Integrating Human Capital with Human Development: Toward a Broader and More Human Conception of Human Capital

John F. Tomer
Emeritus Professor
Dept. of Economics and Finance
Manhattan College
Riverdale, NY 10471, USA
jtomer@juno.com

Abstract

A serious deficiency of the mainstream human capital (HC) concept is that it does not help one gain an adequate understanding of how human capacities develop or fail to develop during an individual's lifespan. Therefore, this paper proposes to integrate the HC and human development (HD) concepts. This allows appreciation that much of HC formation is psychological, social, and emotional. Existing HC theory neglects this important noncognitive development and neglects very important brain development.

A key feature is that HD is represented as a three-sided pyramid. Each triangular side represents a major developmental pathway. The three interdependent developmental pathways are: 1) educational and cognitive development, 2) psychosocial, biological development, and 3) brain development. Humans developing along the pathways may get stuck at certain developmental stages and may fail to develop further without special developmental interventions (investments in HC).

Four main noneducational situations are examined: 1) adverse early childhood experiences often involving trauma, 2) blockage of body and brain network pathways, 3) failure to develop important emotional competencies, 4) failure to develop needed personality traits.

Integrating HC with HD has important implications for HC strategy. This integration should lead to more rational HC decision making and more caring decisions.

Key Words: Human Capital; Human Development; Noncognitive Human Capital; Neurodevelopment; Developmental Approach

I am very grateful to Betty Devine for reading the first draft of this paper and offering very helpful comments on it.

I affirm that this paper has not been previously published in a monograph or scholarly journal and is not currently under review at another journal and will not be submitted to another journal until the editors have reached a publication decision.

1. Introduction

Economics' concept of human capital is very important in that using this term allows us to recognize the huge quantity of real resources that are in people. These resources allow people in the economy to behave better and be more productive than if they were not endowed with these capabilities. There are, however, problems with the concept of human capital (HC) in mainstream economics. Notably, mainstream HC reflects the mechanistic nature of the economics discipline. And utilizing the mainstream HC concept does not help one gain an adequate understanding of how human capacities develop or fail to develop during an individual's lifespan. Because of these problems, the purpose of this paper is to move beyond mainstream HC by integrating the HC concept with the concept of human development (HD). Doing this will allow us to better understand how important HC resources come into existence, develop further, and sometimes fail to develop. Based on a more developmental understanding of HC, one can appreciate that there are many more kinds of opportunities to invest in HC than one could conceive of from reading the mainstream HC literature. In particular, there is a great deal of HC formation that is psychological, social, and emotional in nature, i.e., noncognitive in nature. How well people develop their noncognitive HC capabilities is extremely important for the behavior and productivity of the economy. It is, therefore, very important for economists to understand their nature and be able to analyze these capacities, many of which have been heretofore only studied by a variety of noneconomists. Furthermore, integrating HC with HD will make possible the formulation of a more rational HC strategy for the economy. Finally, this integration represents an important step in making economics a more human discipline.

2. The Existing Human Capital Concept Is Too Limiting

Economics no doubt has been greatly enriched by the development of human capital theory. Unfortunately, however, this theory has been built upon a limited conception of human development. For the most part, human capital theory has emphasized human cognitive development and human acquisition of knowledge and skills that enable enhanced productivity and earnings. Further, human capital research has emphasized human capital formation taking place in workplaces and in schools for children five years old and older. In light of recent research findings, particularly that concerning brain development, it is becoming apparent that

economics' human capital theory has a far too limited conception of human development, especially with regard to its relative neglect of noncognitive development and the brain development that takes place in early childhood. It gives too little consideration to intangible, noncognitive aspects of learning. Also, it doesn't sufficiently consider the role of parents, social workers, psychologists and a variety of others who provide care and therapeutic help to both children and adults. Moreover, it doesn't consider recently accumulated knowledge related to the human brain's functioning and development. Lastly, economists' human capital theory needs to make room for insights and theory concerning intangible capital that derive from writings on social capital, organizational capital, cultural capital, customer capital, moral capital, ethnic capital, and so on (see Chapter 2, Tomer 2008).

3. The Human Capital Concepts of Important Economic Thinkers

A number of early economic thinkers articulated concepts of human capital that were broader, but generally less well developed, than those of modern mainstream economists. For example, although Adam Smith did not use the term human capital, he recognized that the contribution of the labor input and its profitability depended on the quality of labor, i.e., "the acquired and useful abilities of all the inhabitants or members of society" as well as "the state of the skill, dexterity, and judgement with which labor is applied" (as quoted in Sweetland 1996, p. 343). Further, he recognized that labor's productive capability is often acquired at a cost through education, study, or apprenticeship. Therefore, this human capability resembles fixed capital such as a machine or instrument, except that it is in the person (p. 343; Smith 1937, pp. 265-266). Alfred Marshall "defined capital so broadly that personal wealth could be interpreted as capital" (p. 344). He defined "personal wealth so as to include all those energies, faculties, and habits which directly contribute to making people industrially efficient" (p. 344; Marshall 1961, p. 58). Finally, Irving Fisher recognized that "human participation in production processes constituted a form of capital" and that the human machine is as important to production as the nonhuman machine (Sweetland, pp. 344-345).

4. Human Capital Needs to Be Integrated with Human Development

The standard concept of human capital (HC) is based on the concept of a representative agent who in machine-like fashion receives inputs, usually in the form of an intervention, such as education and training, and the outcome is an agent who is more productive. What is missing from this conception is a human being who develops in many different ways along a sequence of stages, a maturational path. As wise thinkers through the ages have recognized, humans are capable of attaining a very high level of development, involving a full flourishing of all their human capabilities in the broadest and highest sense over their entire life cycle. Clearly, the high human development (HD) envisioned by these thinkers involves much more than the acquisition of cognitive capability or workplace skill. High HD certainly involves social, psychological, emotional, and biological dimensions, among others. But the ideal or potential HD often fails to occur. Generally speaking, only when the environment is favorable do humans have a chance of developing a high degree of their potential. So a key question is: what has to happen for individuals to develop to, or near to, their full potential? What kind of environment is necessary for favorable development? Among the necessary environmental conditions commonly recognized as necessary for reasonably high HD are a good education and the kind of early life nurturing usually provided by two loving parents. For many, of course, the environment may not be favorable in some important respects, and as a consequence individuals may fail to negotiate significant stages of development. Thus, an individual may get stuck or partially stuck at a certain developmental stage and may fail to develop further without special developmental interventions. Without such help, it is likely that the individual will remain stuck at a level of HD that does not allow their talents to be fully developed. In general, conventional notions of HC formation provide little or no recognition of noneducational interventions that may make it possible for individuals to advance along important developmental pathways, thus overcoming the kinds of difficulties that would otherwise prevent or inhibit their development.

5. The Concept of Human Development

The concept of human development used here draws from a number of different traditions. First, it incorporates the perspective of developmental scientists whose field of study broadly encompasses HD in physical/biological, cognitive, and psychosocial domains/behaviors (see, for example, two HD texts (Kail and Cavanaugh 2007 and Papalia, Olds, and Feldman 2009).

Second, the HD concept is inspired by the humanistic psychological perspective of Abraham Maslow (1943), notably his hierarchy of needs. Third, it is informed by research on neurodevelopment (see, for example, Perry 2002), particularly Perry's work related to the developmental difficulties occurring in early childhood. Fourth, the HD conception here has been influenced by Ken Wilber's (see, for example, 2001) conception of how humans develop in an unfolding series of stages and levels from lower order to higher order along many dimensions or lines (pp. 5-16).[1]

6. The Human Development Pyramid

To gain a better appreciation of the HD concept used here, it is important to illustrate graphically its main developmental pathways and the essence of the sequence of development along each. For the purposes of this paper, HD is represented as a three-sided pyramid. Each side represents a major developmental pathway. The three developmental pathways are: 1) educational and cognitive development, 2) psychosocial, biological development, and 3) brain development (or neurodevelopment). In each case, the triangles representing the pathways start from very fundamental, early development and proceed stepwise to the highest level of development. The sequence of steps resembles in some respects Maslow's (1943) hierarchy of needs in that with some exceptions earlier stages must precede later stages. Also, note that there is considerable interdependence among the three pathways.

For economists, and presumably many academics, the easiest triangle/pathway to appreciate is the educational and cognitive development pathway. The side of the pyramid representing this pathway is shown in Figure 1. It starts at the bottom with "Learning the basics: reading, writing, and arithmetic, etc." The second step is "Learning/appreciating many types of knowledge and acquiring academic discipline." The third step is "Developing skills and talents: Physical, academic, arts, technology." The fourth and final step is "Acquiring overall life direction, interests, outlooks, and motivation."

[1] The HD concept used here is related to but distinctly different from the HD concept pioneered by Amartya Sen, Martha Nussbaum and others. The latter concept which has been much used by international agencies (for example, World Bank, United Nations) concerned with economic development emphasizes a great number and variety of human functionings and capabilities. This HD concept is very useful for thinking about national and world economic development and how its progress can be measured. A good overview of this concept and its uses can be found in Alkire (2010).

Figure 1

Educational and Cognitive Development

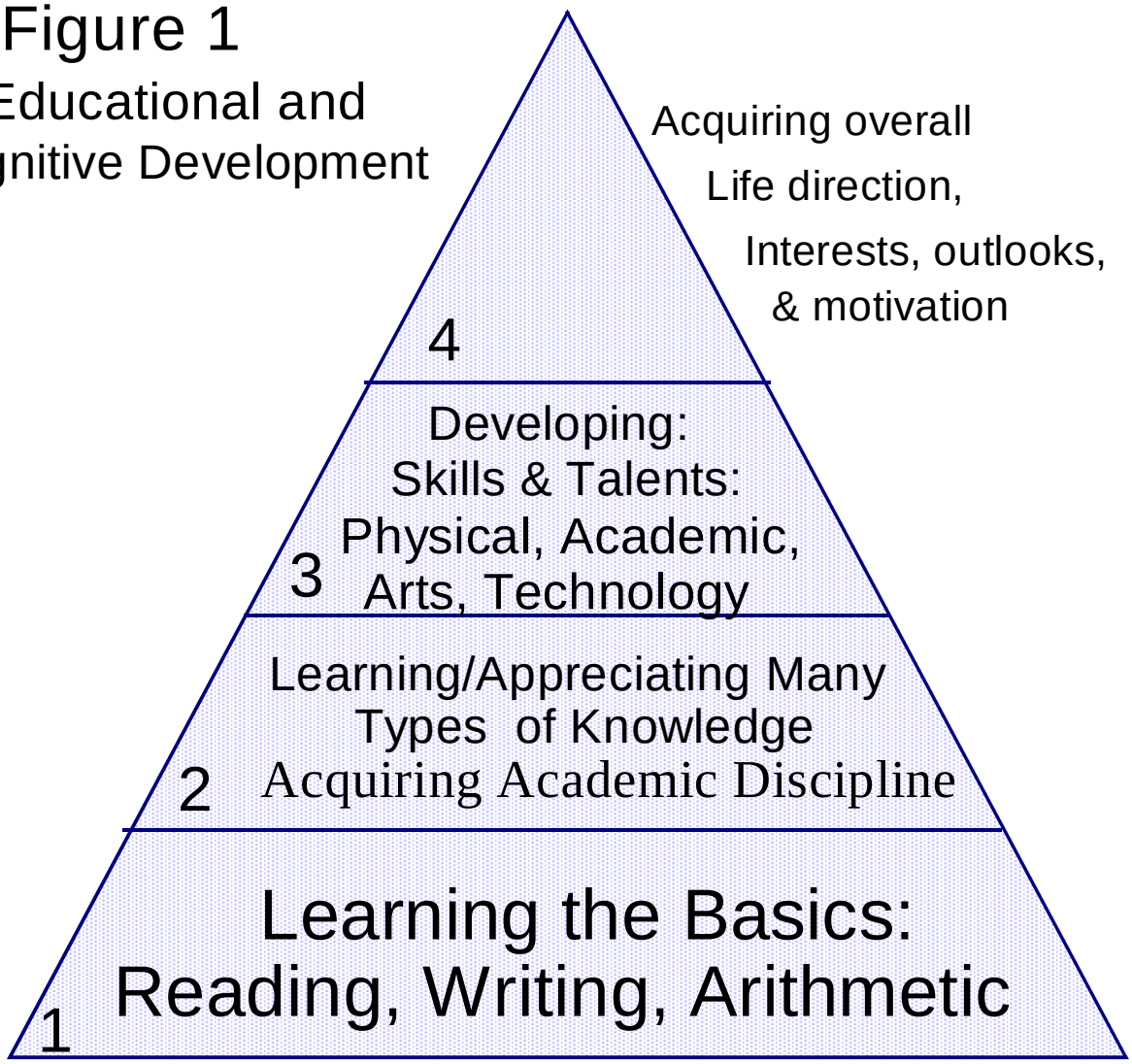
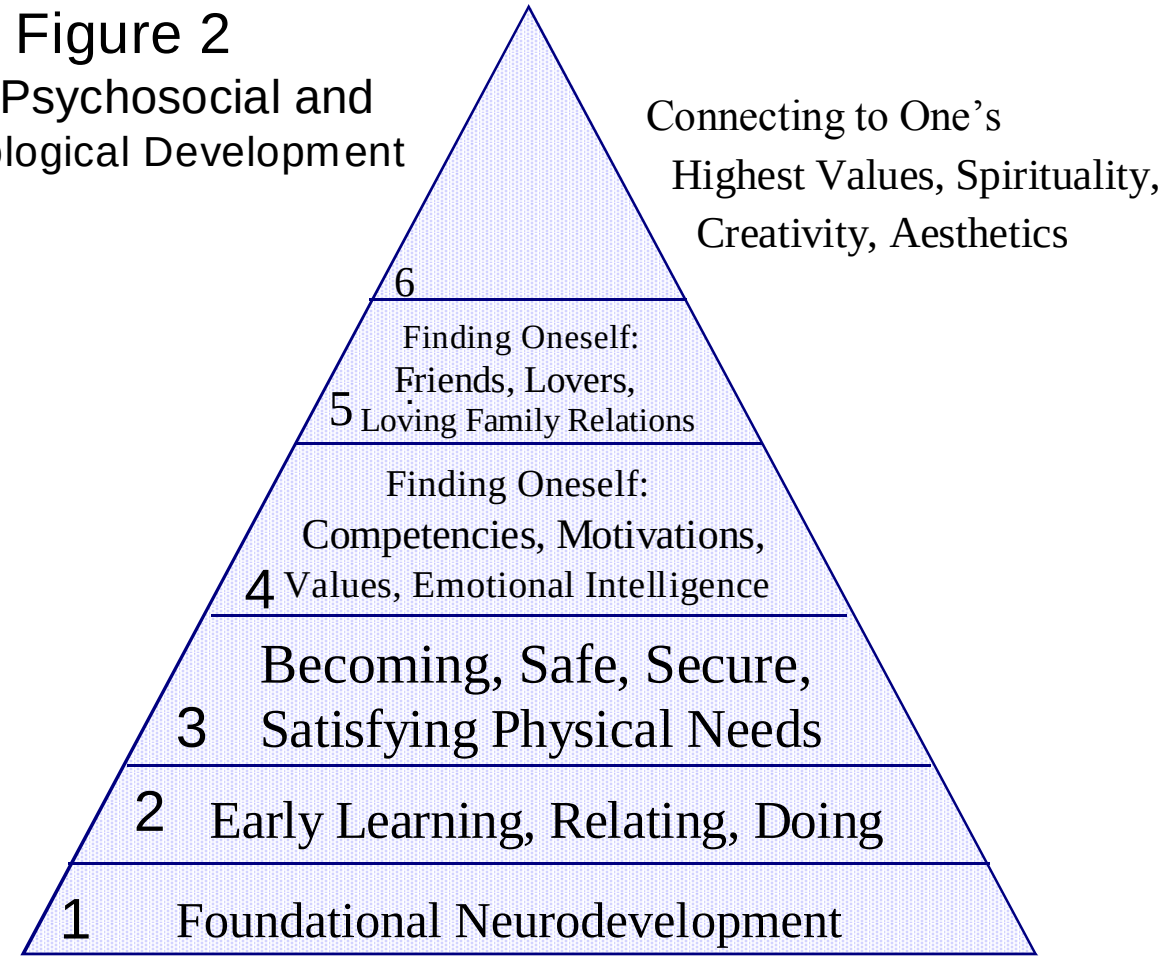


Figure 2
Psychosocial and
Biological Development



The second pathway, psychosocial, biological development, is shown as the triangle in Figure 2. It starts with "Foundational neurodevelopment" and proceeds to "Early learning, relating, and doing" and then to "Becoming safe, secure, and satisfying physical needs." The fourth step is "Finding oneself: competencies, motivations, values, and emotional intelligence." The fifth step is "Finding oneself: friends, lovers, and loving family relations." The sixth and final step is "Connecting to one's highest values, spirituality, creativity, and aesthetics."

The third pathway, brain development, is shown as the triangle in Figure 3. It starts with "Foundational neurodevelopment" and proceeds to "Neurodevelopment associated with doing, achieving, relating, and learning." The third step is "Overcoming brain development deficiencies and problems." The fourth and final step is "Developing creativity and peak performance brain functioning."

Figure 4 shows how the three triangles described above combine to form the HD pyramid. No doubt a much more careful and micro elaboration of the pathways by a developmentally oriented behavioral scientist would include many more steps in each pathway than the number included here.

The benefit of using the HD pyramid is that it focuses attention on three main ways that important human capabilities change, have the potential to change, or fail to realize their change potential. In Wilber's (2001, pp. 5-6) view, human development involves an unfolding, emergent process marked by progressive subordination of older, lower-order behavior and capabilities to new higher-order behavior and capabilities along different pathways or lines. Using the HD pyramid helps us understand how change along one pathway may facilitate change along another pathway and how barriers to change in a pathway may result in lack of desired change along another pathway. This has implications for how HD interventions designed to improve capabilities related to one pathway can contribute to improving capabilities along another pathway. Further, the HD pyramid has important implications for HC strategy insofar as focusing only on the educational and cognitive development pathway can lead to suboptimal results. To achieve better results, HC strategy needs to take into account all three developmental pathways on the HD pyramid. Otherwise, the overall pattern of investment in HC may be inefficient and counterproductive. See later sections of the paper for a number of examples

Figure 3

Brain Development

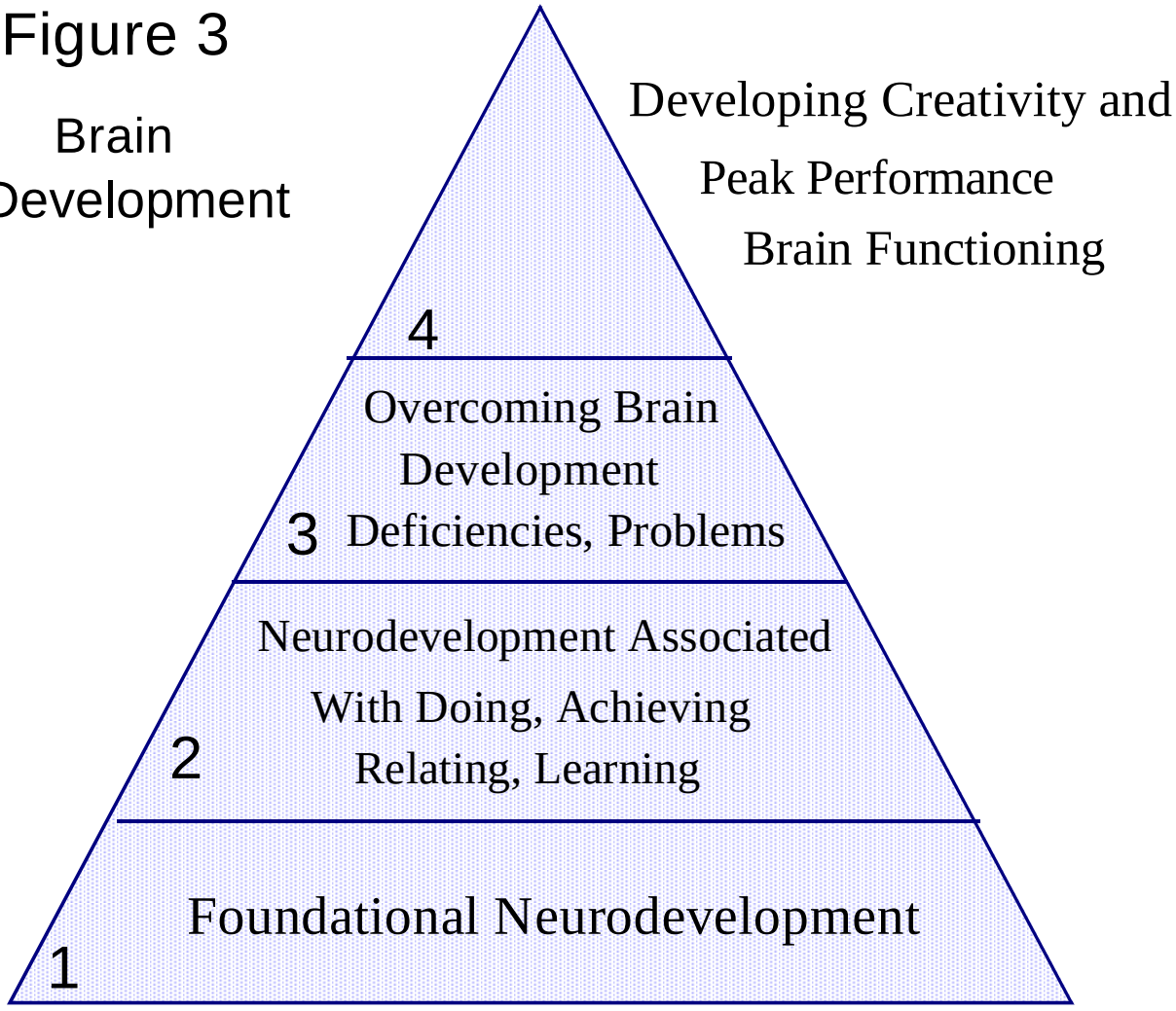
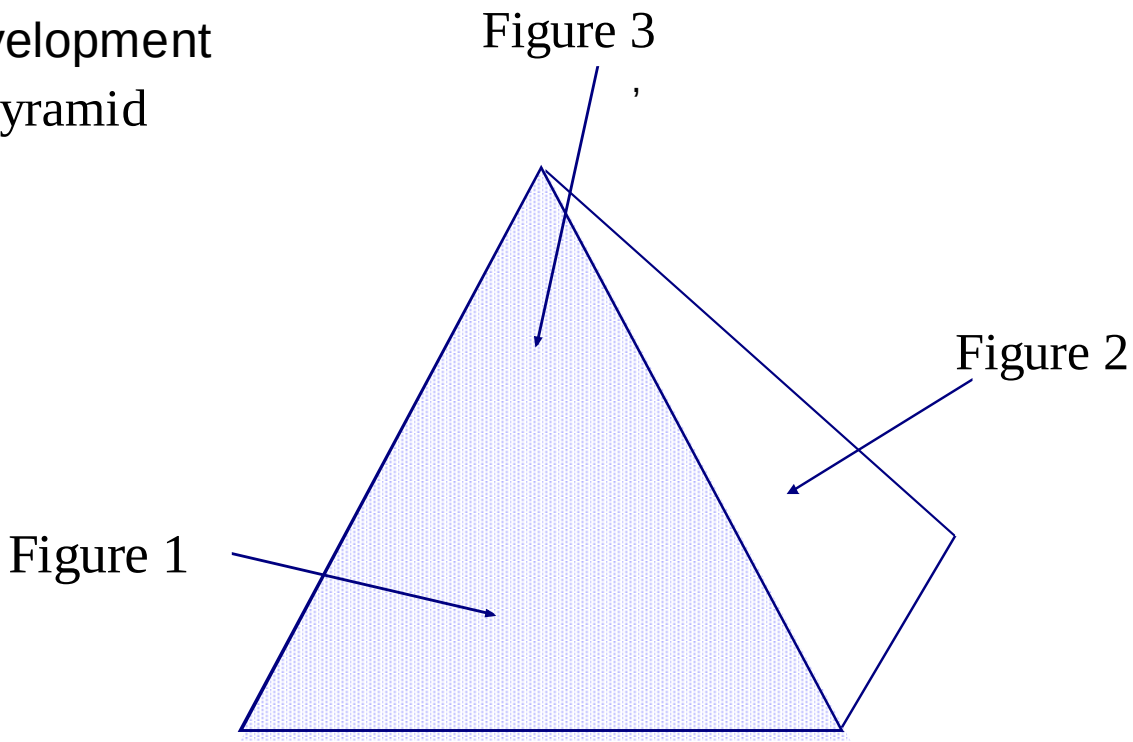


Figure 4

Human Development Pyramid



Note that the three pathways are interdependent

related to these points and how they are related to the different pathways. Further, it seems likely that subsequent research in a number of disciplines will lead to refining the elements of the HD pyramid.

Note that in contrast to the typical mainstream economic conception regarding skills, the HD pyramid conception is not simply focused on the kind of capabilities that are useful in the school or workplace or any particular aspect of life. The pyramid is, of course, concerned with human capability development, but its essence is about human development in the very broadest sense. Accordingly, the HD pyramid is helpful in thinking about all aspects of life including overall wellbeing.

7. Neurodevelopment Is at the Heart of Human Development

The Neurodevelopment Processes

As we learn more and more about brain functioning, it has become increasingly clear that neurodevelopment or brain development, the third pathway of the HD pyramid, is extremely important to a human's overall development. Bruce Perry's (see, e.g., 2002) work makes clear that we can only develop to our human potential if our brains develop to their potential. "Development [especially the neurodevelopment part] is a breathtaking orchestration of precision micro-construction that results in a human being" (2002, p. 82). Eight key processes are involved in creating a mature, functional human brain: neurogenesis, differentiation, apoptosis, arborization, synaptogenesis, synaptic sculpting, and myelination (pp. 82-85). It is not necessary here to consider each of these processes in detail. Suffice it to say that these processes relate to neurons: their birth, movement, specialization, death, formation into dendritic trees, the formation of connections among neurons (synapses), the structuring of the synapsis, and the creation of efficient electrochemical functioning in the neural networks. These neurodevelopment processes occur in response to experience and are most responsive to experience in positive and negative ways during infancy and childhood (p. 82). All of these processes must go well; otherwise, abnormal neurodevelopment occurs, causing profound brain dysfunction (p. 85).

The Brain's Developmental Needs

"In order to develop properly, each [brain] area requires appropriately timed, patterned, repetitive experience" (Perry and Szalavitz 2006, p. 248). The sequential development of the brain starts from the lower regions and proceeds to the higher regions, i.e., starting from the brain stem and then proceeding to the midbrain, limbic system, and cortex. Certain parts of the brain have sensitive periods during which a person's experience can easily modify the neural circuits in those parts. Critical periods are times in which particular kinds of brain development must occur if it is to occur at all. For optimal neurodevelopment, it is crucially important that the lower brain systems develop first in healthy fashion; otherwise, development of higher, more complex parts of the brain will not be able to occur satisfactorily. But in addition to appropriate developmental timing, children need consistent physical affection and patterned repetitive stimulation to properly build the brain systems (p. 86). Children's brains need both quality and quantity of use and stimulation (Karr-Morse and Wiley 2012, p. 98). Further, a child needs committed, attuned, loving parenting that creates a secure attachment between child and parent. Conversely, what is destructive of brain development is inconsistent, inattentive, chaotic, ignorant, abusive, or neglectful caregiving (Perry 2002, p. 93). The latter can be a cause of overwhelming stress or trauma, i.e., stress that is in excess of what the child can manage or bear (Karr-Morse and Wiley 2012, p. 103).

The Adverse Consequences of Impaired Brain Development

It is especially true that adverse early childhood experiences, often involving trauma, deprive children of crucial development, and as a consequence, their brains lack critical organization. Typically, these traumatized children are hyperactive as well as overly sensitive and reactive (Perry and Pollard 1998, pp. 41-42).[2] In general, these children exhibit maladaptive emotional, behavioral, and cognitive problems (Perry et al 1995, pp. 277-279). Whereas a relatively calm child "can … readily focus on the words of the teacher and, using her neocortex, engage in abstract thought and learning, a child who is [traumatized] will be less efficient at processing and storing the verbal information the teacher is providing" (Perry and Szalavitz 2006, p. 249). The cognition of the traumatized child who is developmentally deficient will as a consequence be

[2] These children's hypothalamic-pituitary-adrenal axis is not functioning well (Tough 2012, p. 182).

dominated by these impaired lower brain areas (p. 249). In effect, these children are "stuck" or partially stuck at a lower stage of brain development, and therefore, they are unlikely to be able to take advantage of opportunities to develop their higher brain's functioning. There are also strong relationships between adverse child experiences (ACEs) and the incidence of many physical ailments as shown by the findings from the research performed by Robert Anda and Vincent Felitti and their collaborators in the early 1990s. Findings from these studies indicate that the number of ACEs an individual experiences is related to their likelihood of experiencing in later life serious ailments such as heart disease, cancer, and lung disease as well as their likelihood of experiencing poor general health (see, for example, Felitti et al 1998).

The Prospects for Improvement and Need for Investment in Human Capital

But there is some good news. Even in very severe cases involving trauma and a high degree of neurodevelopment impairment, therapeutic approaches along with enriched preschool may be able to help children repair much of the brain damage and become "unstuck" (Tomer 2014, pp. 20-29; Perry and Szalavitz 2006).[3] Of course, the more severe the impairment, the more therapeutic skill and expense will be required for success. Although some important therapeutic investment in human capital is certainly taking place, judging by the testimony of many social workers and psychotherapists, there is reason to believe that compared to investment in standard educational HC, there is much too little of it taking place. Further, based on the insightful writings of Bruce Perry (with Szalavitz 2006), a highly regarded psychiatrist, there is good reason to believe that the relatively low investment in overcoming neurodevelopmental disadvantage and improving brain development has substantially lowered the return on investment in standard educational HC (this is also implied in Heckman 1998, p. 114). This is but one example of the interdependence of the HD pathways; in this case, it is the interdependence between the brain development pathway and the educational and cognitive development pathway.

[3] One interesting recent development involves a systematic approach to improving parenting (Triple P—Positive Parenting Program) which was originally developed in Australia and is now being tested in South Carolina with funding from the Centers for Disease Control and Prevention. The early results suggest that parenting improvements due to Triple P dramatically reduce the negative consequence of poor parenting (Bornstein 2013).

8. Another Perspective on Brain Development

The Biochemical Basics

Another perspective on neurodevelopment comes from the biochemical research of Candace Pert (1997) and many others who have done similar research. This pioneering research has demonstrated how the chemicals in our brain and body are a key to understanding our behavior, emotions, beliefs, expectations, and consciousness. Her research has focused on receptors, molecules in body and brain that are accessible to the outside environment, and ligands, chemicals (molecules) that may bind to the cellular receptors and thereby convey an informational message to the cell (pp. 350-352). A ligand is the "chemical key that binds to the receptor, entering it like a key in a keyhole, creating a disturbance to tickle the molecule into rearranging itself, changing its shape until—click!—information enters the cell" (p. 23). Note that a specific ligand will only bind with the specific receptor that is made to fit with it. There are three chemical types of ligands: neurotransmitters, steroids, and peptides. Among the most widely known brain neurotransmitters are dopamine, histamine, and serotonin. The role of these neurotransmitters is "to carry information across the gap, or synapse, between one neuron and the next" (p. 25). In general, the "receptors and their ligands have come be seen as 'information molecules'—the basic units of a language used by cells throughout the organism to communicate across systems such as the endocrine, neurological, gastrointestinal, and even the immune system … [This activity] creates an integration of structure and function that allows the organism to run smoothly, intelligently" (p. 27).[4]

Molecules of Emotion: When Development Gets Stuck

Pert refers to the receptors and ligands as the "molecules of emotion" for good reason. Based on her research, she finds that "when emotions are expressed—which is to say that the biochemicals that are the substrate of emotion are flowing freely—all systems are united and made whole … [However], when emotions are repressed, denied, not allowed to be whatever they may be, our

[4] Cells are "surrounded by a semipermeable cell membrane. Cell receptors are located in this membrane, where they are available to bind with various ligands suspended in the extracellular fluid that bathes all cells and serves to transport the various nutrients, waste products, and informational substances" (Pert 1997, p. 348).

network pathways get blocked, stopping the flow of the vital feel-good unifying chemicals that run our biology and our behavior" (Pert 1997, p. 273). When one's emotions are blocked and held in the body, the breakdown in energy flow leads inevitably to a decline in health (p. 276). Pert associates the flow of emotional energy with the flow of information carried by the biochemicals of emotion (the ligands and receptors) (p. 276). When such emotional blockage occurs "due to denial, repression, or trauma, then blood flow can become chronically constricted, depriving the frontal cortex, as well as other organs, of vital nourishment" (p. 289). The result is you "become *stuck* [italics mine]—unable to respond freshly to the world around you, repeating old patterns of behavior and feeling" (p. 289). When this "stuckness" occurs, human development processes of various kinds cease to occur. A person who is thus stuck has unhealed emotions and usually experiences sadness, fear, frustration, and anger (p. 300). A person who has been in this stuck state for any length of time is likely to be in need of help in order to become unstuck and return to making developmental progress. There is also reason to believe that such developmental difficulties are associated with the likelihood of experiencing serious physical health difficulties (see, for example, pp. 279-300).

Investment in Human Capital to Become Unstuck

When human developmental processes grind to a halt as emotions become blocked and the biochemical molecules of emotion are not flowing, many find that mainstream medicine is largely ineffective and is not the answer (Pert 1997, pp. 272-274). Thus, a large number of people have turned to alternative therapies. Somatic-emotional release approaches, also called body psychotherapy, is one of the alternative therapies that involve therapy for both body and mind. It has the "power to simultaneously access emotions through various kinds of body work while enlisting the power of the mind through talk therapy" (p. 274). New and useful approaches used by chiropractors include treatments that release traumatic stored memories from body and mind (p. 275). Some alternative healing methods that release trapped emotions derive from the types of medicine practiced for ages in a number of Asian countries particularly by Hindus and Buddhists (p. 276). Acupuncture originating from China is an example of a type of therapy that has found widespread use even in western countries. Thus, many people around the world are today turning to a variety of alternative therapies and medical practices to achieve the kinds of wellness and unstuckness which they have not been able to obtain from mainstream medicine.

To the extent that these alternative medicine practices enable people to achieve wellness, become unstuck, and resume important parts of their developmental journey, the resources used to do this can be considered an investment in human capital. Clearly, these investments have the ability to raise people's productivity in their work lives as well as helping people live more fulfilled, flourishing lives overall. To this extent, they should be considered investments in HC comparable to educational investments.

9. Psychosocial Development

Developing Greater Emotional Intelligence

Developing emotional intelligence is an important step midway along the second developmental pathway, the psychosocial and biological development of an individual. This section of the paper utilizes Daniel Goleman's (2011) model of emotional intelligence (EI) which has four generic domains: self-awareness, self-management, social awareness, and relationship management (p. 11). EI is distinctly different from IQ and from personality traits. Among the important competencies under the rubric of EI are emotional and physical self-awareness; awareness of emotions of other people (empathy); the ability to handle one's emotions, particularly strong, distressing emotions; ability to manage one's impulses; ability to express one's feelings effectively; ability to relate well with others; and ability to solve personal and interpersonal problems (pp. 13-17). For a fair number of the EI competencies, increasing competence comes when a person is able to gain a better coordination between their thinking brain (neocortex) and the lower, subcortical brain areas. For example, decision making can become more emotionally intelligent by achieving a better balance between one's thinking and emotion, which involves, among other things, a better balance between using one's neocortex and amygdala (pp. 29-30). Arguably, these emotional competencies are particularly important for enabling the kinds of leadership, communication, and teamwork necessary in 21st century organizations.

Human Capital Investment to Improve Emotional Intelligence

School Programs to Improve EI. People ordinarily are able to improve their EI in their home, school and workplaces as a regular part of their life experiences. Nevertheless, there has

been increasing awareness that many of us suffer from EI deficits, and thus, there is a need for programmatic efforts to improve EI. That is where social/emotional learning (SEL) comes in. School based SEL programs "teach the whole spectrum of EI abilities. The best programs run from kindergarten through high school, and teach these abilities at every age in a developmentally appropriate way" (Goleman 2011, p. 71). The goal of these SEL school programs is "to instill a deep psychological intelligence that will help children regulate their emotions" (Kahn 2013). One widely adopted SEL school program is called Second Step; another called Ruler has been less widely adopted but includes more features and is more expensive (Kahn).

Although relatively few studies of SEL have been done, a study by Roger Weissberg looked at over 200 schools with SEL programs. "He found that, on average, SEL programs reduce anti-social behavior like misbehaving in class, fights or substance abuse by about ten percent. And they increase pro-social behavior—liking school, attendance, paying attention in class and so on—by about ten percent" (Goleman 2011, p. 73). In addition, academic achievement scores were increased by eleven percent (p. 73). The biggest gains occurred in schools that needed it the most.

Other Programs for Young People. There are other youth oriented programs that resemble SEL programs in some ways but whose orientation is not strictly on improving EI. One such school program, An Achievable Dream, is particularly noteworthy. It uses tennis to help its students acquire motivation, discipline, perseverance, confidence, etiquette, sportsmanship and teamwork (Friedman 2013). Its orientation is to help students excel in academic achievement, respect themselves and adult leaders, and learn core human values. There are other organizations in the U.S. that are similar to An Achievable Dream in their emphasis on athletics and character development (pp. 24-25).

Improving Adults' EI. It is important to note that adults, not just children, can gain greatly from improving their EI. This is particularly true at work. Adults in all kinds of occupations can improve their job performance by making targeted changes in their EI competencies (see Goleman 1998). Moreover, it is generally understood that in contrast to IQ, improvements in EI can and do occur even late in life. Adults wanting to raise their EI or close EI deficits are increasingly turning to life coaches. Coaches are used by some people to gain mastery of a skill like playing golf or playing the violin. This is because to keep on improving

one's skill or expertise, it is not sufficient merely to put in long hours of practice. What the "student" needs and what the coach can provide is feedback, not only on what to practice, but on what to practice next.[5] Without this feedback, substantial improvement of the skill or improvement of one's targeted emotional competencies will not reliably occur, and thus, the individual will not strengthen their old brain circuits and build the desired new ones. Coaching can help the student pay attention to what is essential so that eventually the newly acquired skills or emotional competencies become reflected in their brain's circuitry, and then, these skills and competencies can be drawn on relatively effortlessly.

Developing Improved Personality Traits

The Importance of Personality Traits. Another important aspect of development which is part of the second developmental pathway, psychosocial and biological development, involves developing and improving one's personality traits. "Personality traits are the relatively enduring patterns of thoughts, feelings, and behaviors that reflect [one's] tendency to respond in certain ways under certain circumstances" (Roberts 2009, p. 140 as quoted in Almlund et al 2011, p. 12). There is considerable evidence that one's cognitive and noncognitive personality traits contribute a lot to one's educational success, labor market success, health, other personal outcomes, and even criminal activity (Almlund et al 2011, p. 219). An analysis of the Perry Preschool Program showed that noncognitive traits were especially important in determining life outcomes (pp. 6-7). In general, one's productivity in a task/situation is understood to be determined by one's traits, broadly defined, and the effort one expends (given one's IQ and the task incentives) (Ferguson, Heckman, and Corr 2011, p. 202; Heckman 2011, p. 14; Heckman and Kautz 2013, p. 13). In light of this, parents and schools have sought through socialization processes to "arm [their] children with skills, abilities, and character structures [traits] that they can take with them into different environments and use to their benefit" (Roberts 2009, p. 138).[6]

Investments in Improving Personality Traits. Personality traits develop via social and biologic/genetic processes. The latter developmental processes occur naturally; they are ontogenic processes. However, a great deal of trait change occurs via investment processes which require efforts using up time, mental energy, and attention as well as resources (Ferguson.

[5] Daniel Goleman, "Perfect Practice Makes Perfect," posted on LinkedIn, December 20, 2013.
[6] There is clearly considerable rethinking going on about the nature of and appropriate naming of these different human noncognitive capabilities. This is reflected in the latest research of Heckman and Kautz (2013).

Heckman and Corr 2011, p. 204). Some of this investment that produces trait change in a person is external as it occurs due to the efforts of peers, parents, and educational and other institutions acting on the individual. On the other hand, another part of this investment is self-initiated or internal investment. The ability of institutional efforts to produce lasting change in the traits of young children is indicated by an analysis of the much studied Perry Preschool Program.

> "This experimental intervention enriched the early social and emotional environments of disadvantaged children ages 3 and 4 with subnormal IQs. It primarily focused on fostering the ability of participants to plan tasks, to execute their plans, and to review their work in social groups" (Almlund et al 2011, p. 6).

It is clear that "the intervention changed something other than IQ" (p. 7). In other words, the intervention produced lasting, beneficial changes in the traits of the young participants. Analyses of a number of other experimental interventions have shown similar outcomes. This is why there is currently optimism about making large scale investments in personality traits, i.e., making investments in the kind of HC that can be produced by preschool programs (Perez-Pena and Rich 2014). Hopefully, much of the contemplated investment will be made and much beneficial trait change will occur as a consequence.

10. Economists and Human Development

A small, but rising, number of economists have departed from the strict tenants of mainstream human capital theory in that their writings generally have a developmental orientation and utilize a broad concept of HC. Three economists, Greg J. Duncan, Art Rolnick, and James J. Heckman, are particularly notable in this respect. These economists and others like them are attentive to differing degrees to what child development specialists are learning and to the new findings from brain development research.[7] [8]

Greg J. Duncan

Greg J. Duncan is recognized for his writings on early childhood development and how that development is influenced by adverse conditions such as poverty. Duncan and Magnuson

[7] For example, child development specialists at Harvard University's Center on the Developing Child (Working Paper 5, February 2008) recognize that the timing and quality of early childhood experiences along with an environment free of toxins and with adequate nutrients combine to shape brain architecture and that it is very important for the young child to have appropriate experiences at the right stages of development (p. 1).

[8] According to Engle et al (2007, p. 229), "child development refers to the ordered emergence of interdependent skills of sensori-motor, cognitive-language, and social-emotional functioning."

(2004, p. 100) recognize that humans develop holistically and that their "cognitive, affective, biological, and behavioral domains are systematically interdependent and mutually influencing [and that] each stage of development requires the reorganization of existing capacities as well as acquisition of new capacities." Further,

> "Developmental theory posits a more sophisticated view of the production function than economists, because it suggests that there is more than one pathway to a developmental outcome. Rather than being the direct result of cognitive ability, developmental theory argues that human capital results from an individual's ability and motivation to organize cognitive, social, and behavioral capacities" (p. 103).

And Greg Duncan clearly recognizes that there are multiple pathways and processes that lead to developmental problems such as school dropout (p. 103). Note also that Duncan and Magnuson provide a very useful and comprehensive survey of intervention strategies being used to invest in young people's human capital (pp. 105-125).

Art Rolnick

Art Rolnick is an economist and researcher who while working at the Federal Reserve Bank of Minneapolis became a leader of Minnesota area efforts to invest more resources in early childhood development. Related to this, his research showed that the rate of return to early childhood development was much greater than the return to the usual public regional development projects being proposed such as building a new stadium for the Vikings, the area's National Football League team (Rolnick and Grunewald (2003). He and his coauthor, Rob Grunewald, recognized that if the period of life from birth to about five years old "includes support for growth in cognition, language, motor skills, adaptive skills and social-emotional functioning, the child is more likely to succeed in school and later contribute to society" (p. 7). In their second round of research, Grunewald and Rolnick (2006) developed a plan for organizing early childhood education on a large enough scale to make a real difference.

James J. Heckman

James Heckman's research, done in collaboration with quite a few coauthors, is concerned with the economics of human development, not simply HC formation. Much of that research over the last 15 years or more has focused on early childhood development (see, for example, Heckman

2007; Knudsen, Heckman, Cameron, and Shonkoff 2006; Cunha and Heckman 2009; and Heckman 2013). In this regard, Heckman recognizes the great importance of the quality of the child's home or family environment, which reflects the behavior of the parents, as well as the importance of preschool. The latter's importance is reflected in Heckman's et al (2010) rigorous estimate of the rate of return to the Perry Preschool Program, an enriched preschool for three and four year old disadvantaged African-American youth. In addition to finding a relatively high societal rate of return to this early childhood investment, the researchers found the rate of return to be considerably higher than the rate of return on the HC investment in later childhood and adult individuals. More recently, Heckman's research on HC and HD has focused on investment interventions designed to improve people's noncognitive capabilities (or character skills) such as personality traits, goals, motivations, self-regulation, self-control, patience, and farsightedness (see, for example, Ferguson, Heckman, and Corr (2011) and Heckman and Kautz (2013)). Heckman is also very much concerned with the policy implications of his research on early childhood development (see, for example Heckman 1998 and Heckman and Masterov 2007). It should be noted that Heckman is currently leader of a large group of researchers who are members of the Human Capital and Economic Opportunity Global Working Group. The mission of this group is to carry out comprehensive and interdisciplinary research into human capital development.

11. Essence of How a Developmental Approach Differs from a Mainstream Economic Approach to Human Capital Investment

In the mainstream economic approach, investment in HC involves a process or intervention during which an input, say knowledge, is being added or incorporated into the individual. The addition of this input, which was not previously in the individual, accounts for the improved performance of the individual at work, school, home, or other locale. In the mainstream approach, this process is not strictly considered to be developmental in nature. Nevertheless, the individual may be thought of as advancing along the educational and cognitive development pathway, but not along any other developmental pathway. Typically, these types of investment interventions take place in educational institutions such as schools and colleges or in the workplace.

In contrast to the mainstream approach, in the developmental approach, investment interventions improve an individual's performance to the extent that it helps an individual progress through one stage of development and move on to the next stage. Such progress is not generally a result of the addition of an input like knowledge. This developmental progress can occur along any or all of the three developmental pathways. However, because the educational pathway is well known, more attention is given here to the two noneducational pathways. Healthy progress occurs along these pathways when 1) an intervention enables or facilitates a person's development or 2) prevents events that might have stopped or retarded the individual's development. If the outcome of a person's development along one pathway is favorable, it may enable a favorable developmental result along one or two other developmental pathways.

A number of important kinds of situations in which humans fail to develop satisfactorily were discussed earlier in the paper. These include:

1) Full, healthy brain development fails to occur because of adverse early childhood experiences often involving toxic stress or trauma. Because of these neurodevelopment deficits, both childen and adults will be stuck or partially stuck at a lower stage of brain development

2) The molecules of emotion (different types of receptors and ligands in the brain and body) fail to flow freely such as when emotions are repressed or denied. As a consequence, body and brain network pathways get blocked, and people get stuck in unhealthy patterns of behavior and experience negative emotional states.

3) People fail to develop important emotional competencies (for example, inablility to handle one's distressing emotions) deriving from a lack of coordination between a person's thinking brain (neocortex) and their lower brain areas.

4) People fail to develop the personality traits that are needed for their educational success, labor market success, health, and positive personal outcomes.

As discussed earlier, there are a great variety of interventions, i.e., many types of investment in HC, that can enable individuals with the above kinds of developmental difficulties to overcome their problems. When people make these investments, this not only increases the productivity of the economy but it improves many personal and societal outcomes. It is, however, important to note that qualitatively these investment interventions to overcome developmental difficulties

encountered along the two noneducational pathways are distinctly different from typical educational investments. Despite this, they are very much HC investments in that when they are successful they raise important human capabilities. And these capabilities, likely noncognitive ones, are no less important for the economy and for the society than capabilities developed through education.

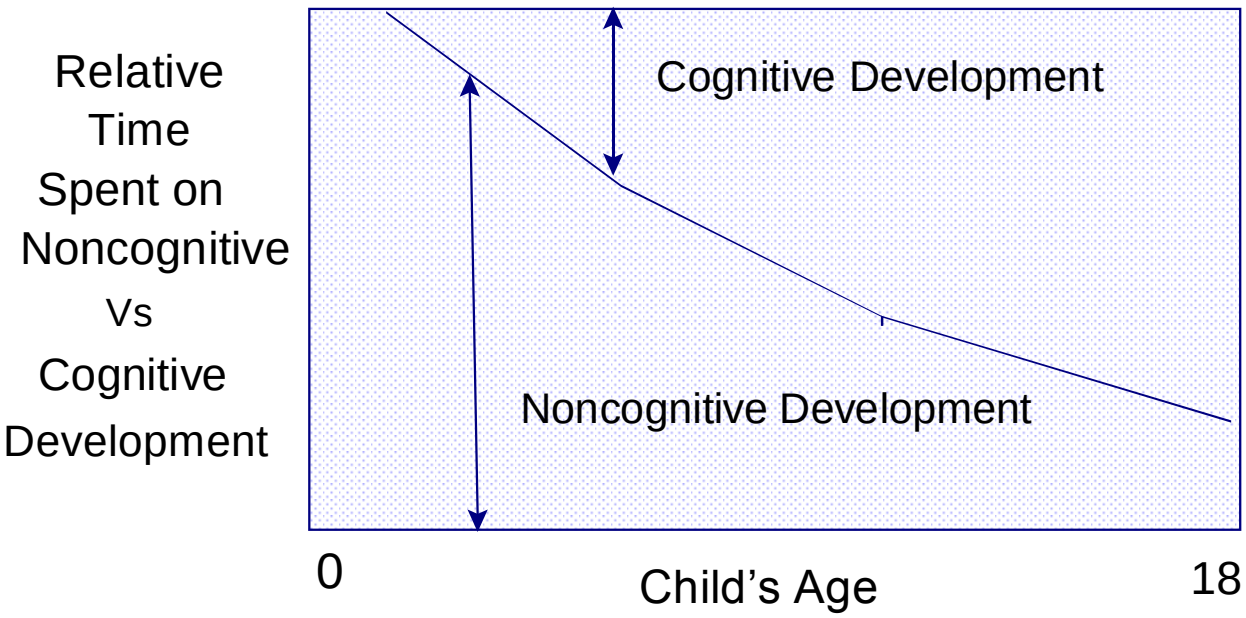
12. The Developmental Pattern Over Time

In early childhood just after birth, a child is not ready to develop cognitively. The development that is taking place is noncognitive development, mainly occurring in the lower brain areas (Perry 2002, pp. 86-88; Perry and Szalavitz 2006, pp. 247-248). During very early child development, children are acquiring basic brain organization, a stable emotional basis, a secure attachment to their primary caregiver(s), and the basis for good social relationships. Obviously, during this developmental period, educators who specialize in imparting knowledge or cognitive skill are not needed. But during this early development, parents may need the help of individuals who appreciate the developmental needs of their very young children as they pass through different stages. What children in these early stages need is essentially nurturing, loving attention, protection, and appropriately stimulating experiences.

Inevitably, of course, as the child grows older and noncognitive development progresses, the relative amount of time devoted to noncognitive development will decline. In other words, as the child matures and becomes more secure, independent, and confident, the child's need for the nurture and care of a parent will become less and less. And as the child's higher brain develops, a greater proportion of the child's development will be cognitive. More and more of the child's development will involve learning and acquiring skills. Figure 5 below is a stylized representation of how the relative time spent in noncognitive versus cognitive development changes over time from birth to age 18. The relative amounts of time shown in the figure are not based on careful empirical research. The proportions are merely based on neuroscientists' generalized understanding of the developmental pattern. Note that Figure 5 is useful for helping one think about the relative importance of noncognitive and cognitive HC formation over the duration of childhood.

Figure 5

Children's Developmental Pattern Over Time



It should be noted that in addition to early childhood, there are certain other important times during an individual's lifespan when people typically make transitions from one stage of development to the next. One important example is the transition from middle childhood to adolescence (see, for example, Papalia, Olds, and Feldman 2009, chapter 11). It is not unusual for people to experience these transitions as difficult and stressful. So the smooth curve (Figure 5) representing the gradual decrease in the time spent on noncognitive development may be somewhat misleading. Perhaps it would be more realistic if the curve showed periodic upward bumps reflecting transitional periods (Duncan and Magnuson 2004, pp. 101-102). These are periods often involving crisis and personal upheaval as one attempts to make needed changes, typically reorganizing some of the psychological, social, emotional aspects of one's life. In many cases, people, often with a great amount of effort, successfully make the transition, moving on to the next stage of their life. But in other cases, people may get stuck or partially stuck in their present stage, and as a consequence of the developmental failure, certain life opportunities may be precluded. Persons in transitional periods are typically making substantial investments in noncognitive human capital, investments that sometimes require professional help such as from social workers or psychologists.[9]

13. Implications for Human Capital Strategy

The predominate HC strategy for addressing the failings of the U.S. educational system has been to attempt to improve kindergarten to 12th grade education by investing more resources and making quality improvements. This strategy is essentially focused on improving students' cognitive performance. Implicit in this strategy is the view that a society's educational failings are not related to its investments, or lack thereof, in noncognitive HC. The exclusion of the latter from HC strategy has presumably been done on the grounds that noncognitive development is perceived to be the responsibility of parents (with the assistance of a few noneducational entities). It follows that noncognitive HC investment need not be the concern of economists and

[9] According to Wilber (2001, p. 17), moving from lower to higher stages of development involves a "successive decrease in egocentrism" as the person's consciousness grows and becomes more aware of self and others. It is also true that "each stage of development brings not only new capacities but the possibility of new disasters; not just novel potentials but novel pathologies; new strengths, new diseases" (p. 22). Further, a person who gets "stuck", unable to negotiate the transition to the next higher stage, will remain more egocentric then if the transition had been successful (p. 22).

policymakers. Unfortunately, such a cognitively focused HC strategy takes for granted the capabilities of the children who enter the school system at about age five. That makes sense, of course, if the educational and cognitive development pathway is the only developmental pathway. However, if there are other important pathways, two as suggested in this paper, and if noncognitive development is a very important part of a child's development in both early and later years, then focusing all of society's HC resources on traditional K-12 cognitive education does not make sense. It is to the credit of developmentally oriented economists such as Duncan, Rolnick, and Heckman that they have recognized the importance of noncognitive investments during early childhood and have advocated a reordering of priorities in this respect. Now it is time to take a further step. We should recognize that a strategy consistent with a true developmental perspective should not only include investments in early childhood development, but should include investment in all the HC needed at all stages of the human lifecycle.[10]

The case, however, for a developmentally oriented HC strategy should not be made solely on the basis of the desirability of improving society's performance along the three developmental pathways. Another important consideration is dealing with the existence of a major social problem, i.e., worsening educational and economic inequality. It is widely recognized that during the last thirty years or so an increasing number of young American children are growing up in disadvantaged environments. Too many children are experiencing family break up and dysfunction, inadequate parenting, traumatic experiences, victimization by crime, and economic deprivation (Heckman and Masterov 2007). Further, many lower income families experience weak cultural support for child development and have little time and money to spend on enriching, stimulating activity. As a consequence, more and more of these disadvantaged children are entering school with relatively low endowments of HC. Not surprisingly, the result has been a very substantial increase in educational and income inequality (Tomer 2014). In the absence of the willingness to commit resources to deal with this social problem, it is likely that this social problem will only worsen. It should be noted that other important social problems

[10] According to the Harvard University Center on the Developing Child's website on the Science of Early Childhood, efforts to overcome the damage done by unresponsive childcare pay off by 1) creating a healthy next generation, 2) raising economic productivity, 3) improving citizenship, and 4) improving the parenting of the next generation. These are important reasons for establishing a developmentally oriented HC strategy that not only supports early childhood development efforts but supports noncognitive development occurring in later years.

such as substance abuse, criminal activity, and health problems such as obesity are also associated strongly with a society's HD deficiencies.

14. Conclusions

This paper has demonstrated how the concept of human capital can be integrated with the concept of human development. An important element in this integration is that there are a number of major parallel and interdependent pathways along which people develop. The three sided HD pyramid provides a representation of the three major developmental pathways. These three are: 1) educational and cognitive development, 2) psychosocial, biological development, and 3) brain development. This idea of multiple developmental pathways is in contrast with mainstream economics which in effect recognizes only the educational and cognitive development pathway. This paper provides explanations regarding the nature of the two noneducational kinds of development, how development along these paths may fail, and what kinds of intervention (investment in HC) might provide a remedy. One example is when a child's brain development fails in early childhood as a result of adverse childhood experiences. In this situation, the type of recommended intervention would depend on the individual circumstances, particularly on the severity of the child's experience. Further, in this situation as well as many others, a child's or an adult's development can get "stuck". Such developmental failures cry out for a remedy, typically some kind of intervention, likely involving an investment in HC enabling the person to develop successfully and move on to the next developmental stage.

It is important to note that the noncognitive HC formed through these interventions is as real and important as the cognitive HC formed through education in the sense that both generally add to the productivity of the economy and to improved behaviors and relationships in the noneconomic aspects of life. It follows that investments in noncognitive HC should be considered along with investments in standard HC when formulating the HC strategy for the economy. Because the U.S. and probably most other developed countries' HC strategies have failed in this respect, there is good reason to believe that advanced economies like the U.S. have underinvested in noncognitive HC. As a result, it seems likely that there are many noneducational investments that will yield a relatively high rate of return compared to more conventional investments. Arguably, integrating HC with HD should lead to more rational and efficient decision making

with respect to HC strategy as well as to decisions that are more caring for the less fortunate. Finally, the integration of HC and HD would seem to be an important step in making economics a more human and humanistic discipline, a discipline in which full human development and flourishing is the ultimate goal.

References

Alkire, Sabina. 2010. "Human Development: Definitions, Critiques and Related Concepts," Oxford Poverty and Human Development Initiative Working Paper No. 36, May 1.

Almlund, Mathilde; Duckworth, Angela L.; Heckman, James J.; and Kautz, Tim D. 2011. *Personality Psychology and Economics*, National Bureau of Economic Research Working Paper 16822, March.

Bornstein, David. 2013. "The Benefits of Positive Parenting," *New York Times*, February 20.

Cunha, Flavio and Heckman, James J. 2009. "The Economics and Psychology of Inequality and Human Development," *Journal of the European Economic Association*, 7(2-3), April-May, 320-364.

Duncan, Greg J. and Magnuson, Katherine. 2004. "Individual and Parent-Based Intervention Strategies for Promoting Human Capital and Positive Behavior," in Chase-Lansdale, P. L.; Kiernan, K.; and Friedman, R. J. Eds. *Human Development Across Lives and Generations: The Potential for Change*. Cambridge: Cambridge University Press.

Engle, P. L.; Black, M. M.; Behrman, J. R.; and Meena, C. 2007. "Child Development in Developing Countries: Strategies to Avoid the Loss of Developmental Potential in More Than 200 Million Children in the Developing World," *The Lancet*, 369, 9557, January 20-26, 229-242.

Felitti, Vincent J. et al. 1998. "Relationship of Childhood Abuse and household Dysfunction to Many of the Leading Causes of Death in Adults," *American Journal of Preventive Medicine*, 14(4), 245-258.

Ferguson, Eamonn, Heckman, James J., and Corr Philip. 2011. "Personality and Economics: Overview and Proposed Framework," *Personality and Individual Differences*, 51(3), 201-209.

Friedman, Andrew. 2013. "An Achievable Dream," *Tennis*, November/December, 23-27.

Goleman, Daniel. 1998. *Working with Emotional Intelligence*. New York: Bantam Books.

Goleman, Daniel. 2011. *The Brain and Emotional Intelligence: New Insights*. Northampton, MA: More Than Sound.

Heckman, James J. 1998. "What Should Be Our Human Capital Investment Policy?" *Fiscal Studies*, 19(2), May, 103-119.

Heckman, James J. 2007. "The Economics, Technology, and Neuroscience of Human Capability Formation," *Proceedings of the National Academy of Sciences*, 104(33), August 14, 13250-13255.

Heckman, James J. and Masterov, Dimitriy V. 2007. "The Productivity Argument for Investing in Young Children," *Review of Agricultural Economics*, 29(3), 446-493.

Heckman, J.J.; Moon, S. H.; Pinto, R.; Savelyev, P. A.; and Yavitz, A. 2010. "The Rate of Return to the HighScope Perry Preschool Program," *Journal of Public Economics*, 94, 114-128.

Heckman, James J. 2011. *Integrating Personality Psychology into Economics*. Institute for the Study of Labor (IZA) Discussion Paper 5950, August.

Heckman, James J. 2013. "Lifelines for Poor Children," *New York Times*, September 14.

Heckman, James J. and Kautz, Tim. 2013. *Fostering and Measuring Skills: Interventions That Improve Character and Cognition*. Human Capital and Economic Opportunity Working Paper No. 2013-019, November.

Kail, Robert V. and Cavanaugh, John C. 2007. *Human Development: A Life-Span View*. 4th Ed., Belmont, CA: Thomson.

Kahn, Jennifer. 2013. "Can Emotional Intelligence Be Taught?" *New York Times*, September 11.

Karr-Morse, Robin and Wiley, Meredith. 2012. *Scared Sick: The Role of Chokdhood Trauma in Adult Disease*. New York: Basic Books.

Knudsen, Eric I., Heckman, James J., Cameron, Judy L., and Shonkoff, Jack P. "Economic, Neurobiological, and Behavioral Perspectives on Building America's Future Workforce," *Proceedings of the National Academy of Sciences*, 103(27), July 5, 10155-10162.

Marshall, Alfred. 1961. *Principles of Economics*. 8th Edition, New York: Macmillan.

Maslow, Abraham. 1943. "A Theory of Human Motivation," *Psychological Review*, 50, 370-396.

Papalia, Diane E., Olds, Sally W., and Feldman, Ruth D. 2009. *Human Development*. 11th Ed., New York: McGraw Hill.

Perez-Pena, Richard and Rich, Motoko. 2014. "Push for Preschool Becomes a Bipartisan Cause Outside Washington," *New York Times*, February 3.

Perry, Bruce D. et al. 1995. "Childhood Trauma, the Neurobiology of Adaptation, and 'Use-dependent' Development of the Brain: How 'States' Become 'Traits'," *Infant Mental Health Journal*, 16(4), Winter, 271-290.

Perry, Bruce D. and Pollard, Ronnie. 1998. "Homeostasis, Stress, Trauma, and Adaptation: A Neurodevelopmental View of Childhood Trauma," *Child and Adolescent Psychiatric Clinics of North America*, 7(1), January, 33-51.

Perry, Bruce D. 2002. "Childhood Experience and the Expression of Genetic Potential: What Childhood Neglect Tells Us About Nature and Nurture," *Brain and Mind*, 3(1), April, 79-100.

Perry, Bruce D. and Szalavitz, Maia. 2006. *The Boy Who Was Raised as a Dog and Other Stories from a Child Psychiatrist's Notebook*. New York: Basic Books.

Pert, Candace B. 1997. *Molecules of Emotion: Why You Feel the Way You Feel*. New York: Scribner.

Roberts, Brent W. 2009. "Back to the Future: *Personality and Assessment* and Personality Development," *Journal of Research in Personality*, 43(2), 137-145.

Rolnick, Art and Grunewald, Rob. 2003. "Early Childhood Development: Economic Development with a High Public Return," *The Region*, 17(4) Supplement, December, 6-12.

Grunewald, Rob and Rolnick, Arthur. 2006. "A Proposal for Achieving High Returns on Early Childhood Development," Prepared for "Building the Economic Case for Investments in Preschool," A Conference Convened by the Committee for Economic Development in Washington, DC, March.

Smith, Adam. 1937. *An Inquiry into the Nature and Causes of the Wealth of Nations*. New York: Modern Library.

Sweetland, Scott R. 1996. "Human Capital Theory: Foundations of a Field of Inquiry," *Review of Educational Research*, 66(3), Fall, 341-359.

Tomer, John F. 2008. *Intangible Capital: Its Contribution to Economic Growth, Well-being and Rationality*. Cheltenham, UK: Edward Elgar.

Tomer, John F. 2014. "Adverse Childhood Experiences, Poverty, and Inequality: Toward an Understanding of the Connections and the Cures," *World Economic Review*, forthcoming 2014.

Tough, Paul. 2012. *How Children Succeed: Grit, Curiosity, and the Hidden Power of Character*. New York: Houghton Mifflin Harcourt.

Wilber, Ken. 2001. *A Theory of Everything: An Integral Vision for Business, Politics, Science, and Spirituality*. Boston: Shambhala.