Sternberg differentiates between ability and style, saying that a style is the way someone prefers to use their abilities and he says that, “If we don’t take styles into account, we risk sacrificing some of our

best talent to our confused notions of what it means to be smart or a high achiever, when in fact some of the smartest people and potentially highest achievers may only lack the style that we just happen to prefer (1997, p. 160).” He writes about the way schools value certain ways of thinking over others and that people who think differently from the ways that are valued are penalized or marginalized. Sternberg believes that educators are failing students by teaching in ways that benefit the styles of only a select group of students. He believes these ideas are deeply entrenched in the American psyche and that because intelligence is associated with academic success, many people end up thinking they are stupid (1988, p. xi). When children are faced with these negative assumptions, either from their teachers or within themselves, it is a huge obstacle in their own development (1996, p. 19). Conversely, he says when we learn to see intelligence in a broader way, and know our assets, and believe in our ability to develop ourselves even further, we will make better use of our potential as human beings. Sternberg suggests that many standardized tests are in fact measuring whether a student has an affinity toward that style of assessment and, at best, are measuring a very small aspect of intelligence. He warns, “We need to carefully consider how our practices in educational settings may deprive able people of opportunities, while giving opportunities to those who are less able... (1997, p. 159).” Sternberg believes in helping students develop an awareness of their unique intellectual profile so they can capitalize on their strengths and compensate for their weaknesses. He alleges that none of the most successful people are good at everything; instead they made the most of their unique aptitudes.

Gardner says that so many areas of human endeavor are ignored by such a narrow definition of intelligence, as there are so many different ways to exhibit intelligence than linguistically or logically. He discusses the way a concept is learned or accessed by students in different ways and if only one or two ways are explored, then certain students will be at a definite disadvantage. He says, "An exclusive focus on linguistic and logical skills in formal schooling can shortchange individuals with skills in other intelligences. It is evident from inspection of adult roles, even in language-dominated Western society, that spatial, interpersonal, or bodily-kinesthetic skills often play key roles. Yet linguistic and logical skills form the core of most diagnostic tests of 'intelligence' and are placed on a pedagogical pedestal in our schools (Gardner, 1993, p. 31)." He adds that, "Current approaches to education and training are hobbled by assumptions about intelligence and creativity that have squandered the talents and stifled the creative confidence of untold numbers of people. This waste stems partly from an obsession with certain types of academic ability and from a preoccupation with standardized testing (Gardner, 1993, p. 8)."

Gardner laments that beyond the waste of talent, this thinking also "...stamps us with an impression of ourselves that is hard to remove (1993, p. 7)." Carol Dweck has studied this phenomenon in depth. In her book, *Mindset* (2006), she talks about the way student performance is affected by the implicit theories they hold about intelligence. She demonstrates that when children believe intelligence is

fixed, they perform more poorly than children who believe intelligence is malleable. She argues that the unitary-fixed theory decreases the motivation of a student and she shows how such thinking is deeply limiting. Children can actually lose access to their true abilities because of the beliefs they hold about themselves. Mayra Bloom happened upon the same discovery in her work as a college professor. She writes in her doctoral dissertation, *The Reclamation of Intelligence* (1991), about the pervasive feeling of stupidity that she has found many adults possess about themselves because of the way they were educated throughout their lives being inculcated with a limited view of intelligence by which they have measured themselves. Her research study identifies the process of becoming aware of one's implicit ideas about intelligence and countering these with a new definition of what it means to be smart, as an essential component in reclaiming a sense of being intelligent (1991, p. 79). Bloom argues, "When people are unaware that they are intelligent, when they are unable to exercise the intelligence they have, then that intelligence cannot be directed to useful or constructive ends, but may, indeed be put to less conscious or constructive uses (1991, p. 63)." This reinforces the imperative to teach young children in a way that they don't grow up feeling stupid and have the chance to "claim" their intelligence early on through the right kind of schooling and a changed view of what it means to be smart. If we want to raise children who feel competent and empowered to contribute positively to the world, then we have to rethink the messages we communicate through our educational practices.

Lynda Miller also writes about the epidemic of “feeling stupid” amongst less academically minded adults in her book, *What We Call Smart* (1993). She says that growing up in a world that equates traditional academic ability with intelligence and doesn’t appreciate the many other ways there are to demonstrate talent and ability, has led to a lack of development in many people. She reveals the unfair biases underlying many of the practices we have in schools today and she highlights the way we educate children in a way that privileges some and disenfranchises or isolates others. She points out how damaging it is to focus so much in schools on comparing children to each other through their scores on tests. She says, “They are compared with their peers within the classroom and school, with students from other school districts, with children from other cities or towns, with students from other parts of the state or country, and, in the American quest to be best at everything we do, with students from other countries (Miller, 1993, p. 24).”

Ultimately, some students end up on the bottom and Miller claims this has led to a huge increase in the number of children receiving labels for various learning problems, a practice she identifies as one of the major tragedies of the testing movement. She says, “Because their test performance or behavior diverges from that of their peers, they are tagged with labels such as “disabled,” “disordered,” “handicapped,” or “impaired.” This labeling assumes that there is a “normal” way for everyone to learn and perform and that all human learning proceeds in the same fashion (Miller, 1993, p. 26).” Miller believes that these kinds of standardized assessments completely ignore what we know about individual variation in ways of thinking. She says, “We have created disorder out of difference (1993, p. 43).” A

perception of inferior intelligence, of course, accompanies this label and people live with the consequences of those labels their entire lives. Robinson writes about the same phenomenon, saying that another consequence of a narrow view of ability is a “correspondingly wide view of disability (2011, p. 125).” He says, “People with obvious disabilities, physical or otherwise, naturally have many other abilities that can be overlooked or undiscovered. Their real powers and true identities may lie in these unexplored territories of talent (Robinson, 2011, p. 125).”

In his book *Neurodiversity* (2010), Thomas Armstrong writes about the “disability culture” that exists in our society. He says that the natural diversity in human brains is something to be celebrated, but instead we “medicalize and pathologize” those differences (2010, p. 2). Armstrong calls for the need to focus on ability in our students, rather than on disability, as so many in our society do. He writes about the tendency “to emphasize deficits, disabilities, and dysfunctions and to de-emphasize strengths, talents, and aptitudes (2010, p. 5).” Armstrong asserts that, “One of the many reasons that people with intellectual disabilities have had difficulty integrating into the mainstream of society is that they violate a core American value: the belief that intelligence is a single innate and fixed entity that can be measured by an intelligence test (2010, p. 142).” He reminds us that the psychologists who are responsible for bringing the IQ test to this country were actually eugenicists who believed that people with undesirable qualities should be weeded out of society through control of human breeding in order to create a superior nation. He comments that, “It has always seemed strange that anyone



could take someone's rich potential and complexity and reduce it to a single number (Armstrong, 2010, p. 143)." Armstrong argues that our current model of education leaves behind many children who don't fit the standard academic profile to which schools cater. He says that of all the children out there who are labeled with learning disabilities, many of them are actually suffering from schools and teachers who fail them in their teaching methods (Armstrong, 2010, p. 52). He believes all students are disadvantaged by these kinds of classrooms because "there is not much room to be a whole person – exercising one's physical, emotional, creative, cognitive, and spiritual capacities (Armstrong, 2010, p. 187)." Gardner echoes these sentiments saying, "First of all, it is clear that many talents, if not intelligences, are overlooked nowadays; individuals with these talents are the chief casualties of the single-minded, single-funneled approach to the mind. There are many unfilled or poorly filled niches in our society and it would be opportune to guide individuals with the right set of abilities to these billets. Finally, our world is beset with problems; to have a chance of solving them, we must make the very best use of the intelligences we possess (1993, p. 34)."

Furthermore, many authors question the relevance of what schools teach and the skills their tests measure outside of formal schooling. Gardner points out that this view doesn't acknowledge what is actually done with intelligence. He asks how intelligent a person with a high IQ is if he or she doesn't actually do anything productive. He suggests that some people might just be really good test-takers and that's all. Sacks also talks about the need for more authentic assessment based on

actual performance because standardized tests only measure aptitude or potential ability versus real life skill. He says, “Educational researchers have found that such tests have proven to be of dubious value in predicting one’s ability to perform on practical tasks that really matter (1999, p. 2).” Sternberg also writes about the way students learn to play by the rules in school, rather than actually learning to think or to be creative and really grapple with information in a way that will ever make it useful (1997). Robinson also talks about this tendency to value answering questions about writing versus actual writing ability or answering questions about logic versus actually solving real problems. The focus seems to be on a potential to achieve rather than on achievement itself. It is obvious that there are so many other important factors to human success than our IQ scores and yet this measure still holds so much value in our society. We need so many other important skills to live fulfilling lives and make the world a better place. Robinson makes a point that many other authors have corroborated; there is a long tradition of undervaluing skills that cannot be measured as easily as those that are measured by standardized tests. But, he argues, “Not everything we know can be put into words and numbers... (2011, p. 273).” Robinson (2011) calls this thinking “...the ideology of rationalism, objectivity and propositional knowledge (p. 107)” and he says it has “...driven a wedge between intellect and emotion in human psychology; and between the arts and sciences at large (p. 107).”

Robinson (2011) discusses the way a narrow view of intelligence leads to an epidemic of not making the most of our human resources. He says that children are

so severely limited in their ability to develop their natural talents because of the emphasis that is placed on certain subjects and certain kind of ability in schools. Aside from the personal injustice of this prevailing trend in education, Robinson writes extensively about the way our current educational approach is failing to develop the skills needed to be successful in the 21<sup>st</sup> century work force. Creativity has become increasingly valuable and business leaders report that it is very hard to find people with this capacity. Robinson (2011) makes the important point that creativity is something most people are born with, but somehow the process of education steals this ability from them, so it is more about preserving and cultivating it than developing it in children. He believes that schools were created on the interests of industrialism and are failing to look forward to the way our world works now. In past times, the linear ideal of education leading to a planned career might have been more realistic, but now it doesn't work as well. Academic success just doesn't guarantee success in life. Cultivating the range of talents students possess is an unpredictable, uneven, non-linear process that is being stunted in schools. Robinson stresses that the change needed is not about raising standards, which is being emphasized so vehemently in the field of education, but in changing the whole method of education and the assumptions that underlie our practices and policies. He says, "And now, maybe more than ever, human communities depend on a diversity of talents not a singular conception of ability (2011, p. 138)." Robinson believes that a new conception of intelligence and human capacity is necessary for there to be a change in our appreciation for creativity and the arts. He says that the most important shift in thinking that needs to take place in order to better prepare

for the future, is to change our thinking about ability. He points out that we are otherwise wasting the resources that allow us to compete with other nations in innovation and development.

Of the many social and cultural implications, Gould (1996) says that the acceptance of the unitary theory of intelligence shows its worst consequences in the realm of education (p. 334). It is this thinking that underlies so many of the faulty practices in our educational system. In a summative quote, Gould (1996) says, “We pass through this world but once. Few tragedies can be more extensive than the stunting of life, few injustices deeper than the denial of an opportunity to strive or even to hope, by a limit imposed from without, but falsely identified as lying within (p. 60).”

It is obvious that if we define intelligence in a one-dimensional way, we lose out on so much human potential. Aside from stunting growth in students and being unfair and inhumane, it is also a waste of important human resource, as we need all kinds of talents and skills to meet the needs of our changing society. Helping children develop their true potential is surely contingent upon the theory to which their educators subscribe. The question then becomes; “How can we be more inclusive of the many kinds of talents and styles that exists amongst students and do a better job cultivating the many ways there are to demonstrate intelligence and accomplish important things in the world?”

## Pluralistic View in Schools

So many authors have written about the limitations of dominant views of intelligence that are evident in our educational system. They call for a different way to conceive of intelligence, advocating theories that recognize the diversity in human capacity and the many ways there are to demonstrate ability. Pluralistic views of intelligence have very different educational implications. The assumptions of this view are that people are vastly diverse in their cognitive profiles and that these differences should be celebrated and nurtured in order to increase human productivity and happiness. Helping people discover their natural affinities by creating the opportunities for them to explore and learn in a variety of ways increases the likelihood that people will find positive and valuable ways to contribute to the world. It is also a more humane approach to education as it promotes equality. Developing the best of what students have to offer the world is what education at its best is really about. Focusing on meeting the needs of all kinds of learners and developing each individual student's potential is in clear contrast to the uniform view that characterizes so many schools today. If children start school with the world wide open to them and with the opportunity to discover their true affinities and then have the chance to nurture those talents, they have a much stronger chance of becoming happy and productive people than if they are made to fit into the narrow definition of what is smart and what is important. Schools that embrace a pluralistic view of intelligence create structures that allow students to discover their talents and demonstrate their abilities and develop themselves in

meaningful ways. It simply makes sense that an education should include all the ways there are to shine. All students should feel their strengths are represented and respected within the classroom. A strong conviction amongst education stakeholder's, that all kinds of learning proclivities have value, is bound to be a more productive outlook. When we value an array of ability we make better use of our resources as human beings.

One of the main educational implications of Gardner's theory of multiple intelligences is individual centered education. He advocates an approach in which educators aim to learn as much as they can about the unique strengths and inclinations of each of their students and then use this information to create the most optimal curriculum for each child (2006, p. 56). Gardner says this is necessary for two important reasons. First, it recognizes that not all students learn the same way or have the same abilities, and second, it acknowledges that no one can learn everything there is to be known (1993, p. 10). His point is that trying to help students master too many things is counter-productive. Since nobody can be great at everything, it is wise for teachers to guide students in making informed choices about the direction in which they want to focus their learning. He talks about helping children find their occupational niche, saying that exposing students to a variety of vocational options, allowing them to explore the roles that appeal to their strengths and interests, and then supporting them in the pursuit of their choices, could, as Gardner describes, "...spell the difference between a frustrating educational experience and one that has purpose (2006, p. 57)." Gardner makes

sure to point out that his theory is not a curriculum or educational goal in itself. He believes that developing core competence in each discipline is important, but that these subjects should be taught in all the various ways there are to approach learning. He calls this, “a traditional educational goal with flexible means to achieve it (Gardner, 2006, p. 61).” He writes, “Now that we know something about teaching styles, learning styles, and individual intelligences, it is simply inexcusable to insist that all students learn the same thing in the same way (Gardner, 1993, p. 73).”

Gardner explains that, “...an intelligence can serve both as the *content* of instruction and the *means* or medium for communicating that content (1993, p. 32).” So aside from including a variety of topics in the curriculum, he also believes that having multiple representations of the key concepts can be what spells the difference between a student’s success and failure to grasp academic ideas. Attaining a deep understanding of a concept, Gardner describes, requires repeated exposure to the idea in a variety of contexts. He uses the metaphor of a room being the central concept and there being multiple doors or entry points from which each child will access the information. He writes that this not only ensures that educators are reaching all types of students, but also that concepts will become more solidified in all students minds by exploring ideas from different vantage points thus activating different clusters of neural networks (2006, p. 60). Gardner’s research on brain function further helps us to understand that people can have uneven levels of competency in different areas. Through the lens of multiple intelligences it makes sense that we all have different cognitive profiles that can make us stronger at some

things and weaker at others. It is important to note that although Gardner believes in a curriculum and style of instruction and assessment that take into account the individual strengths and learning profiles of students, he also believes that their weaker areas should be further developed. He writes, "It seems to me that early identification of strengths can be very helpful in indicating what kind of experiences children might profit from; but early identification of weakness can be equally important. If a weakness is identified early, there is a chance to attend to it before it is too late, and come up with alternative ways of teaching or of covering an important skill area (Gardner, 1993, p. 11)."

It is for this reason that Gardner also advocates testing that is more diverse. He promotes testing for the purpose of developing individual student potential. Meaningful assessment practices give teachers the opportunity to get to know their students in order to inform their teaching choices. Understanding how the curriculum or instructional style might need to be adjusted in to strengthen weaker areas or provide enrichment for students can have an obviously positive impact. Gardner (1993) discusses the importance of several key features in fair assessment practices that contrast with typical IQ tests. He advocates individualized instruments that are specific to the aspect of intelligence being measured and account for individual approaches, levels of development and varieties in expertise. He stresses contextualized assessment that reflects variation in the functional and cultural significance of a skill. He encourages the opportunity for students to develop skills through experiences that resemble authentic working conditions and



says that assessment can then happen during the course of normal engagement with the learning environment (Gardner, 1993).

Sternberg writes about the different ways that people approach learning, saying, “How people prefer to think might be just as important as how well they think (1997, p. 9).” He talks about his own teaching experience and his discovery that changing the style of instruction or the way he assessed his students, could completely change which ones stood out in their abilities and which did not. Sternberg is also a big supporter of individualized instruction and he advocates the use of a variety of teaching and assessment strategies so that all students have the chance to show their ability and to grow in other styles of learning. He says, “We will better utilize other people’s talents, and better help them develop, if we recognize people for their own stylistic strengths, rather than for what we might ideally like them to be (1997, p. 98).” Sternberg reflects that testing would also need to include these many areas of ability and would take on a whole new meaning with a focus on revealing unique profiles of intelligence so that children have a better chance at actualizing their true potential (1997, p. 32). He says, “It is a view of intelligence that is less exclusive, far more democratic, and with far wider application in the real world (1996, p. 49).”

Like Gardner and Sternberg, Robinson (2011) also advocates a broader curriculum and a range in instruction styles and assessment strategies. But he also believes that it is also important for students to expand their understanding of the

world by exploring subjects that they might not gravitate towards. He points out the value in all the various disciplines schools have but stresses the need for there to be equal status between them. He doesn't denounce academicism or even argue against developing academic ability; he just thinks it is one particular approach that should be included as part of a range of ways to approach subjects in school. He says that some people are good at this kind of thinking and some people are not and it doesn't make anyone more or less intelligent; it's just one kind of ability amongst many kinds of valuable abilities. He emphasizes that while having a well-rounded program is important, it is equally critical for students to feel that their natural interests and abilities are respected and engaged. He says, "The implication of diversity is that breadth in schools should be balanced by depth. Alongside any common curriculum, there have to be opportunities for students to delve more deeply into areas that interest them particularly (Robinson, 2011, p. 250)."

Robinson stresses that finding ways to personalize learning for students is essential for them to truly invest in their education and have the best chance of reaching their full potential. He says, "When people find their medium, they discover their real creative strengths and come into their own. Helping people connect with their personal creative capacities is the surest way to release the best they have to offer (Robinson, 2011, p. 165)." He also reminds us that equal encouragement of different career options is important. He says schools habitually encourage students down one particular path. But he argues against this tendency, saying, "Human communities depend on a diversity of talents, not a singular conception of ability (Robinson, 2011, p. 250)." In the final lines of his book, Robinson summarizes his

views so eloquently; “It is often said that education and training are the keys to the future. They are, but a key can be turned in two directions. Turn it one way and you lock resources away, even from those they belong to. Turn it the other way and you release resources and give people back to themselves (2011, p. 286).”

Armstrong (2010), too, believes the definition of intelligence that is so obviously at work in schools is much too narrow and thus deeply limits students. He has written extensively on the vast range in approaches to learning and diverse capacities that students bring to their school experiences, and he denounces the common practices in education that marginalize certain capacities. He urges the great imperative that schools cater to different learning styles and types of intelligence in order to reach all students and develop the individual gifts of each one of them. He says that our current model of education leaves behind many children who don't fit the standard academic profile to which schools privilege. A huge proponent of inclusive education, Armstrong advocates for classrooms that cater to every kind of learner. He writes, “A neurodiverse classroom is a classroom where students with all sorts of labels and nonlabels – disabled, gifted, average – come together as equals to form a new kind of classroom, one that represents that there is no such thing as a normal student and where each and every child is identified as a unique learner (Armstrong, 2010, p. 197).” He writes extensively about the many unique gifts of people who have been labeled with various disabilities, such as, attention deficit hyperactivity disorder, autism, dyslexia, mood disorders, anxiety disorders, intellectual disabilities, and schizophrenia. Armstrong

talks about “niche construction,” saying that there are so many areas of work that all require different sorts of skills and we would be wise to try and match people with jobs that utilize the specific abilities with which they are endowed (2010, p. 16).

Armstrong says that in our current models of instruction, “there are so many assets and skills that are literally being thrown away (2010, p. 205).” He says, “*We need a new field of neurodiversity* that regards human brains as the biological entities that they are and appreciates the vast natural differences that exist from one brain to another regarding sociability, learning, attention, mood, and other important mental functions. Instead of pretending that there is hidden away in a vault somewhere a perfectly ‘normal’ brain to which all other brains must be compared, we need to admit that there is no standard brain, just as there is no standard flower, or standard cultural or racial group, and that, in fact, *diversity among brains is just as wonderfully enriching as biodiversity and the diversity among cultures and races* (Armstrong, 2010, p. 3).”

These ideas have been confirmed in the field of neuroscience as John Medina outlines in his book, *Brain Rules* (2008). He writes about the implications of current brain research on our everyday lives, including the educational practices in our schools. He discusses the studies that have shown great variation in the way brains are wired and for this reason he advocates “customized instruction” for students saying that it doesn’t make sense to expect all brains to learn the same way (2008, p. 66). David A. Sousa and Carol Ann Tomlinson’s book *Differentiation and the Brain* (2011) also explores the implications of brain research in education. They write

about the way many classrooms are operating under principles counter to what we know about the way children learn. They discuss the various practices that are compatible with brain research, mostly, differentiated instruction. The authors look at learning profiles as just one way to differentiate instruction in classrooms. They identify a learning profile as being made up of learning styles, intelligence preferences, culture and gender. They cite the work of many researchers who have shown evidence that teaching with individual learning profiles in mind makes a big difference in the success of students of all ages in school.

Many current researchers write about skills they have found people need in order to be successful in today's world and the way these capacities are neglected in most schools. Robinson (2011) writes extensively about the power of creativity and the many areas of life and work where being innovative and resourceful is greatly important. Daniel Pink (2006) has devoted much study to proving the necessity in our modern age to develop skills that are usually referred to as "right-brained abilities," such as inventiveness, joyfulness, and empathy, and have traditionally been demeaned in society in favor of "left-brained abilities," like logical and analytical thinking. Ellen Galinsky (2010) has studied the habits of highly effective people and she lists seven that she believes are essential for children to be taught in school in order to better prepare them for successful living. Daniel Goleman (2005) writes expansively about the concept of emotional intelligence and insists that it matters much more than academic intelligence because it correlates much more surely to positive relationships, general happiness, and other types of real-life

success. Martin Seligman (2006) has devoted his career to the positive psychology movement and his immense work in the field confidently demonstrates that a focus on nurturing the talents people possess, allows them to craft their lives around their strengths and gives them a much greater chance at genuine happiness from living a meaningful life.

Nell Noddings (1995) goes further and asks why we are so preoccupied with intelligence in schools in the first place. She asks why there isn't there more emphasis on creating caring people instead of smart people (p. 366). Intelligence is important but certainly not the only factor in achievement and happiness. She asks us to reconsider what it is we really want for our children and what it is our society needs in its citizens. She says that the current emphasis on academic standards neglects students "multiple identities," for we are much more than just our levels of intellectual ability (1995, p. 368). Noddings writes, "I have argued that our main educational aim should be to encourage the growth of competent, caring, loving, and lovable people... [Children] must find an ultimate concern in some center of care: care for self, for intimate others, for associates and acquaintances, for distant others, for animals, for plants and for the physical environment, for objects and instruments, and for ideas. Within each of these centers, we can find themes on which to build courses, topical seminars, projects, reading lists, and dialogue (Noddings, 1995, p. 366)."

There are so many big thinkers in many fields who support individualized education and the need to appreciate diverse ways of being smart. Schools are starting to catch on slowly, but there is still a ways to go. In order for deep change to happen, there must be a change in prevalent perspectives of intelligence. Schools that embrace more pluralistic views value a wider range of ability in students. The result of this thinking is variety and flexibility in subject matter and a range in instructional styles in order to meet the needs of all kinds of learners. Assessment practices also would be correspondingly more varied, adaptable and meaningful. There is automatically more of a focus on children as individuals with distinct profiles of intellectual strength and weakness and all children are given the chance to excel. We know undoubtedly from the research available that not every brain is created equal, so it doesn't make sense for classrooms to cater to one or two or even three kinds of ability. Classrooms that are truly inclusive and express value for the full range of human capacity will be accessible to all students. The diversity amongst the children will be viewed as a gift. There is beauty in our diversity and each of the ways there are to be smart must be cultivated if we are to make better use of our human resources and raise children to be happy and healthy adults ready to be contributing members of society. An emphasis on only certain kinds of intelligence deprives us of the benefits of the full range of human capacity. We need an array of talents and skills to solve the world's problems and to make it an interesting place to live.

## The Early Childhood Classroom

Although the educational implications of the unitary view of intelligence are less pronounced at the level of early childhood education, many authors have acknowledged the growing academicism of preschool programs. Pianta, Cox and Snow (2007) have written a comprehensive analysis of the increasing focus on achievement in young children during our current political climate of accountability. They report that children are experiencing an emphasis on academic ability at much younger ages than in the past, saying, “The educationalization of early care and education is evidenced by a research driven focus on critical measurements of quality that have traditionally been associated with k-12 education (p. 12).” Historically, preschools have been characterized by more play, less structure, and a greater focus on the individual child. However, the authors say that “Rather than individualizing expectations for each child, standards are becoming universalized (Pianta, Cox & Snow, 2007, p. 21).” They also acknowledge a “shift from a focus on all domains of development to those that promote a greater emphasis on literacy, language and quantitative skills (p. 22).” In many places, preschool age children are also being assessed by standardized tests. Accordingly, there will be children who receive the same message that their strengths have less or more value. During such important developmental years when children are just beginning to form impressions of themselves and the world around them, it seems especially damaging to expose them to the unfair assumptions of this way of understanding intelligence. At such a sensitive time, it seems essential that children be afforded a



wide range of opportunities to discover their natural affinities and develop the confidence to pursue meaningful learning.

Gardner and his colleagues at Harvard Project Zero have developed an educational approach, called Project Spectrum, which includes an assessment tool built directly into the curriculum. He says that, "Because the intelligences are manifested in different ways at different developmental levels, both assessment and nurturing need to occur in apposite ways... In the preschool and early elementary years, instruction should emphasize opportunity. It is during these years that children can discover something of their own peculiar interests and abilities (1993, p. 29)." Project Spectrum speaks to the belief that learning proclivities can be identified in young children and that this information can then be used to create a program that strengthens weaknesses and nurtures strengths. The benefit of this approach, Gardner (1993) asserts, is the way activities are context bound by being embedded in the actual curriculum and being related to the children's daily experiences, thereby giving the most accurate and meaningful assessment of ability. The evaluation is conducted in a child's own environment using rich materials that stimulate all of the intelligences through fifteen different tasks that will reveal a profile of intelligence. The researchers looked at "working styles," or how a child approached a task and interacted with the materials, as well as their intellectual capacity in each area (2006, p. 91). This kind of assessment has proven to be extremely beneficial in generating very specific information that will help provide the most ideal plan for educating of a child according to their unique needs. A

standardized test is not capable of revealing such personal or particularized information. Those tests simply grade a child according to one or two capacities and, furthermore, they use just one style of measurement so if someone isn't good at taking that kind of test they won't score well, but it doesn't actually tell us what we need to know to help the child improve. Gardner (2006) tells us that intelligence is just too nuanced, detailed and distinctive to be measured by only one standard in only one way. He calls his, "...a program rooted in the celebration of individual differences among young children... (2006, p. 112)" and reminds us that young children's brains are very pliable and they can learn a lot during this stage to develop their abilities if they are given the opportunity.

Gardner also advocates the approach of Reggio Emilia in early childhood programs. It is a preschool educational approach that originated in the village of Reggio Emilia, Italy, and is characterized by a curriculum that is guided by the students themselves. Gardner wrote the forward for the leading book on the philosophy, *The Hundred Languages of Children* (1993), and he describes the system as follows: "It is a collection of schools for young children in which each child's intellectual, emotional, social, and moral potentials are carefully cultivated and guided (p. x)." He writes that, "In Reggio, the teachers know how to listen to children, how to allow them to take the initiative, and yet how to guide them in productive ways (1993, p. xi)." In the book's introduction, the editors, Carolyn Edwards, Lella Gandini, and George Forman, assert, "This approach fosters children's intellectual development through a systematic focus on symbolic

representation. Young children are encouraged to explore their environment and express themselves through all of their natural “languages,” or modes of expression, including words, movement, drawing, painting, building, sculpture, shadow play, collage, dramatic play, and music (1993, p. 3).” This stands out against many early education programs where the focus is on letters and numbers and everything else is viewed as secondary.

Lilian Katz also writes an article for the book about the many lessons we can take from the Reggio Emilia educational approach. She writes, “Using this approach we can see how children’s minds can be engaged in a variety of ways in the quest for deeper understanding of the familiar world around them (Edwards, Gandini & Forman, 1993, p. 25).” She talks about the relationship between teacher and child being central to the method and that, “Because there are no formal pre-specified lessons that all children must learn, teachers can generate activities that can contribute to developing children’s more appropriate understandings of the topic (Edwards, Gandini & Forman, 1993, p. 29).” She sees Reggio schooling as being in stark contrast to the factory models of American schools where, “...most of our official state and school district curriculum guides reflect an assumption that virtually all children should be subjected to the same sequence of instructional treatments in lock-step fashion in the interests of creating a standard product (Edwards, Gandini & Forman, 1993, p. 34).” That goes directly against what we know about child development. She observes that, “...the approach to curriculum seems to be that each individual child’s characteristics, aptitude, needs, and

interests are examined and monitored by extensive and detailed recordkeeping and documentation (Edwards, Gandini & Forman, 1993, p. 36).”

Although the pluralistic view of intelligence has different implications at each age level and requires different strategies during each stage of schooling, there is an obvious imperative for the optimal development of any child that his or her teachers are willing to cherish individuality and diverse perspectives. Teachers need to remain open to the possibilities in their students and help identify and build their strengths while also broadening their understanding of the world. Teachers who are interested in developing the full potential of their students must give equal status to all the strengths their students bring to the classroom.

### **PART THREE: Why it Makes a Difference**

The main essence of this literature review is that there isn't just one idea about what defines intelligence and whatever idea you subscribe to has implications for the way you perceive your own abilities and the abilities of others. I promote the idea that there are many ways to be smart and I believe that once you accept this way of thinking, you change how you view human potential and relate to others. This simple change in thinking can completely change the way we educate children and can drastically effect their development. There is a definite call to think more broadly about human capacity and to raise children to value the gifts they possess and to teach them to value what is most important in life. We must all give up on the

idea that IQ is everything; it really doesn't guarantee you much of anything in life. You can have a low IQ and be a successful, moral, and happy person and can have a high IQ and be the opposite... We need to value the other important aspects of what makes a person successful in life, the things that will really make our world a more just, healthy, happy and beautiful place. If we want children to feel confident in their abilities and to love learning, we need to stimulate all their varying styles of intelligence. If we want children to be responsible, thoughtful, contributing members of society and to appreciate the diversity in each other and recognize the need for all kinds of people in the world, then we have to model this for them.

Educators have been the group most supportive of pluralistic views of intelligence and despite our typically more limited understanding of the brain, we spend hundreds upon thousands of hours observing and assessing children's learning and development and the theory of multiple forms of intelligence rings true loudly for so many of us. As a teacher, I am personally confronted with young children in preschool every year who are brilliant in ways that I know could make them greatly successful in certain areas of life or in specific occupational roles, but who do not fit the stereotype of intelligence in our schools. And so I know their gifts will not be appreciated and I know they will not be encouraged to develop these strengths. Most tragic of all is that they very well might get so squashed with the expectations of formal schooling that the special qualities I see in these young children will eventually wither and die.

## Conclusions

There is much research to indicate that the way teachers and school leaders define intelligence and the beliefs they hold about the nature of human ability has a profound affect on their capacity to nurture or inhibit student potential. This demonstrates an imperative for educators to be cognizant of their assumptions about intelligence and how their views can affect student outcomes. The benefit for students when their educators think more broadly about human ability is very clear, but a greater awareness in the field of education of this reality is necessary so that more people can adjust their thinking in a way that brings out the best in students. Teachers and school leaders must believe that there is no normal or ideal child to whom all others can be compared. Appreciating students as individual's means that they will not be held up to a uniform standard of achievement. Each child must be appreciated for his or her unique gifts and be afforded the opportunity to grow and develop further. Looking at children through the narrow lens of traditional concepts of intelligence profoundly limits them and recognizing this is the beginning of raising children to grow up feeling capable and empowered and ready to contribute positively to the world. Children must feel that their strengths are represented and encouraged and they should receive the message, through the teacher's attitude and the curriculum instruction and content, that they are significant and their particular aptitudes have value. There is much evidence to indicate that what students believe about themselves can actually affect their ability to achieve. They need to develop a positive sense of themselves and a belief in their

ability to contribute meaningfully to society because we now know that this will directly affect their actual accomplishment in life. All of the information we have on this topic makes it so apparent that teacher views about intelligence are an enormous factor in student success. Therefore, my suggestions for practical applications of the information in this literature review are about professional development opportunities for teachers.

### **Practical Applications**

I have used the literature review as a way to develop my thinking about the topic of defining intelligence and to create a rationale for the professional development plan I would ultimately like to put into place.

My goal in writing the literature review is to provide some insight about how our collective thinking about intelligence has developed and the way different perspectives can create empowerment or disempowerment amongst people and affect student success. I hope to add to the conversation about “how we understand intelligence and why it makes a difference” in a way that makes people examine their own beliefs and consider alternatives to traditional concepts of intelligence for the effect this might have on their own concept of self and their evaluation of the intelligence of others. Adults who cannot appreciate their own or each other’s learning styles and individual ways of being intelligent will not be able to do this for the children in their care. This could greatly interfere with their job of empowering

students toward personal fulfillment and productivity. Accepting a flawed theory of intelligence is not productive in the development of human beings and thus in the development of a better world! Almost completely I am simply summarizing other authors ideas, but I am working to put it together in a way that I hope further underscores the importance of awareness amongst educators of the consequences of their thinking about intelligence on students. I hope to contribute to a change in mindset amongst stakeholders in education; teachers, school leaders, policy makers, so that we see change in school structures, in curriculum, in instructional methods, in assessment, in goals and objectives, and in the way we think about human capacity. In doing this, we will better actualize the potential in children.

I believe in the power that an awareness of this topic can bring to other educators. I believe that it is an essential task for all adults who guide children to examine their definitions of intelligence and to study this subject so that they are sure to appreciate and nurture the varied ways that children can demonstrate intellectual ability. I hope my review of the literature demonstrates the importance of this goal. I think the way my experience with this topic has changed me as an educator is instructive of the effect it can have on others. My ultimate goal is to create a way to facilitate this same process for others. I think that many people will experience a similar awakening that I did and it will change their lives and ultimately the lives of the children with whom they work.



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