The Difference That Differences Make: Adolescent Diversity and its Deregulation

by
Melvin D. Levine, M.D.

n and America's Future:
The William T. Grant Foundation
Commission on Work, Family and Citizenship

YOUTH AND AMERICA'S FUTURE:
THE WILLIAM T. GRANT FOUNDATION COMMISSION ON WORK, FAMILY AND CITIZENSHIP

When William Thomas Grant established the Grant Foundation in 1936, he sought a better understanding of the ways in which individuals adapt to the vicissitudes of life. Touched in his professional life by the importance of good human relationships, Mr. Grant wished to "help children develop what is in them" so they would better "enjoy all the good things the world has to offer them."

Fifty years later, recognizing the special needs of older adolescents in our changing society, the Foundation's Trustees established **Youth and America's Future** with much the same purpose; its charge is to evaluate current knowledge, stimulate new ideas, increase communication among researchers, practitioners and policymakers, and, thus, to help our nation chart a better future for youth.

The Foundation's President, Robert J. Haggerty, M.D., has described the Commission's unique perspective:

"Against a rising chorus of legitimate concern about the many problems facing today's youth, the Foundation has initiated this Commission on Youth and America's Future to speak in a different voice. It will explore the strengths of America's young men and women, their famlilies and the programs and community institutions that serve them. We adopt this approach not to diminish the importance of the problems that exist, but to learn the lessons of success. The Foundation is confident that this effort to look with renewed respect at youth, where it strides as well as where it stumbles, will help forge the links of understanding and mutual responsibility that make our democracy strong."

The publications in this series have been prepared to inform the Commission and to stimulate its thinking. While the Commission does not necessarily endorse the various findings presented, it does encourage their thoughtful consideration in the interests of American youth.

THE DIFFERENCE THAT DIFFERENCES MAKE: ADOLESCENT DIVERSITY AND ITS DEREGULATION

Melvin D. Levine, MD

This paper was prepared for the Commission by **Melvin D. Levine, MD**, Professor of Pediatrics, University of North Carolina, School of Medicine.

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EXECUTIVE SUMMARY

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The years from 16 to 21 constitute a critical transitional period in human development. Adolescents differ considerably in the extent to which they are able to meet the challenges of these years. Late adolescence is a period in which youngsters are rigorously judged by their society. Critical determinations are made regarding their futures. Meanwhile, every adolescent is delineating a self-image, seeking personal authenticity in ways that can have major impacts upon the assumption of a work role, the integration into a family, and the entry into true community citizenship. There are many adolescents who are simply unready for such commitments. Their lack of readiness has a major impact upon communities and upon the individual and his or her prospects for young adulthood.

At the same time that we are becoming increasingly aware of adolescent disengagement, we are learning more and more about the ways in which these young people differ from each other and, therefore, have unique requirements that may or may not be met by the resources we offer them. By understanding the sources and manifestations of variations among adolescents, it is likely that we can derive policy that is more flexible and therefore more likely to result in a higher yield of young adults who are ready for work, for family membership, and for citizenship.

It is critically important to understand the sources of variation among adolescents. As we scrutinize individuals in this age group, we discover a wide array of biological predispositions, cultural origins, family backgrounds, temperaments, and levels of physical health. Moreover, adolescents differ from each other with respect to the amount of success or gratification they have experienced during the first 16 years of their lives. Their prior educational exposures and cumulative track record influence self-esteem, motivation, and

ambition. Furthermore, different adolescents have been exposed to different types of role model at home, in the community, and in school. They vary in the critical life events they have experienced. Some have endured significant losses or other heavy life stresses, while others have been fortified in their development through a chain of nurturant experiences. By the time they reach late adolescence, youngsters may be laden with risk factors or relatively free from accumulated stresses. Those who are said to have "risk factor complexes," adolescents who have accumulated multiple forms of stress and disadvantage during their lifetimes, are unlikely to be "ready" for the challenges of this transitional period.

There are indications that the various sources of variation are mediated by a series of neurodevelopmental phenomena. That is to say, they appear to be certain fundamental neurologically-based functions that are strongly influenced by the sources of variation we have described. The neurodevelopmental functions include: selective attention; memory; language; simultaneous/sequential processing and production; higher order cognition; neuromotor function; and social skill. These functions are major determinants of academic success or failure at the same time that they create wide differences among adolescents. The differences are commonly misconstrued. Students who harbor circumscribed weaknesses in one or more of these basic functions may experience inordinate frustration in school which can lead to disenchantment, anxiety, and a range of maladaptive behaviors. Unrecognized neurodevelopmental problems are a major mediator of "unreadiness" for the challenges of adolescence. Those students whose neurodevelopmental profiles prevent them from meeting expectations in school and in the community frequently become disillusioned. They are likely to falter in their quests for meaningful roles in society. There is evidence that such patterns of mismatching to imposed expectations are extremely common and represent a major cause of adolescent maladjustment and role confusion.

Not all neurodevelopmental variations are handicaps. A jagged profile of

strengths and weaknesses may actually represent an individual's unique style or personal specialty. Such uniqueness only becomes a problem when it is stifled, deprived of opportunities to generate success, or negatively reinforced -- either implicity or explicity.

At the same time that we are recognizing the implications of adolescent diversity, there is, ironically, a strong thrust to generate policy based on assumptions of adolescent uniformity. This disparity is most certainly a barrier to role definition during adolescence. The educational system and society in general must acknowledge adolescent diversity, accommodate the phenomenon, and even celebrate it. There need to be educational opportunities that nurture a wide range of developmental profiles without creating a second-class citizenry. Policies should generate processes rather than serving as edicts. Such processes must take into consideration the individual needs of adolescents. For example, there are many 16 and 17 year-olds who will be irreversibly damaged if they are retained in a grade. The trauma to their self-esteem is likely to leave a disfiguring psychological scar, diminishing motivation and creating intense inclinations toward dissociation from society. If a particular state or school system enforces a rule stating that all students who fail competency testing must be retained in a grade, some adolescents will be seriously harmed. It is far more logical and humane to weight the particular effects of a particular adolescent through a well-designed process than it is to adhere to a hard and fast implacable regulation. Over the coming years, schools must adopt a more pluralistic view, one that is based upon a keener understanding of differences among adolescents. At the same time, policymakers have to recognize that the cultivation, rather than the denial, of such differences is utterly critical to the maintenance of a productive adult society composed of diversely talented collaborating citizens, each of whom offers a unique repertoire of products and services.

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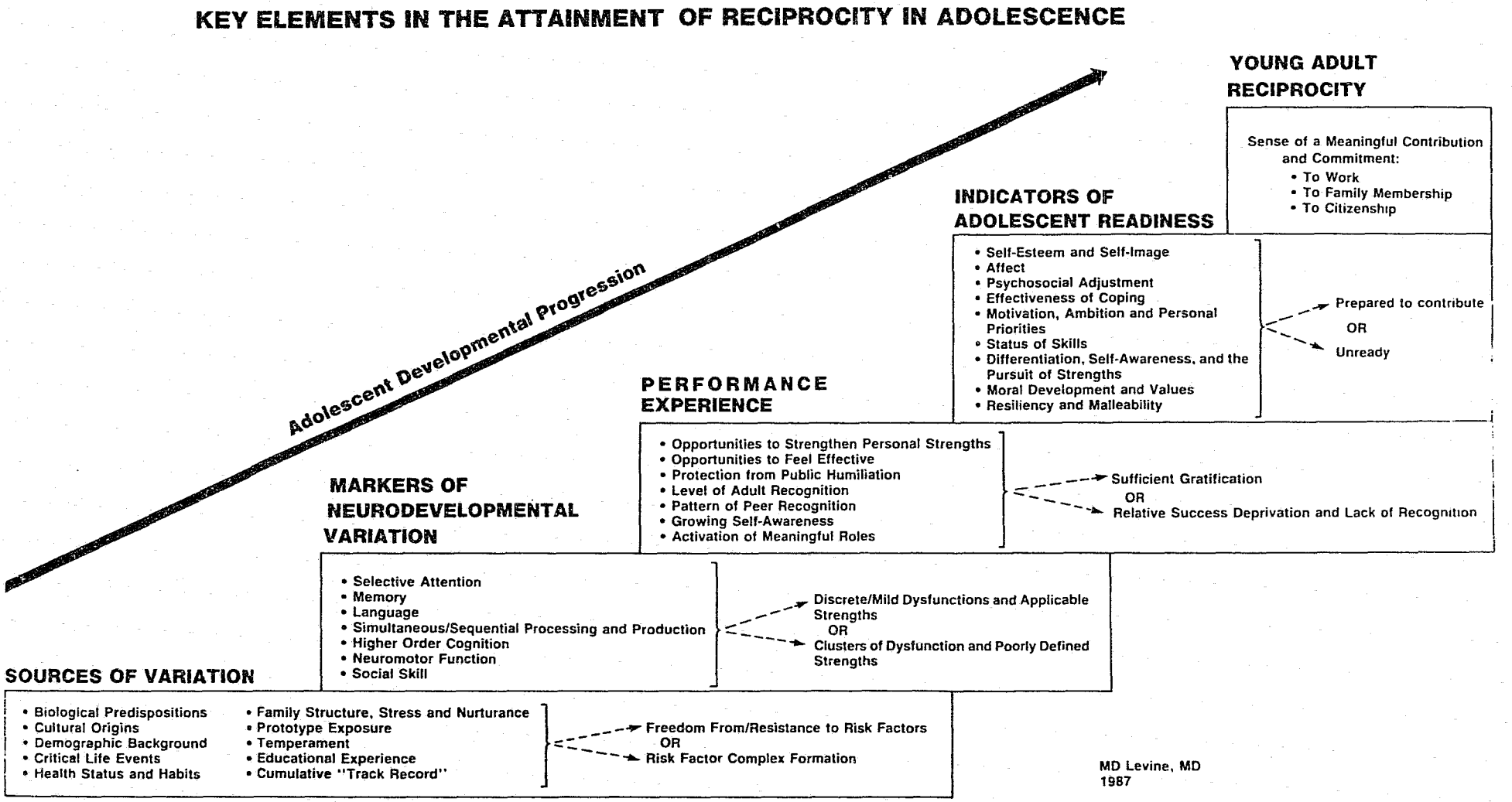
The years from 16 to 21 represent a pivotal transition in human development. This is a period of differentiaion, categorization, and self-declaration, a half decade during which a young person submits (often unwittingly) to a rigorous developmental audit--the results of which become strong determinants of his or her future work role, family integration, and community citizenship. The educational process during adolescence encompasses a system of implicit and explicit processes through which students are judged and classified (Gardner 1984). Young adults emerge from this period variably prepared and variably confident to discover a productive and satisfying adult identity. Such variation in outcome is not surprising in view of the maze of tortuous trails through which the developing child and early adolescent arrive at late adolescence. This report will focus upon that evolving individual and at least some of the critical determinants of outcome that facilitate or impede mastery and meaningful integration within the spheres of work, the family, and citizenship. It will examine adolescent diversity on multiple levels, including the sources of variation, the mediating influence of neurodevelopmental variation, the adolescent performance experience, and the ultimate elements of readiness for adulthood (Figure I). We will explore the broader implications of individual variation as they affect educational attainment, mental health, and the quality of adolescent life and as they relate to the formulation and justification of policy.

I. REGULATION AND INDIVIDUATION: THE DILEMMA

The years from 16 to 21 are a time for the activation of true reciprocity. The adolescent presumably has benefited from the relatively passive receipt of education, protection, and nurturance and is now developing an awareness of the need to contribute in order to continue to receive. In school and the workplace,

FIGURE I


KEY ELEMENTS IN THE ATTAINMENT OF RECIPROCITY IN ADOLESCENCE
Adolescent Developmental Progression
YOUNG ADULT RECIPROCITY
Sense of a Meaningful Contribution and Commitment:
• To Work
• To Family Membership
• To Citizenship
INDICATORS OF ADOLESCENT READINESS
• Self-Esteem and Self-Image
• Affect
• Psychosocial Adjustment
• Effectiveness of Coping
• Motivation, Ambition and Personal Priorities
• Status of Skills
• Differentiation, Self-Awareness, and the Pursuit of Strengths
• Moral Development and Values
• Resiliency and Malleability
Prepared to contribute
OR
Unready
PERFORMANCE EXPERIENCE
• Opportunities to Strengthen Personal Strengths
• Opportunities to Feel Effective
• Protection from Public Humiliation
• Level of Adult Recognition
• Pattern of Peer Recognition
• Growing Self-Awareness
• Activation of Meaningful Roles
Sufficient Gratification
OR
Relative Success Deprivation and Lack of Recognition
MARKERS OF NEURODEVELOPMENTAL VARIATION
• Selective Attention
• Memory
• Language
• Simultaneous/Sequential Processing and Production
• Higher Order Cognition
• Neuromotor Function
• Social Skill
Discrete/Mild Dysfunctions and Applicable Strengths
OR
Clusters of Dysfunction and Poorly Defined Strengths
SOURCES OF VARIATION
• Biological Predispositions
• Cultural Origins
• Demographic Background
• Critical Life Events
• Health Status and Habits
• Family Structure, Stress and Nurturance
• Prototype Exposure
• Temperament
• Educational Experience
• Cumulative "Track Record"
Freedom From/Resistance to Risk Factors
OR
Risk Factor Complex Formation
MD Levine, MD
1987

Caption for Figure I

This diagram depicts five levels that ultimately culminate in "Young Adult Reciprocity". At the bottom are the sources of variation, above which are the markers of neurodevelopmental variation. With these background variables and evolving abilities, adolescents undergo a series of performance experiences that may either negatively or positively influence their readiness for young adulthood. That readiness in turn makes them more or less eligible for the give and take rhythm of work, family membership, and citizenship. The sources of variation, the neurodevelopmental variations and the elements of readiness are expolored upon in this report.

this translates into a realization that personal effort and delay of gratification foster productivity and garner positive feedback. There is, as well, the realization that what parents have invested in childrearing will reap dividends in the form of personal accomplishments that bring pride to the family. The older adolescent comes to perceive that by contributing in a defined manner to the community, one becomes a true citizen thereof, a working part of a working ecology.

To be an active reciprocator, the adolescent must feel that he or she has something substantial and authentic to contribute. Fortunately, it is likely that all individuals have within them the potential to reciprocate for benefits within the family, the workplace, and the community. It is just as likely that the nature of that reciprocation, the exchange currency, varies markedly from individual to individual. At present, new knowledge regarding human development places us in a position to comprehend the elements and impacts of such variation more fully than was ever before possible.

Today there exists a silent tension between our deepening knowledge of the profound ways in which adolescents differ from one another and a progressive trend toward policies aimed at presumably homogeneous groups of adolescents. An underlying assumption of uniformity implies similarity of needs and likeness of best interests. As we shall attempt to show, this is a dangerous and misinformed trend. While many such policies appear to serve a social purpose, they often represent hazardous oversimplifications with respect to human diversity and the needs of the individual adolescent. Indeed, a tidy policy that works to the benefit of one particular 17 year-old and creates comfort and order for the community may be seriously detrimental to a peer of that 17 year-old. The following vignettes (based upon actual cases seen by the author), serve as concrete illustrations of the tension between individuation and regulation:

Vignette A

A 16 year-old girl in the tenth grade of a public high school was showing signs of increasing depression and anxiety related to her school performance. Throughout elementary and junior high school, she performed well academically, receiving A's and B's in her major subjects. However, in ninth grade she enrolled in a beginning French course which proved to be inordinately difficult for her. Somehow she could not keep pace with the memory demands imposed by the second language. Despite diligence, her performance was seriously marred. In fact, she was required to repeat French I during tenth grade. Little improvement was noted despite the efforts of a sympathetic teacher. At the end of tenth grade, having failed French, she arranged to take a Spanish course in eleventh grade which proved to be just as elusive for her. By January she was not only failing the Spanish course, but was foundering in other subjects as well. She had become increasingly exasperated, and her self esteem had declined precipitously. She expressed the desire to obtain a waiver from foreign language, but was told that she had to learn a language or she would not receive an acceptable recommendation for college. She became discouraged and depleted of academic motivation; she focused increasingly on her social life as a substitute for unattainable scholastic gratification. She also lost interest in her family, feeling somehow she could not live up to expectations and the levels of accomplishment of her parents and siblings.

Vignette B

A 17 year-old high school student from the inner city was suspended from the football team because of a low grade point average. This boy had always been struggling academically and only marginally succeeding. His learning problems were primarily the result of a significant language disability, a dysfunction that made it hard for him to grasp verbal explanations, comments, and directions. He was

markedly delayed in his reading comprehension and in his ability to express his thoughts in written language. Out of frustration, he was openly defiant and at times hostile toward his teachers. Since verbal facility is so critical for academic success in our culture, this boy was at a serious disadvantage in all of his classes. School was a site of perpetual humiliation. Meanwhile, it was assumed in school that his failures were the combined result of cultural deprivation and a behavior disorder. He lived in a 1 1/2 room tenement apartment with his mother and a maiden aunt both of whom were unemployed and had significant drinking problems. The neighborhood was marred by violence and heavy trafficking in drugs. The boy's only source of gratification was football; he displayed solid talent as a running half back. However, because of his poor grades, he was deprived of that sole source of personal gratification. It was assumed that because he could no longer play football, he would allocate more time to the pursuit of academic sufficiency. Instead, immediately after school he sought the company of other adolescents and young adults in his neighborhood who too felt disenfranchised. Over time, he became involved in drugs and participated in some delinquent acts. He dropped out of school at the beginning of twelfth grade.

Vignette C

A 16 year-old girl had always endured serious difficulty concentrating in school. Testing showed repeatedly that she was extremely bright, in fact "gifted". In her academic work, however, she was disorganized, easily distracted, fidgety, and highly impulsive. Despite these traits, her basic academic skills were on grade level. She exasperated her teachers because of her extreme inconsistency, her tendency to be forgetful, and her failure to submit assignments. This girl's father had exhibited very similar problems with attention and organization in school. In adult life, he developed incapacitating mental health problems, subsequently divorced his wife, and became unemployed. The girl herself had little insight into her own

problems. Her teachers failed to recognize and/or understand that she had a significant handicap with respect to attention and that it was, therefore, inordinately hard for her to concentrate on relevant details in school. Because her academic skills were intact, it was determined that she did not qualify for any special educational services. Her teachers frequently embarrassed her in class and were incessantly reminding her that she had "potential", that she could do better if she would only "apply herself". She was given her school's basic competency tests and failed, largely because she committed multiple careless errors and at one point overlooked the directions for a whole section of the examination. This was a typical occurrence. It was determined that the girl had to be retained in ninth grade which proved to be intensely humiliating for her, as she had to endure the jibes of peers and began believing that she was born to be a loser, that she had nothing to offer but her physical attraction to the opposite sex. Over time she seemed to exhaust all motivation to succeed, so she began to live in the present to seek immediate gratification instead of investing in the future. She became pregnant just before her seventeenth birthday.

Vignette D

A ninth grade boy simply did not possess the reading skills to keep pace with his classmates. He had been retained in fourth and again in seventh grade because of his lack of proficiency in basic skills. The boy himself found that he simply could not keep pace with the flow of expectations in school. He once commented that he could only do things well if he worked slowly and carefully, but that to "make it" in school you have to know how to think fast and to work fast. The boy was especially adept at working with his hands; he showed a superb mechanical aptitude. When it came to building and fixing things, he was well organized, resourceful, and systematic. On the other hand, his school work reflected a lack of caring and only minimal personal investment. The boy himself kept insisting that

he wanted very much to learn more about engines, that his interests and abilities ere in how things work, how they get built or fixed. He despised answering questions about stories and poems. He wanted to learn a trade. Unfortunately, he was living in a state that had just abolished vocational high schools and had decided instead to support technical training within the community college system. This act was justified by state legislators who felt that children should be learning "basic skills" in high school prior to branching out into trades. This particular boy became increasingly frustrated. School represented a daily embarrassment for him. He referred to himself as a "retard" and had a growing sense of helplessness. He dropped out of school at the end of ninth grade and was employed only intermittently over the subsequent several years. His family rejected him. In the community, he was perceived as a "loser", a kind of second class citizen. At the age of 21 he was without a job, rejected by this family, and functionally illiterate.

Vignette E

A 20 year-old boy dropped out of college toward the end of his sophomore year. He had always been a B and C student throughout his elementary and secondary school careers. This boy came from a rather ambitious family; his father owned a chain of convenience stores, and his mother was a real estate agent. Both parents had "come up the hard way". They were heavily preoccupied with their own careers. A younger sister was an outstanding student and athlete, and an older brother graduated near the top of his class in high school and performed extremely well in college and graduate school.

This boy was good with art work and enjoyed making designs for cars, but did not pursue his artistic proclivities at any point. He did not have any major problems with social interaction, academic performance, or behavior during adolescence; nor did he particularly distinguish himself in any area. He was always a passive participant in the education process. Throughout high school he held a

job after school, working in a fast food store where he earned money to buy and maintain a car. At the end of high school, he had no clear goals or ambitions. He applied to three colleges that were on a list provided by a guidance counselor. He was not sure he wanted to go to college. He thought about working for a while to earn more money and decide about future pursuits. However, in his family it was customary to attend college at age 17 or 18. All of his friends were going to college, so it seemed to be part of the "life cycle" in his community. He certainly did not want to be perceived as a "drifter". Nor did he want to disgrace his parents. The boy was bored during his freshman year at college. He received C's and D's in his courses and extracted no gratification from his studies. He was fairly popular and enjoyed drinking beer and partying. However, after his various "binges", he often had a shallow feeling. He commented at one point early in his sophomore year: "There's nothing I really believe in or respect. There's nothing special about me. I don't bother anyone else and I don't expect anyone else to hassle me." He facetiously referred to himself as a man without a country and felt he had little to contribute and wanted nothing in return. His alienation and disenchantment appeared to increase during his sophomore year. By the second semester, he had stopped studying and did poorly despite the fact that he had selected the easiest courses in the catalog. His father, sensing the decline, threatened to cut off all tuition payments unless he settled down and "produced". In April he quit school and started to work in a fast food store. He was asked if he wanted to be a candidate for store manager at one of the branches. He declined the offer.

These vignettes dramatize the conflict between individual needs and the uniformity imposed and presumed by regulation:

- The girl in Vignette A was required to study a foreign language despite a substantial foreign language disability, one that precluded mastery of that

subject area. By being constrained to pursue what was unobtainable for her, she became increasingly disillusioned. She never even understood the reasons for her failure. In this way a potentially good student was sacrificed, as a paralyzing surge of performance anxiety took hold. While it is useful to invoke foreign language requirements for all students, it may also be justifiable to consider those students for whom foreign language learning is likely to have deleterious effects.

- In Vignette B the high school athlete is deprived of his sole means of establishing personal efficacy and deriving gratification. Were there no alternatives? Perhaps that student could have been required to remain after school for an extra hour each day, missing 60 minutes of football practice rather than foregoing reciprocity and the chance of feeling good about himself. In all likelihood, peers and coaches would have rallied behind him to enable him to regain that extra hour of practice. Also, this boy was a victim of reductionist thinking that gives rise to the notion that if you are poor or if your behavior is a problem, you do not also have a learning disability; instead you are assigned to a single category.
- The girl (in Vignette C) who is retained in a grade and does not qualify for special services is also misunderstood by the community. Instead of appreciating her plight, the system somehow punishes her for her impairment and assumes that her "giftedness" means she has no valid reason to be failing in school.
- In Vignette D a boy's lamentations imply that he possesses a specialized brain, but is being forced to practice other peoples' specialties.
- Finally, in Vignette E a youngster has dropped out of college. He has never really differentiated himself. It is likely that there has never been

a systematic search for strengths. His embryonic artistic and design interests were neither noticed nor reinforced. Over the years, he was carried on the crests of various waves of conformity and somehow never emerged as an individual. He went to college when he may not have been ready for college simply because everyone else went to college at that age. He was never permitted to feel "hungry" for an education, to find a pathway that might be gratifying for him. Such a youngster might have benefited from guidance and advocacy to help him discover a life rhythm or pace as well as specific routes toward personal gratification. Ultimately, this youngster felt that he had nothing to contribute, that he could not in any way engage in reciprocity in the workplace, the community, or the family. He could form no commitments.

In each of these cases, an adolescent has been victimized by the assumption that what is good for most is good for all. The end result may be an individual who can neither see nor foresee a meaningful role in society because of a perceived lack of value. There is a sense of having little or nothing to contribute: reciprocity in the workplace, the family, and the community hardly looks feasible.

It is sometimes argued that the kinds of woes portrayed in these vignettes could be lessened if some students were classified as exceptional in some ways. The school and the community would be more tolerant and flexible if we identified an individual as being "an inner city kid" or "a handicapped student," or a "gifted underachiever." Such labels might then allow for a more sensitive approach. In fact, there has been widespread acknowledgment of the existence of special subgroups of children. The National Commission on Excellence in Education in its report A Nation at Risk stressed the importance of having states and localities "meet the needs of key groups of students such as the gifted and talented, socio-economically disadvantaged, minority and language minority students, and the

handicapped" (National Commission of Excellence in Education 1983). As we shall argue, even these groupings are dangerously global. Moreover, such classification systems frequently imply a kind of mutual exclusivity whereby a gifted student cannot be handicapped or an inner city student may not be perceived as "learning disabled". In addition the notion of key groups with special problems implies that so-called "normal kids" who fall outside of preset categories are neatly uniform in their needs.

The Vignettes portray rather dramatic prototypes. However, as we explore the multiple sources of variation, it becomes increasingly clear that every adolescent has some unique requirements, that all in one way or another are prone to being misinterpreted; thus, all are susceptible to the damaging effects of universally imposed expectations. In the section that follows, we will examine the sources of individual variation that generate a diverse pattern of needs within any population of adolescents.

II. Sources of Variation

There are many ways to conceptualize the multitude of influences that shape development prior to and during adolescence. The relative impacts of nature and nurture, for example, have been a subject of debate within and between disciplines for centuries (Kessen and Scott 1983). In recent years, there has been widespread recognition of the need for a multifactorial approach to the understanding of the developing human being. Research studies have demonstrated clearly that no one influence can account for a very large percentage of the variance (Gallagher and Ramey 1987). We have come to recognize that a complicated matrix of factors interact and transact over time to create variability within a community. Eleven such sources will be reviewed below:

- Biological Predispositions - This source comes closest to representing the "nature" side of the "nature-nurture" duality. A young person's genetic

endowment exerts a critical influence upon learning, behavior, socialization, life adjustment, and personal interests. Many of the common neurodevelopmental dysfunctions (Part III) that impair adolescent performance in school arise from a potent genetic predisposition (Owen 1978). Reading disabilities, attention deficits, and adolescent depression are examples of disorders that are often (but by no means always) associated with family histories suggestive of inherited patterns of dysfunction. Chromosomal disorders (such as the recently recognized Fragile X Syndrome) similarly predispose to certain kinds of academic underachievement (Pennington et al 1982). In some instances, delinquency and other forms of behavioral maladaptation may be linked to abnormal chromosomes (Offord and Waters 1983). On the positive side, there exist endogenous predispositions to talents in specific domains. Thus, a youngster may inherit an aptitude for mathematics, for music, or for spatial/mechanical insight. Health stresses occurring during pregnancy, delivery, and the newborn period may induce biological variation, as may nutritional effects. As with other sources of variation, biological factors react over time with environmental events and circumstances which may either mitigate or exaggerate their effects. It has been demonstrated, for example, that prematurity by itself does not seem to have a major deterrent effect upon development. However, when premature infants grow up in economically deprived circumstances, these dual "risk factors" are far more likely to impede development and learning (Werner, Bierman and French 1971).

- Cultural Origins - Within a broad population of 16 to 21 year-olds, there are apt to be wide differences in cultural traditions associated with racial diversity, contrasting ethnic origins, or varied linguistic preferences

(Harrington 1982). However, even within groups, there is likely to be substantial cultural variation including wide differences in the extent to which families are influenced by their geographic origins, religious backgrounds, and the traditions and values of grandparents.

- Demographic Backgrounds - Major influences on values and abilities stem from demography. Youths who grew up on farms differ drastically in their skills, interests, and priorities from inner city or suburban adolescents. Moreover, there are powerful socio-economic effects on school performance, scores on standardized tests, and behavioral adjustment (Schorr 1983). While affluence has its unique problems, poverty is decidedly more likely to be associated with school dropout, adolescent pregnancy, and delinquency.
- Sociocultural Milieux - The behavior attitudes and, to some extent, the abilities of adolescents reflect distinct cultural overtones unique to the time and place in which they live. For example, contemporary adolescents are likely to have been influenced significantly by the pervasive impacts of television (Schorr 1983). There has been widespread concern about repeated exposure to violent themes on television. In addition, there are thought to be possible negative influences upon cognition or thought processes. Television offers very small chunks of information with little requirement for sustained attention to detail, effective use of memory, and systematic problem solving. In addition, television conveys immediate gratification, the opportunity to derive pleasure and even meaning without cognitive exertion or attentional expenditure. Contemporary music is another example of a possible negative influence. Much of the music that children and adolescents enjoy emphasizes redundancy, very brief melodic lines, with little

requirement for sustained attention, reflection, or active memory. Many adolescents hold jobs after school. Such pursuits occupy an inordinately large amount of time for some. There is a conspicuous deficiency of stimulation and educational value inherent in delivering pizzas, bagging at a supermarket, or depressing the pictorial keys of a cash register at a fast food restaurant. The latter keyboard does not even contain numbers; it generally depicts the actual hamburger variations or fried chicken parts that are being sought. The device also calculates the price and the amount of change to be returned to the customer, thereby purging the experience of any cognitive strain. Thus, some of the abilities of contemporary youths may be shaped (or misshaped) by experiences that are repetitive, intellectually understimulating, and wasteful of substantial potentially enriching hours. Many students work to buy a car or to obtain other prestigious goods; such acquisitions become obsessional foci. They also serve to reinforce the notion that the end justifies the means, that a particular experience can be devoid intellectually as long as it leads to some gain in social status or growth in the material arsenal. One might speculate that such a view could engender considerable job dissatisfaction and a failure of focused interest in subsequent years. Thus, any analysis of individual variation must take into account the extent to which contemporary adolescents are immersed in and developmentally stunted by lean experiential contexts.

- Critical Life Events - Unforeseen traumatic circumstances can mar the life adjustment of an adolescent. Major incidents, such as the loss of a close friend or relative, a serious illness in the family, the experience of abuse, or a prolonged separation may serve as a deterrent to optimal development (Bowlby 1980). Not all critical life events are acute;

festering turmoil at home may gradually erode behavior and learning. Critical life events can also constitute facilitators of development. A child or adolescent may be exposed fortuitously to a person or a pursuit with whom or with which he or she somehow resonates. This then triggers the emergence of a talent or interest which becomes a critical biographical turning point.

- Health Status or Habits - Physical health relates closely to function. Chronic illness may alter an adolescent's body image at the same time that excessive school absenteeism takes its toll on academic performance and socialization (Blum 1988). Substance abuse is a health habit that has been demonstrated to impair behavior and learning in adolescence (Haas 1987). In particular, there is a strong negative effect of narcotic drugs on the functions of attention and memory (Schwartz 1987). Some medications taken for therapeutic purposes can also alter development. Certain drugs commonly used to control bronchial asthma, for example, are thought to weaken the selective attention of students in the classroom (Rachelefsky et al 1986).

- Family Structure, Stress, and Nurturance - The stability of the family is likely to influence multiple components of adolescent performance (Hetherington 1988). Sizeable numbers of high school students are members of families in which there has been a divorce or in which a permanent separation is incipient or in progress. Others, on the other hand, find considerable security and insulation from stress in knowing that their families are likely to remain intact and accessible for ongoing support and as an audience before which one can display and obtain credit for accomplishments and attributes. Recently, there has been considerable interest in the "latchkey child", the youngster who finds no

one at home upon returning from school. This phenomenon might be thought of as less problematic in adolescence than it is in earlier childhood. However, older teenagers frequently lament that their parents seem to have no time for them. There may be a feeling that they have been abandoned or that their mothers and fathers are heavily preoccupied with their own careers and personal priorities. Students in high school may be harboring burdensome preoccupations with family matters. Financial woes, marital infidelity, sibling rivalry, and other home-based stresses may weigh heavily upon the consciousness of a student. In some cases, such preoccupations drain attention from school work and make a student appear disengaged or unmotivated.

- Prototype Exposure - As children progress through their elementary and junior high school years, they are exposed to a succession of potential human models for emulation. The latter may include relatives, friends, teachers, or celebrities. Some experimentation with the modeling of behaviors, tastes, and values is a universal occurrence. The extent to which an adolescent identifies and imitates the desirable (or undesirable) features of prototypes becomes a visible source of variation.
- Temperament - In recent years, there has been a body of research on the subject of temperament or behavioral style. It has been shown that even young infants exhibit individual characteristics, patterns of acting and reacting that are likely to differentiate them from other babies (Thomas and Chess 1977). Some infants are "slow to warm up", while others quickly become engaged in activities and social interactions. Some are characterized as "difficult babies", while others are "easy". There is now evidence that temperamental characteristics persist throughout the school years and into adolescence (Carey and Earls 1988). Even within families,

there can be vivid contrasts in the temperamental qualities of brothers and sisters. Temperament may exert a profound influence on adjustment in school, integration within a family, and output on the job.

- Educational Experience - By late adolescence, youngsters are likely to manifest the effects of their considerable individual variation with respect to the quality and ambiance of antecedent educational experience (Rutter 1979). Some students may have enjoyed the initiatives of caring and stimulating teachers, while others failed to encounter or experience the exhilaration of such inspired learning. Some may have languished in school systems where resources were inadequate, law and order being the highest priority, and where there was little if any remedial help available for problematic learning. Others may have come through highly supportive educational experiences marked by creative teaching, remediation where needed, individual recognition, and mutual respect on the part of students and teachers.
- Prior "Track Record" - Adolescents enter the 16 to 21 year-old age bracket with a track record of prior triumphs and setbacks. Those who have experienced excessive frustration, embarrassment, and failure are often found to be chronically success-deprived. Such students are acutely at risk for motivational depletion in adolescence. Those who have never really tasted mastery in any knowledge or skill domain may be hard to teach and hard to reach during high school. Gaps in their skills are likely to widen progressively and exert a lasting impact on future accomplishments (Taggart 1987). A lack of academic skills has been shown to culminate in a range of social problems and subsequent failures. Affected adolescents are prone to trouble finding a suitable niche in the job market. On the other hand, students who have received

sufficient reinforcement for their efforts, those who have savored mastery, are likely to be determined, planful, and sufficiently optimistic in their quests for further success.

As youngsters proceed into late adolescence and early adulthood, they compact their varied patterns of advantage and disadvantage emanating from the 11 sources of variation we have enumerated. Some unfortunate students are multiply vulnerable. In a study we performed at The Children's Hospital in Boston, we evaluated consecutively incarcerated adolescent delinquents and compared them to a control group of similar age who were not in trouble with the law (Levine et al 1985). We studied the ways in which the two groups were "at risk" from various standpoints. It was found that adolescents in the control group commonly had one or two risk factors. Some of the controls came from divorced families, but were doing well nevertheless. Others had experienced a considerable amount of academic failure but did not become delinquent. In contrast, it was discovered that the adolescent delinquent population tended to accumulate multiple sources of risk (such as in Vignette B). The same youngster might be a victim of poverty, academic failure, family disruption, health problems, and the absence of positive role models. These multiply vulnerable adolescents were characterized as harboring "risk factor complexes". That is, they were contending with clusters of reasons for failure, such that the burden was too great, their intrinsic resiliency or self-righting ability (see page 67) had been exceeded. Thus, it would appear that most adolescents are at risk in one way or another but that those who have had the misfortune of accumulating a cluster of risks are especially predisposed to maladaptation and failure at an early age.

Undoubtedly, there exist other sources of variation relevant to performance and adjustment between the years of 16 and 21. However, those delineated above have been most extensively studied. These sources of variation exert their

influence in part through important yet readily overlooked mediators of variation or basic capacities called neurodevelopmental functions which, in themselves, comprise essential markers of variation and differentiation. In Part III we will examine the spectrum of these neurodevelopmental functions and their implications for understanding the diverse qualities and needs of adolescents.

III. Neurodevelopmental Variation In Adolescence

Over the last several decades, professionals from a wide range of disciplines have been involved in defining and understanding the so-called low severity-high prevalence disabilities that quietly take their toll upon academic performance and self-esteem among students of all ages (Levine 1987). These disabilities are considered low in severity because they are not as crippling as mental retardation or related severe handicapping conditions. They are said to be of high prevalence because they are found in large numbers of students (estimates vary from 3 to 20% depending upon definitions and line drawing standards). These often subtle disabilities consist of relative weaknesses in fundamental abilities (so-called neurodevelopmental functions); language, memory, attention, and motor coordination are examples of these capacities. Adolescents with disappointing school performance are apt to harbor clusters of impaired neurodevelopmental functions which together are sufficient to impede learning and reduce academic productivity. The deficits have been referred to as "specific learning disabilities". However, on close scrutiny, it becomes apparent that the low severity disabilities are more than just a clinical condition affecting a limited number of students. In fact, they have a much broader relevance and are especially insidious and compelling (although relatively neglected) during adolescence. The key neurodevelopmental functions (and dysfunctions) are described below:

Selective Attention

The capacity to concentrate selectively with sufficient intensity and duration is

critical for a successful school experience and ultimately for fulfillment in the workplace. Problems with attention are unquestionably the most prevalent neurodevelopmental causes of persistent academic underachievement (Levine, Busch, and Aufesseser 1982). Affected students show a cavernous gap between what appears to be their innate ability and what turns out to be their day to day performance levels in school. Attentional problems are characterized by a tendency to keep focusing on the wrong stimuli (Levine 1987). Students with blatant attention deficits tend to be highly distractible. They are prone to daydreaming and they are visually impulsive as they pursue tasks frenetically and with insufficient planning. They have trouble regulating their tempo, often rushing through important operations and committing numerous careless errors in route. In addition, they fail to engage in self-monitoring; there seems to be little quality control of their work; and they tend not to sense when they are going astray or making mistakes.

During the years from 16 to 21 attention deficits can be insidious in their manifestations (Coleman and Levine, In Press). In fact, it was once thought that such disorders abated at puberty. It is now widely recognized among professionals that attentional problems persist, sometimes originate, and frequently worsen during the adolescent years. In many instances, younger children with attentional problems are overactive; such overactivity is not as common among adolescents with attentional difficulties. Instead, they tend to show other traits, such as an inability to focus on relevant deta respects. Performance inconsistency is a particularly common and misunderstood manifestation of attentional difficulty during adolescence. Affected students seem to tune in and out capriciously. They have good hours, good days, or even good weeks or months, but then lose their ability to remain focused and suddenly demonstrate inadequate performance for no apparent reason. Their erratic quiz scores in high school may be indicative of such

inconsistency as they gyrate up and down the grading scale from 90 to 40 to 86 to 38 to 89! Such inconsistency very often leads to accusations of not really trying or of poor motivation. In reality, the student has no idea why he or she exhibits such wide shifts in the quality of performance (as in Vignette C). Sometimes the accusations and embarrassment have a more malignant effect than the performance inconsistency itself.

It should be stressed that all students are struggling with selective attention. The ever present possibility of cognitive fatigue is a powerful threat to mastery in any domain of work. For some, however, the neurodevelopmental function of attention is especially brittle, unusually susceptible to distraction and stress. Many such students can concentrate effectively but only when the motivational lure of what they are focusing upon is intense. For example, a particular teenager may have no trouble whatsoever concentrating on fixing a motorcycle, but that very same student experiences focal diffusion when trying to listen in social studies class. For that youngster, the stimuli emanating from a carburetor are far more romantic and attractive of attention than those deriving from the teacher's wisdom and insight. Thus, an important capacity involves the ability to focus effectively on moderate motivational level detail as opposed to having an attentional mechanism that can only be responsive under the most alluring conditions.

Problems with attention have been shown to have an enormous impact upon early adulthood (Weiss et al. 1979). It has been revealed through longitudinal studies that youngsters with attentional weaknesses are predisposed to delinquency, mental health problems, school dropout, substance abuse, and automobile accidents. Thus, the stakes are high. Yet, attention deficits can elude interpretation by the adult world. This is because their manifestations are often subtle in this age group. Furthermore, some students who have had chronic difficulty concentrating develop secondary behavioral manifestations that conceal attention deficits and

betray their underlying feelings of inadequacy and guilt. Thus, attentional dysfunction in late adolescence may reveal itself embedded within a behavior problem in a highly controlling, "macho" youth who is confused, anxious, and uninformed of his own dysfunctional "wiring".

During late adolescence, many students with attention deficits experience serious difficulty organizing their lives. They are chronically restless and difficult to satisfy. They seem to have trouble "settling down". If they graduate from high school, they are susceptible to transitional turmoil. It is not uncommon for such students to drop out of college, to hold a succession of jobs, and to keep looking ahead rather than functioning effectively in the present. For many such students, it is inappropriate that they attend college immediately following high school. They are likely to need more years to "ripen", to discover a pathway that feels feasible and potentially rewarding. Premature entry into higher education invites disaster; the affected adolescent is likely to accumulate an ever more extensive track record of repeated failure and turbulent disappointment. The latter, in turn, can culminate in growing alienation from the family as that youngster feels that he or she has no real contribution to make, a sense that is often associated with a form of hedonism, a life dedicated to instant gratification, the impulse-driven satisfaction of appetites. Yet, there is hope. It is not difficult to extrapolate from the traits of attention deficit to a construct in which restlessness and insatiability during adolescence mutate into ambition and a heightened drive toward accomplishment in later life. Distractibility may predispose to creativity; those individuals with a "wide angle" view of the world have the potential to discern or create novel environmental interrelationships that would elude more disciplined minds.

Memory

The efficient utilization of memory is critical for learning and productivity in secondary school (Levine and Zallen 1984). Unprecedented strains are imposed upon

memory in many academic content areas. Such strains are a temporary phenomenon since virtually no adult careers necessitate such a high degree of mnemonic efficiency. Most jobs are relatively routinized, limited to a circumscribed area of knowledge or expertise. In secondary school, new subject matter is introduced in an endless wave that ripples across diverse content areas. There are resultant casualties - potentially competent individuals whose capacities for reasoning and creativity far exceed the rate and precision of their recall. To understand their plight, it will be helpful to make note of the following strenuous demands imposed upon memory during high school:

- There is a progressively growing requirement for rapid retrieval memory. In the early grades of school, the emphasis is on associative and recognition memory. The former entails encountering a particular stimulus (such as a written word) and associating it with another stimulus (such as a meaning or pronunciation). Recognition memory entails simply the sense that one is encountering information or skill to which one has been exposed previously. These rather discrete mnemonic demands are replaced in junior high school and beyond by a growing need for retrieval memory, for the recall of entire configurations of data with relatively little cueing. What's more, students are expected to engage in very rapid, precise, and simultaneous retrieval memory. For example, when composing a book report, a student must synchronously retrieve letter formations, correct spellings, appropriate vocabulary, rules of grammar, regularities of punctuation and capitalization, needed facts, and the flow of his or her own ideas.
- Secondary education imposes heavy demands upon active working memory which consists of the ability to sustain in mind one part of a task while completing some other aspect of that same task, then returning to the

first part. This is particularly germane during mathematical computations (Steeves 1983). While carrying a particular digit, the student must be able to remember what it is that he or she intended to do once that component of the operation was achieved. In foreign language acquisition, it is essential to recall a vocabulary word without forgetting the sentence of which it was to be a part!

- During high school there is a steady demand for cumulative memory. In subject areas such as chemistry, foreign language, and much of mathematics, there evolves a hierarchy of knowledge development. Therefore, it is critical in March that one recall what was learned in October. Other courses (such as social studies and English) tend to be discontinuous. Therefore, cumulative recall is not as germane.
- An increasingly significant proportion of skill and knowledge needs to become automatized during adolescence. A student must be able to recall a growing body of factual data and/or skill with only minimal conscious effort. Such well automatized memory is essential for writing and for mathematics. In order for a student to be able to write and think at the same time, letter formation, spelling, and at least some of the ideation must be highly automatic; if it is not, if too much effort and attentional reserve is expended to recall the mechanical aspects of such a task, the ideational content is likely to be seriously compromised.
- Students in high school are expected to display remarkable virtuosity of memory. Highly specific memory formats all need to become automatized. Such capacities as factual memory, rapid word finding, revisualization (visual memory - probably very important for spelling), and motor memory (needed to recall procedures) are indispensable if one is to harvest the plaudits of teachers.

A low severity dysfunctions constrain the effectiveness of memory during high school. These conditions frequently go unrecognized and are very likely to pass through the sieves of traditional diagnostic testing for students with academic difficulties. Many students simply cannot keep pace with the demands for retrieval memory (Levine 1987; Levine and Zallen 1984). They have difficulty recalling highly specific data or previously gained skills at a rapid enough rate. Some have trouble with the requirement for simultaneous retrieval; their minds simply balk at recalling several different memory traces at the same time. Some students much prefer divergent to convergent recall. Such youngsters are adept at discussing and thinking about what they can remember. Thus, they may be highly creative and scintillating participants in class discussions. On the other hand, they are inept at taking tests or coming up with responses to questions that have only one correct answer. The latter places a strain on convergent recall, a function that entails the retrieval of highly specific data from memory. Affected students fare much better in courses that offer some latitude of acceptable responses to questions. Thus, they tend to be much more comfortable and successful with literary interpretation than with mathematics or certain science classes.

Still other students have difficulty with active working memory; they appear to have limited working space in memory. When they think about or work on one aspect of a problem, they frequently lose the remainder of it. This dysfunction can be especially unsettling and is frequently associated with extreme test-taking anxiety.

Other students grapple in vain with the cumulative load on memory. Their performance tends to decline in the second half of each academic year, as cumulative long term recall is increasingly tapped.

Finally, students may have memory problems confined to one sensory modality. Some have difficulty retrieving precise language. Vocabulary acquisition, the recall

of details in a story, and the mastery of a second language may be especially elusive to them. Other possibilities include visual memory problems, inability to recall sequences of information, or deficiencies of motor memory.

It should be reiterated that such maladaptive memory patterns can seriously disrupt the high school education of an adolescent who may be articulate, creative, and talented in certain domains. Since memory occupies such a central position in content area learning during high school, the student commonly manifests widespread failure and endures a relentless barrage of criticism.

Language

In our society secondary education rewards linguistically proficient students. The language demands imposed by school are as formidable as the memory strain. Beginning in their early elementary school careers, students discover the striking differences between language at home and the literate language structure of formal education (Westby 1984). The former is likely to be more redundant and related to familiar contexts, the latter more densely permeated with ideas, events removed from direct experience, abstraction, and sophisticated syntax. Over time, there is a steadily growing need to comply with complex verbal directions and to interpret lengthy explanations. Such receptive language demands are paralleled by intensified requirements for sophisticated and fluent expression. Students must become quick at finding words and constructing sentences to convey their own ideas. They must be able to incorporate thoughts into speech with relative ease, precision, and speed in order to respond to questions and participate actively in the learning process. A lack of such participation is commonly interpreted by teachers as a sign of low motivation, disinterest, or an overall lack of ability.

Many specific academic skills are based upon language facility (Wiig and Semel 1984). Reading is the most notable example. Lucid oral comprehension is a prime requisite for the derivation of meaning through reading. Students must decode

lengthy passages while ferreting out main ideas and relevant supporting details. They must be able to summarize what they have read orally or in writing. Furthermore, they need to be skilled at varying the style of their reading from skimming and scanning, to looking up a fact, to reading deliberatively in ideationally dense science texts (Chall 1983). Secondary school students must become increasingly facile with abstract language, metaphor, simile, and other symbolic representations. A student's own written language is of equal importance. Good verbal expressive abilities are among the prerequisites for organized written narrative. Linguistic facility is also tapped in other academic contexts, such as for the solution of word problems in mathematics, the acquisition of a foreign language, and the mastery of political and economic concepts in a social studies class.

It is not surprising that language dysfunctions insinuate themselves prominently on a high school student's report card. Among the many symptoms of such disorders are diminished vocabulary, difficulty understanding syntax or word order, trouble processing language quickly enough to keep pace with demands, and dysfluencies or impediments of expressive language (Wiig and Semel 1975). Affected students may live in constant fear of being called upon in class. Often they feel exhausted, depleted of attentional strength, and acutely anxious as they strain throughout the school day to process and produce language. All too often their disabilities remain undetected in high school partly because systematic language evaluations are seldom performed in this age group but also because of a strong tendency on the part of adults to blame poor motivation, lassitude, or emotional turmoil. Many language disabled students are remarkably keen in their non-linguistic thinking (as in Vignette D). However, opportunities to deploy such non-verbal conceptual skills may be severely constricted and only minimally valued during high school.

The impacts of language disabilities are sometimes catastrophic. In one study,

severe language weaknesses were uncovered in 30% of adolescent juvenile delinquents (Karniski et al 1982). Language disorders may easily predispose to repeated academic failure and disillusionment with subsequent dropout. The combination of an undiagnosed language disability with restricted educational opportunity is likely to be a common pathway culminating in adult illiteracy. Of interest is the fact that most students with language-related disorders have no idea why they are failing. Instead, they are likely to perceive themselves as pervasively defective, just plain "dumb".

Simultaneous and Sequential Processing and Production

Much of the information that enters our central nervous systems for processing is arranged either in a distinct meaningful sequence or in a simultaneous array (i.e. configuration or "Gestalt"). Similarly, our own productions in school and in the workplace often take the form of either sequences or simultaneous patterns. The flow of ideas in a narrative and the steps in a geometric proof are examples of sequentially arranged products. That is, the serial order of their contained elements is absolutely essential to their overall meaning. On the other hand, a painting, an architect's blueprints, and a topographical map are products that entail simultaneous rather than sequential elements. The capacity to appreciate, assimilate, store, and make use of sequences and simultaneous material represents another important parameter of neurodevelopmental variability (Das, Kirby, and Jarman 1979).

Some students experience significant difficulties with sequential organization. They have a relatively poor sense of time and sequence rendering it hard for them to organize narrative in writing, arrange the steps for a geometric proof, or carry out a series of instructions in class. Some also have difficulty using time and sequence effectively for planning. They may be poor at allocating time and staging long term assignments. On the other hand, there are students for whom sequential organization is a strength. They are particularly well oriented in time. They

appear to have no difficulty arranging their ideas in the most meaningful sequences or retaining information in its essential serial order.

Most relevant simultaneous processing appears to involve the visual/spatial world. A student with keen visual simultaneous processing is likely to have a heightened awareness of directionality, relative position, three dimensionality, shape, and form constancy. Such a solid sense of simultaneous arrangement may be associated with mechanical aptitude, an impressive ability to understand how things work, an uncanny capacity to troubleshoot, and a nearly intuitive sense of construction. Superior awareness of spatial entities and their interrelationships may be associated with artistic ability. Relatively weak simultaneous processing can result in mechanical ineptitude, problems with mathematical reasoning, or weak comprehension of certain scientific abstract concepts.

Most simultaneous processing takes place within the right hemisphere of the brain, while sequential organization and language are largely housed in the left hemisphere. Therefore, it is not surprising that some youngsters are adept in visual/spatial and mechanical pursuits, but falter repeatedly with sequences and language. The latter, for better or for worse, are of the utmost importance for academic success in high school. Throughout secondary education and into college, lecture formats, expository writing, textbooks, outlines, and many mathematical processes entail a blending of sequential organization and language, deficiencies of which are likely to predispose to academic failure and disenchantment. Ironically, there exist at all economic levels a plethora of adult occupations that require little or no sequential organization and linguistic sophistication. The sequences and language in an adult career are apt to be predictable and redundant over time, so that ultimately they can be mastered. In high school, on the other hand, there is the relentless introduction of novel sequences and fresh linguistic frames of reference. Thus, the expectation for effective sequencing and language function

constitutes a somewhat temporary yet potentially demoralizing hurdle for adolescents.

Higher Order Cognition

Higher order cognition comprises conceptual skills and reasoning or problem solving abilities (Ault 1983). Higher order cognition probably comes closest to what most people mean by "intelligence" and is often difficult to separate clearly from other developmental functions. For example, there is an intimate connection between higher cognition and memory; it is obviously difficult to reason if one cannot recall the relevant information to reason with!

The adolescent must confront a progressively growing demand for abstract reasoning (Sternberg and Downing 1982). Thinking about symbolic representations of reality is a recurring theme throughout his or her secondary educational experience. The effective use of algebraic equations, the consideration of various abstract social and historical concepts (such as justice, balance of power, and liberalism) in social studies, and the interpretation of literary metaphors are prime examples of the need to manipulate abstract concepts. During a period that the French psychologist Piaget called "formal operations", adolescents are said to become particularly adept at flexible abstract reasoning (Piaget and Inhelder 1968).

In recent years, it has become increasingly evident that there are multiple variations on the themes of higher order cognitive ability. Careful scrutiny of diverse reasoning styles forces us to take a long and cautious pause before we sort students into categories of high ability or low ability. Instead, if we are compelled to sort at all, we are compelled to reckon with kinds of abilities rather than just levels of abilities. For example, some students are especially proficient at verbal reasoning. They conduct much of their thinking in a language medium; it is difficult for some of them to understand and manipulate ideas unless they are encoded linguistically. On the other hand, many adolescents excel at nonverbal

thinking and are excellent at problem solving without the imposition of language. Such a reasoning style might be well suited to a career in engineering, architecture, interior design, mechanical repair work, or furniture making. It is unlikely that an individual who relies mainly on nonverbal reasoning would feel comfortable as a literary critic, a journalist, or a student in a poetry course.

Distinct patterns of higher order cognition, often conspicuous for the first time during adolescence, ultimately evolve into an essential and remarkable ecological system, allowing for complementarity and collaboration in the ecology of the adult work world. The psychologist Howard Gardner has elucidated six different kinds of intelligence, including linguistic intelligence, musical intelligence, logical-mathematical intelligence, spatial intelligence, bodily-kinesthetic intelligence, and personal intelligence (Gardner 1983). In his "theory of multiple intelligences," Gardner asserts that individuals display distinctive profiles of strength and weakness in these particular domains. It is of interest that school rewards mainly logical-mathematical intelligence and linguistic intelligence. A student can be remarkably talented in one of the other domains and be relatively deprived of recognition and reinforcement.

Another perception of intellectual style has been advanced by Sternberg. He and his colleagues describe a "triarchic theory of human intelligence" in which three basic forms of ability vary considerably from person to person (Sternberg 1985). The first of these, componential intelligence, entails the capacity to think analytically and critically and to apply effective logic to understanding the internal elements of a problem. Individuals who are highly proficient in this aspect of intelligence are likely to be good critical thinkers, clever analysts of detail and excellent test takers. A student with strengths in the componential area has a good chance of performing well on standardized multiple choice examinations such as those required for college admission.

A second form, experiential intelligence, involves the capacity to be highly synthetic in one's thinking. This ability is associated with creativity and strong elaborative tendencies, facilitating the assembly of multiple facts or bits of data into novel products or customized conceptual models. Thus, experiential ability can lead to rich self-expression and novel perspectives or discoveries. A student strong in experiential intelligence and not nearly as talented with respect to componential intelligence may be poor at taking multiple choice tests, much preferring class discussions and opportunities to expand upon concepts and extrapolate from facts while constantly integrating new ideas with personal experience.

The final form of the triarchic theory is contextual intelligence, which relates to an individual's ability to adapt to a particular environment. Adaptability enables students to modify their performances to satisfy the demands of specific courses or teachers. Included is well developed skill at discerning adult expectations and working comfortably in a range of milieux either by being flexible oneself or by changing the milieux to meet one's needs. Contextual intelligence may be characteristic of student leaders and emergent politicians, who are experts at sizing up and possibly modifying the contexts in which they find themselves.

So it is that there are multiple parameters of higher order cognition which are likely to vary in the extent to which they predispose to success in school. Many youngsters with highly specialized brains may struggle inordinately because they are not being permitted to practice their specialties. Others are most fortunate in being able to demonstrate patterns of higher order cognition that conform to traditional expectations.

Much of the literature on learning and academic productivity in secondary school alludes to the critical importance of cognitive strategies (Kail and Hagen 1977). As students proceed into the upper grades, there is an exponential expansion in the complexity and amount of material they must assimilate, integrate, retain,

and apply. As a result, they must become increasingly skilled at simplifying and reducing the workload while devising the most direct methods for solving problems and completing tasks. The use of effective strategies impacts directly on all developmental functions. For example, students must become adept at deploying mnemonic strategies, techniques to ensure adequate registration and consolidation in memory (duFlavell, Friedrich, and Hoyt 1970). To do so they must develop a sense of how memory works (so called "metamemory"). They must be able to scan material and decide what they need to remember and what they will be able to extrapolate from what they need to remember. They then must determine and make use of the best possible techniques for remembering and for self-testing. Additionally, a student must have a keen awareness of how much time it will take to commit specific material to memory.

All subject areas in secondary school demand strategic behaviors. There is growing evidence that the most competent students are able to appropriate multiple alternative strategies so that if one technique fails them, there remain other options. Recent research points out that there exists a population of students who are clearly "inactive learners" (Flavell 1985). They tend to be rigid in their approach to tasks. They fail to think in terms of methods or best possible techniques when undertaking academic work. Unlike more methodical classmates, these students when they do devise a method have available only one method rather than multiple alternative strategies. That means that when an approach is ineffective or too demanding, they are unable to alter their strategies flexibly and repeatedly until the problem is solved or the task completed. Such students are likely to become frustrated and anxious. They may be prone to excessive guessing and to simply quitting or resigning themselves to low standards of performance. Thus, an important differentiation between high school students becomes increasingly apparent: some possess multiple flexible alternative strategies, while

others might be described as simply as "non-methodologists". The latter comprise a large group of underachievers in high school.

Neuromotor Function

There are a limited number of channels of output through which an adolescent can demonstrate mastery. Gross and fine motor function constitute two highly visible pathways through which efficacy can be displayed. Students with impairments in one or both of these areas may experience a progressive erosion of self-esteem (Shaw, Levine, and Belfer 1982). Those especially skilled motorically can make use of their highly developed neuromuscular coordination to compensate for shortcomings involving other developmental functions. The implications of gross motor dysfunction differ significantly from those of fine motor dysfunction. We will consider each separately.

Gross motor ability during adolescence relates strongly to athletic skill. Those individuals whose bodies move through space with agility undoubtedly are beneficiaries of a substantial boost in body image. Those who experience shame due to poor coordination are likely to be at risk for deep feelings of inadequacy. In particular, a combination of gross motor delay with other associated learning problems has been found to have a significant negative effect on self-esteem and mental health. Within the realm of gross motor coordination, there exist a number of specific developmental elements. Much of gross motor output is dependent upon the form of information processing that results in a motor response (Denckla 1984). That is, for every gross motor output, there is some form of input. Some adolescents have difficulty participating in athletic events with a predominant visual/spatial input. For example, baseball or volley ball entails a series of precise judgments regarding the positions of moving spheres in space, so that gross motor responses are based upon visual/spatial decisions. Swimming and gymnastics, on the other hand, entail gross motor responses to "inner spatial" information, a sense of

where one's body is at a particular moment. Some individuals are extraordinarily agile when it comes to gross motor activities reliant on inner spatial data but woefully clumsy at those pursuits demanding outer spatial judgments. Other elements of gross motor function include the capacity to integrate language (such as verbal instructions) with gross motor responses, the effectiveness of motor planning and organization, and the precision of motor praxis (i.e. the implementation of highly specific segmental patterns of muscle movement).

Students with gross motor dysfunctions are apt to feel highly self-conscious in the spotlight of physical education classes. They may be adversely labeled by their peers because of their awkwardness. Social isolation or even ostracism may ensue. On the other hand, adolescents who are conspicuously talented in the gross motor domain can benefit from substantial admiration or even adulation from their peers, teachers, and parents. Sometimes, extreme athletic success itself comprises a risk factor. An adolescent who becomes a local sports hero may experience such intense gratification that his or her academic motivation and subsequent career can never be as satisfying. Therefore, it is likely that there exists an optimal level of gross motor satisfaction and positive feedback in the nurturance of healthy adolescent development.

Fine motor abilities also play an important role. In the academic sphere dexterity is relevant to writing (Levine 1987). As students proceed into and through secondary school, there are steadily increasingly demands for well organized and fluent written output dependent upon four critical processes: Ideational fluency (i.e. the flow of good ideas); verbal fluency (the production of words to express those ideas); mnemonic fluency (the retrieval of facts, skills, and rules to inform those ideas); and graphomotor fluency (the efficient movement of a writing utensil so as to capture the words, ideas, and facts on paper). For a student to be sophisticated and productive in writing, it is important that these four fluencies be

rapid, well synchronized, and relatively effortless. Clinically, we encounter many discouraged adolescents who harbor a dyssynchrony of the fluencies. Some exhibit remarkable ideational fluency; they are a virtual wellspring of extraordinary thoughts. However, they may not have the language skills, memory efficiency, or motor capacity to harness these ideas, so that they can be transmitted graphically in writing. Such students are often accused of being lazy or poorly motivated. They tantalize the adult world with their expressed thoughts only to disappoint their parents and teachers with inadequate (and reluctantly undertaken) homework and poor test performance. In such instances, a subtle fine motor dysfunction is a common developmental culprit.

As with gross motor problems, fine motor difficulties can be of various types (Levine, Oberklaid, and Meltzer 1981). Some adolescents have difficulty with writing because they are unable to appreciate essential sensory feedback emanating from their fingers during writing (so-called finger agnosia). Consequently, they overrely on visual monitoring of the writing utensil, a process that is too slow and mechanical at the same time that it diverts an inordinate share of their attention thus leaving little concentration for memory and flexible higher cognitive activity. Other students harbor a fine motor dyspraxia. They have trouble knowing which muscles to inhibit and facilitate in which particular order to form letters. Their writing is excessively slow and mechanical; it simply cannot keep pace with the tide of ideas and language. Other students contend with motor memory deficits. They are unable to retrieve quickly the "blueprints" or so-called motor engrams for letter formation. They frequently exhibit an erratic, fluctuating memory, as a result of which they can forget how to form a letter while they are in the process of forming it. This phenomenon manifests itself in frequent retracing, crossing out, and a generalized eclipse of other developmental functions. All of the above "hidden handicaps" can be seriously disconcerting and destructive of initiative. One

might argue that fine motor dysfunctions are relatively transient since few professions in the adult world require large amounts of sustained expository writing. Nevertheless, during adolescence, these problems can go unrecognized and lead to a progressive decline in productivity.

It can be argued that fine motor problems might be eliminated through typing or the use of a word processor. Such bypass strategies are often at least partially effective, but many students whose fine motor difficulties compromise their writing also experience some problems with the use of a keyboard. Fine motor talent can generate substantial gratification for an adolescent. Artistic ability, draftsmanship, and dexterous mechanical skill have the potential for salvaging a faltering ego. On the other hand, such propensities may go underutilized (even unidentified) during high school; and their ultimate vocational implications may escape notice.

Social Skills

The social skill of an adolescent is a potential contributor either to gratification or humiliation. Interpersonal transactions and their success or failure over time have significant implications for overall lifestyle, family relationships, and success at work. Therefore, any broad descriptive profile of a 16 to 21 year-old must take into account his or her level of social skill. In recent years, there has been considerable progress in our understanding of social development during childhood and adolescence (Flavell and Ross 1981; Asher 1983). Multifaceted research has uncovered a distinct matrix of aptitudes that together comprise social cognition. As with other developmental functions, the sources of social cognitive ability are diverse; they include such varied factors as genetic inheritance, cultural context, and the influence of peers and siblings. Parents almost universally report that their own children differ from each other with respect to their social skill and patterns of social life despite the fact that they share the same environments and have been exposed to nearly identical values and life experiences.

While it is not possible to describe comprehensively all of the known elements of social skill, the following examples are among the landmarks of variation in this developmental function (Levine 1987):

- The capacity to take the perspective of others. By the age of 16, an adolescent should be able to "read" his or her audience. This entails an ability to understand the needs of the listener or partner in a relationship. Affective matching or the capacity to alter one's mood to resonate with that of others is an important component of perspective-taking. Knowing when to laugh, when to praise, when to sympathize, and when to share indignation, etc. are all elements of this process. Some students are poor perspective takers; they simply cannot "read" the needs of others.
- Predicting the social consequences of actions or statements. A socially adept adolescent is planful and therefore tactful. He or she can foresee the outcomes of various social initiatives. A student with tenuous social skills tends to be undiplomatically impulsive, to say and do things without anticipating their consequences.
- Verbal pragmatic strategies. Language is a prime ingredient of social interaction. By adolescence, youngsters should have developed strong verbal pragmatic abilities (Wiig and Semel 1975). That is, they should be able to employ language effectively in social settings. They should be attuned to the true intent of a speaker and be able to impart their authentic sentiments through speech, by generating a rhythm, using intonation, and choosing words to connote exactly how they feel (i.e. angry, sad, happy, displeased, etc.). Many adolescents with poor verbal pragmatic strategies misinterpret and are misinterpreted. For example, they may sound angry when they do not feel angry. They engender a

disastrous breakdown in communication because of their weak verbal pragmatic strategies. Other aspects of verbal pragmatics include: having a good trait vocabulary (knowing the contemporary jargon for characterizing other people); code switching (knowing how to use different social languages for different audiences); and social inference-drawing ability (understanding what is being implied by a speaker).

- Sensitivity to social feedback cues. The capacity to detect and respond to subtle forms of feedback is an important element of social interaction. Knowing when one has committed a faux pas or experienced a social setback enables a person to apply a compensatory social strategy. Many adolescents with underdeveloped social skills are unpopular, but have no understanding of why they are so often so unacceptable. They keep committing social errors, but are not sensitive enough to ongoing feedback to self-correct or even to recognize when they have offended or disappointed others. Feedback cues may be visual, verbal, or intuitive; but whatever their format, they are critical determinants of social effectiveness.
- Resolution of conflict without aggression. Sustained social interactions inevitably generate conflict. The capacity to resolve conflict without resorting to aggression is a critical social skill. Such resolution entails the mobilization of persuasion tactics, negotiating ability, and the aptitudes needed for compromise. Some adolescents simply lack the tools needed for resolving social conflict. When problems occur, they most often resort to verbal or physical aggression because they simply fail to formulate less bellicose alternatives. In recent research, it has been discovered that the same students who possess multiple alternative

strategies (see page 41) for problem solving tend also to be highly adept at devising multiple alternative strategies for social conflict resolution. Conversely, students who lack multiple alternative strategies for cognitive problem solving tend to be weak problem solvers when faced with social duress.

Students in secondary school are starkly visible; there is little privacy for the adolescent. Those who exhibit poor social skills are likely to suffer recurrent public humiliation. Some of them may retreat or seek divergent (sometimes antisocial or aggressive) pathways toward gratification. Furthermore, social inability in adolescence may portend significant problems in the workplace in the course of young and older adulthood. Poor social skills can compromise a person's ability to undergo job interviews, to collaborate with others at work and to relate to a supervisor. The problem is exacerbated when an individual with social cognitive weaknesses has no idea that he or she suffers such deficits. Unfortunately, the absence of awareness is common.

General Considerations

Neurodevelopmental variation in adolescence is laden with educational and policy implications:

- Through an understanding of the specific disabilities of adolescent students, we become aware of what capacities are required for academic success in all students. For example, a student with a discrete form of memory weakness that interferes with spelling and writing actually dramatizes the role of that element of mnemonic function in acquiring proficiency.
- The array of neurodevelopmental functions that may be deficient in youngsters with learning problems themselves comprise an inventory of requisite capacities. Thus, by describing relative strengths and

weaknesses in these areas, it is possible to compile a neurodevelopmental profile for any adolescent. The profile itself constitutes a critical component of any empirical description of a student. The description, in turn, is likely to have powerful implications for that student's future education, career, lifestyle, and mental health.

- All students are grappling with their neurodevelopmental functions. A good understanding of the workings of these functions, therefore, has important implications for the teaching of high school and college students.
- A flow in an adolescent's neurodevelopmental profile need not be construed as a handicap. The balance sheet of relative strengths and weaknesses should be thought of as a rendering of individuality, and more broadly as part of an ecological system within a society. Thus, a particular student's array of abilities and inabilities might merely denote that youngster's "cognitive style" rather than implying some judgment as to normalcy or deviancy, high ability or low ability.
- Students struggling with substantial neurodevelopmental dysfunctions are easily misunderstood. Their problems may be perceived exclusively as signs of moral turpitude, primary emotional disturbance, immaturity (a much overused and maligned term) or low motivation. The students themselves almost inevitably suffer from a lack of insight into the reasons for their failure (Vignette A). Their personal misunderstandings may lead them to fantasize and believe that they are "dumb", predestined to fail, or morally cuplable in some way, feelings which in turn may cause adolescents to lose all motivation. The threat of self-fulfilling prophecy also looms.
- As we have noted, our understanding of neurodevelopmental profiles

restrains the impulse to label adolescents as being of "high ability" or "low ability". Instead, they need to be perceived as harboring differing abilities.

- There are substantial differences in the specific neurodevelopmental capacities required for the mastery of specific tasks or subject matters and in varied contexts. For example, good visual-spatial skills greatly facilitate learning the alphabet during the early grades, while the ability to remember multiple facts and skills simultaneously is not essential during those early grades. In high school, visual-spatial skills are of little academic relevance; instead, facility at retrieving multiple facts and skills simultaneously and synchronously becomes critical. Thus, there is flux over time in the functional capacities needed as mediators of success. The functions required for competency in tenth grade may differ markedly from those that contribute to success in college and in a subsequent career. Thus, an adolescent is likely to discover (consciously or unconsciously) that his or her array of strengths and weaknesses varies in its suitability and adaptability from life stage to life stage and from setting to setting.
- Single neurodevelopmental functions do not operate in isolation. Memory is highly dependent upon attention. Reasoning is facilitated through the use of language. Motor function is often guided by good spatial awareness. There are likewise many other critical interactions between neurodevelopmental functions.
- By late adolescence neurodevelopmental functions reflect not only endogenous endowments but also a series of transactions with the sources of variation covered in Part II. Thus, a 17 year-old student's language ability may be the end product of multiple transactions between his or

her basic genetic language endowment; years of education; linguistic exposure in school, at home, and within a social environment; the presence or absence of recurrent ear infections; as well as a range of cultural influences and critical formative events. Thus, it should be stressed that the status of neurodevelopmental functions by late adolescence is not strictly or exclusively a neurological phenomenon, but rather the product of converging influences.

IV. Parameters of Young Adult Readiness

The concept of "readiness" has been applied widely to young preschool children. It has become common to describe and assess "educational readiness," a preschooler's likelihood of being able to acquire basic skills and satisfy social and behavioral demands in kindergarten and early elementary school. The concept is meaningful in early childhood and at least equally germane during any transitional period, including the years from 16 to 21 when readiness for adult family life, for college, for technical training, for the military, or for productive employment warrants careful consideration.

In adolescence, the sources of variation producing and interacting with neurodevelopmental phenomena culminate in a balance sheet composed of elements of readiness. These elements constitute fairly stable, but rather tentative, outcomes which exert a significant developmental thrust, the effects of which are felt throughout adult life, impinging upon work, family formation, and citizenship. Nine closely interrelated elements of readiness are described below:

- Self-esteem and self-image - adolescents emerge from childhood varying in the extent to which they feel effective and worthy. Some youngsters have tasted sufficient mastery through their academic and nonacademic exploits during elementary and junior high school. Their lives in late adolescence may offer a continuing skein of gratifying feedback that

enables them to build a strong sense of personal efficacy. In other instances, students are survivors of chronic success deprivation. There are those who have encountered repeated frustration in their efforts to fulfill personal aspirations or harvest respect socially, athletically, and as family members. They have little or nothing to boast about; they have experienced insufficient reinforcement. Such deprivation chronically erodes self-esteem and leads to deeply adherent feelings of ineffectiveness. Low self-esteem may be pervasive in the life of an adolescent, or it may be confined to specific areas of function. For example, it is possible to have reduced self-esteem in school but adequate confidence in social and athletic spheres. Self-image relates closely to self-esteem; as adolescents proceed through the years from 16 to 21 they perceive a clearer picture of their own personal identities, of who they are, what they are, and where they are. They are likely to project an acceptable image at the same time that they are coping with more or less realistic inner views of themselves.

- Affect - In adolescence affect may be closely related to self-esteem. Feelings of sadness or depression may accompany low self-esteem and chronic success deprivation. However, excessive sadness, performance-related anxiety, and lowered resistance to stress can be as much a cause of failure as it is a result (Puig-Antich and Rabinovich 1983). In some instances, anxiety and depression stem from familial predispositions and do not emerge in an individual until adolescence. So called bipolar illness or manic-depression is often encountered in several family members. Pervasive anxiety seriously diminishes the working capacity and motivation of an adolescent, while affective stability provides essential insulation from the stresses of transition.

- Psychosocial Adjustment - In addition to low self-esteem and affective disorders, there exist other common forms of psychosocial dissonance. Some adolescents have difficulty coming to terms with their own bodies and the somatic changes that have taken place. A range of psychosomatic preoccupations and illnesses can ensue. These include the various eating disorders (such as anorexia nervosa and bulimia), excessive absenteeism from school or work because of somatic complaints, and a range of psychosomatically influenced chronic illnesses (such as ulcerative colitis). Also included within this element of readiness is an adolescent's psychosexual adjustment. The extent to which he or she has come to grips with sexual appetites and behaviors will exert a continuing influence upon life adjustment. Also, during late adolescence, there arise multiple devastating behavioral outcomes which can have a self-destructive impact upon the adolescent. These include: delinquency, substance abuse, teenage pregnancy, and suicidal behavior. Clearly, the psychosocial adjustment of an adolescent is highly dependent upon the matrix of sources of variation as well as the outcomes of transactions between neurodevelopmental functions and imposed expectations. A high loading of psychosocial maladaptive tendencies constitutes a major risk factor for failure in early adulthood. On the other hand, somatic harmony, a positive psychosexual adjustment, and freedom from self-defeating behaviors are positive markers of readiness.
- Effectiveness of Coping - It is expected that the late adolescent is equipped to contend with setbacks and to buffer stresses. Transitions to college, to the workplace, or to some other form of young adult enterprise commonly engender conflict and intermittent failure. Effective coping, whether through the mobilization of multiple alternative strategies

(see page 45) or through a sense of optimism and personal efficacy, constitutes a form of adaptability that facilitates the passage into adulthood.

- Motivation, Ambition, and Personal Priorities - In recent years research has highlighted the importance of motivation in childhood and adolescence. Diener and Dweck (1978) have found that motivation is dependent upon three factors: 1) The attractiveness of a goal; 2) the likelihood that one can achieve that goal; and 3) the effort required to achieve that goal. A motivated adolescent has been able to discern and set desirable goals that are achievable with relative ease. An unmotivated youngster may fail to sense the attraction of any clearly established goals. Some students who have experienced inordinate failure during their academic careers shun goal setting because they are convinced either that goals are unattainable or that goals call for levels of effort that exceed their capabilities for sustained attention and the postponement of gratification. Such youngsters, who are virtually paralyzed by their feelings of inadequacy, often develop a mind set that Diener and Dweck (1978) have called "learned helplessness". They believe that they can do little to better their condition in life, that somehow things just happen to them, that they are utterly susceptible to the vagaries of good or bad fortune and have little influence over their futures. "Learned helplessness" is a prime indicator of unreadiness. On the other hand, students who feel motivated, especially those whose motivation has paid off in the past, are likely to emerge optimistic and ambitious. They can afford the luxury of delaying gratification and of aiming high in their aspirations because of a felt likelihood of success. Those with a dim view of the future live in the present, seek immediate

pleasures, and fail to strive. They are susceptible to depression and to antisocial behaviors, thereby acquiring multiple strata of unreadiness for adulthood.

- Status of Skills - Gardner has referred to high school as a "sorting out process" (Gardner 1984). From the student's vantage point, this is a period of growing recognition of one's own personal abilities and shortcomings. By the high school years, students have had ample opportunity to develop and apply skills in a wide range of pursuits. By ninth grade, teachers assume that their pupils have well-honed basic academic skills and that many of these skills are fully automatized. That is, such functions as letter formation, spelling, punctuation, grammar, and the multiplication tables are so well integrated and assimilated that they can be applied by the student with little conscious effort. The skill profile that presents itself during late adolescence has a critical bearing on the choice of career and on the level of gratification that a person will experience during the years from 16 to 21. Some students in this age range show highly specialized skills which may be entirely nonacademic. Athletic ability, artistic talent, musical skill, or mechanical aptitude may blossom amid average or poor academic skills. Regrettably, some students harbor underutilized strengths. They may have missed the opportunity to practice specialties perhaps because their affinities were not valued within the family or at school. Other adolescents are more fortunate; their skills are directly applicable to conventional performance standards of adolescents.
- Differentiation, Self-Awareness, and Pursuit of Aptitudes - Although adolescents harbor a profile of strong, average, or weak skills across a variety of domains, they differ in their awareness of these skills and in

the extent to which they provide themselves with opportunities to pursue their personal aptitudes and interests and to allow such inclinations to become high personal priorities. A well-differentiated student seeks and discovers situations that facilitate the strengthening of strengths. In other cases, an adolescent may have a poor sense of differentiation, of personal aptitude, and interest. He or she may strive to be fairly good at everything or vaguely interested in most things. Such a lack of differentiation may make it difficult for that student to find a niche or determine a course over the years that follow secondary education. To some extent this situation may be fostered by the American obsession with "well roundedness" during youth.

- Moral Development and Ethical Values - Parents, a peer group, religion, the media, and tradition together impact upon the shaping of morals and ethical standards during adolescence. This is a time when youngsters commonly question their own basic values ultimately to discover and affirm a moral code. They are likely to scrutinize carefully the beliefs and behaviors of their parents and teachers. They often engage peers in intense discussions on value-laden issues. According to Kohlberg (1963), most adolescents have reached a high stage of moral development. They have come to believe in morality for the sake of morality, in such noble values as altruism, punishment, and honor. Those with a strong moral sense may be especially well equipped to deal with adversity (Coles 1986). However, for a variety of reasons, some adolescents fail to develop or even contemplate a stable ethical system. They may have suffered a moral maturation arrest earlier in life, adhering to pragmatic or even amoral tenets of behavior. The discovery of a somewhat stabilized code can be construed as yet another important marker of

readiness.

- Resiliency and Malleability - In studies of early childhood development, serious thought has been devoted to the extent to which youngsters can improve function spontaneously or with assistance. Like the notion of readiness itself, resiliency and malleability pertain to the adolescent. As we regard the various signs of readiness as well as the neurodevelopmental variations of adolescence, it is natural to question the extent to which these attributes are fixed (Levine and Jordan 1987). Is an adolescent or young adult capable of significant change? Might that change be spontaneous over time, such that we could say that the adolescent is resilient? Alternatively, can one impose change? Can one alter the neurodevelopmental profile and the elements of readiness in a young adult through counseling, teaching, rich opportunity, or strong example? To the extent that such induced change is feasible, we can describe the adolescent as malleable. Resiliency and malleability vary from individual to individual. The factors behind such variation are as important as they are obscure. Many questions remain unanswered: Can weaknesses be strengthened or must they be bypassed? Can previously underutilized talents emerge in young adulthood or do they undergo irreversible atrophy through disuse?

V. The Performance Experience

In many respects it is easier to be an adult than it is to be an adolescent. During adult life one is permitted, actually encouraged, to practice one's specialty which enables an individual to ignore or de-emphasize personal deficiencies. It is universally accepted (and acceptable) that adults differ drastically from each other in their abilities and inabilities. In fact, during adulthood, deficits are often depicted as amusing quirks. An adult whose behavior is a bit odd might be seen as

"eccentric". A 16 year-old with rare habits or interests would be more likely to be considered deviant, especially by his or her peer group and possibly by the school. An adult who is not proficient with language might be thought of as "the strong silent type". That person would have the option of pursuing a career and recreational ventures in which nonverbal skills predominate.

By contrast, a high school student with weak language skills is apt to be classified as one of the "less able students" in the school. Adults are afforded more privacy than adolescents. In high school, in particular, strengths and weaknesses are conspicuously on display before peers, siblings, and parents. Many students, therefore, are engaged in a constant unsuccessful struggle to sidestep humiliation and disheartening exposure. In the adult world, such avoidance is convenient and feasible. As an adult if you can't dance, you may refuse invitations to dances. When you are an adolescent, if your gross motor skills are deficient, you are nonetheless required to exhibit your inadequacies in front of your classmates during physical education classes! This observation is not intended to advance the argument that students should be permitted to avoid all activities they perform poorly. However, it is essential to consider the possible cost to society of expecting and demanding broad competencies on the part of all individuals during adolescent years, while the needs of our society are such that the specialized adult is highly valued and rewarded.

Moreover, we have to worry about the adverse and wasteful effects of humiliation during adolescence. We need to consider the plight of students with "premature specialization". What becomes of the highly differentiated high school student, the boy or girl with narrowly defined strengths and weaknesses who would much prefer to practice his or her own specialty now rather than later? Are there some gaping wounds, some students who acquire learned helplessness, anxiety, and lessened self-esteem because they are traumatized by inordinate humiliation and

deprived of the opportunity to pursue their specialties and savor rewards and gratification from their particular aptitudes?

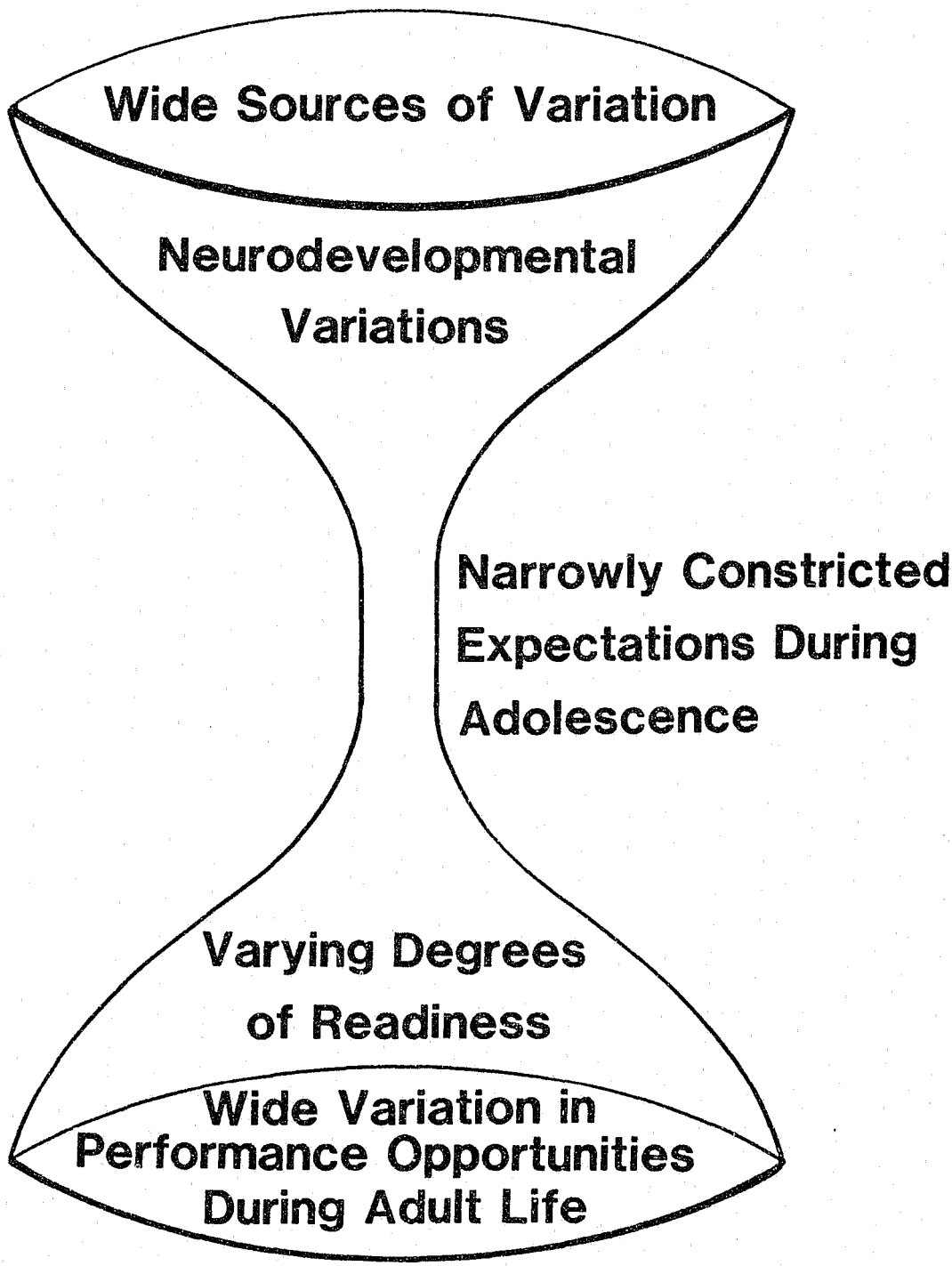
In a sense, development can be conceptualized as having an hourglass configuration (Figure II), such that a broadly diverse childhood and adolescent population is forced through a narrow constrictive set of expectations only to emerge into a world that tolerates diversity in adult life. But are there serious injuries inflicted during the constrictive stage? Are there ways we can assure a smoother flow, a more cylindrical configuration during youth? Some vital questions emerge if we are willing to explore this possibility. First, are students themselves aware of their own readiness for different pathways toward adult fulfillment? Can we assume that those with strong nonverbal cognition, weak language skills, or a tendency to be experiential in their intelligence possess sufficient insight into their own profiles to enable them to create and actively seek opportunities that are likely to generate gratification through mastery? Do we provide students adequate information about themselves to help them in decision making and goal setting? Do teachers, parents, and other important adults in the lives of adolescents on some level understand the sources of variation, the relevant neurodevelopmental phenomenology, and the various elements of readiness that coalesce in individuals and within a society to create natural proclivities and configurations of variation.

In all fairness, it should be stated that there has been recognition of variation in a range of policy oriented and administrative contexts. Instead of talking about adolescents in toto, reports more commonly allude to identifiable groups of adolescents. Various Commission documents describe the special needs of inner city youth, minority teenagers, bilingual youngsters, handicapped students, and the talented and gifted (Gross and Gross 1984). Unfortunately, there is an assumption that within these categories, there exists a uniformity of needs based upon a homogeneous substrate of attributes. In fact, such is not the case. The multiple

Caption for Figure II

The "hourglass configuration" is one way to conceptualize the challenge of adolescent development. At the top of the diagram it can be seen that there are a wide range of characteristics harbored within a population of youngsters. Adolescents with diverse abilities must fulfill some rather rigid and narrow expectations in order to arrive at an age when they are able to express their diversification, as society acknowledges the need for heterogeneity among adults. Undoubtedly, there are casualties, some adolescents equipped to thrive as adults but unlikely to pass unscathed through the constrictive period of education and of uniform expectations.

THE DEVELOPMENTAL HOURGLASS



variables covered in this report penetrate the inner city to create urban students with excellent language skills, some who are predominately componential in their intelligence, some with gross motor strengths and some with dyspraxias, along with a cadre of individuals whose self-esteem, motivation, and coping skills differ drastically. Therefore, to speak glibly of the needs of the inner city teenager, to formulate policy based upon stereotypes or global assumptions of homogeneity promotes a dangerous reductionism that might readily lead to the mismatching, mismanagement and misunderstanding of the teenager as an individual.

As Gordon (1983) notes: "...students of cultural and ethnic groups increasingly assert that differences within groups are as important as differences between them" (p. 190). The same might be said of the striking contrasts evident within groups of gifted adolescents, handicapped youth, and inner city youngsters. Indeed within such categories, there are more ways to be different than there are to be the same!

The strident pluralism explicit in this report is, of course, problematic in itself. A community and its policies must acknowledge some mutuality of need, adopting principles and procedures to create the greatest good for the greatest number of adolescent citizens. Therefore, in the section that follows, we will suggest some policies aimed at reconciling the search for authenticity and the celebration of individuality with the needs and best interests of the community.

VI. POLICY IMPLICATIONS

Throughout this report, one central hypothesis has been implicit: By understanding and accommodating to individual variation, it is possible to derive and implement policies that potentiate the reciprocal role of the adolescent at work, in the family, and as a citizen. It is most likely that sound transitional decisions will be more likely to occur when there exists keen awareness of an individual's sources of variation, neurodevelopmental profile, and readiness for adulthood. Further, it becomes obvious that authentic egalitarianism during adolescence entails more that

just the passive provision of equal opportunities for all. Education should consist of a menu of universal "core" competencies. Adolescence should be a time to differentiate, to discover, activate, and accentuate personal uniqueness. Adolescents should have the right to specialize, the mandate to mobilize resources as part of a vigorous campaign to strengthen strengths! To take this one step further, we might also argue that, during adolescence, we should begin to infuse the right to lessen the impacts and importance of one's deficiencies and to do so without creating a second class citizenry, totally separate tracks, or new pinnacles of elitism. Therefore, the central purpose of education, parenting, and community support for an adolescent should be the facilitation of self-discovery and with it the visualization of distinct and realistic possibilities for fulfillment.

The follow notions represent some specific policy recommendations that emanate directly from our scrutiny of diversity:

- Advice and Advocacy - It is abundantly clear that at a critical transitional point in life, adolescents are woefully deprived of sound advice based upon sophisticated knowledge of their individual uniqueness and possible future pathways for reciprocity. There is a major need in our society for professionals and/or semiprofessionals who are capable of understanding adolescents and providing them with rational individualized counsel or advice to help them negotiate critical decision points in their lives. Adolescents often proceed unfettered with little introspective insight and only a minimal sense of the medium range implications of their actions and decisions. Sometimes they mistrust advice from parents or teachers, believing such wisdom to be biased, self-serving, or contaminated by alien values and a kind of remote absolutism. A youngster is more likely to respond to an individual who possesses some professional familiarity and respect for his or her life struggles,

priorities, and functional strengths and weaknesses. Few school guidance counselors, mental health specialists, pediatricians, clergy, or other individuals with a sincere interest in adolescents are now qualified and logistically capable of establishing rapport, descriptively assessing a youngster, providing continuity, and offering custom fitted advice based upon familiarity with career pathways, educational opportunities, and the requisites for a smooth entry into work, the family, and citizenship. Yet, there exist potential models for more effective assessment and counselling (Hohenshil 1984). It is suggested, therefore, that a new kind of professional emerge (from one or more disciplines), one who is capable of providing information and advocacy based upon accurate individual assessment. Such advice and advocacy could be offered not just to students with problems but to all adolescents as they explore this substantial life frontier with understandable trepidation.

- Decision Making and the Individual - Mechanisms need to be put in place, so that decisions involving adolescents allow for due process based upon individuality of needs. Frequently, policies come forth as edicts rather than systems or processes. For example, instead of requiring basic competency testing and making absolute decisions based upon such examinations, it would be more reasonable (in view of individual needs and variations) to allow for testing but then to interpret it and form decisions that also take into consideration other highly compelling factors, such as the emotional status of the youngster, test-taking skills (which may not reflect true ability), his or her age, the psychological toll of a potential action (such as the decision to retain that student in a grade), and other feasible alternatives for action. Such flexibility is desperately needed if we are to avoid inflicting serious harm by ignoring

the individuality of needs. Thus, policies pertaining to grade retention (Vignette C), prohibition from sports, hard and fast requirements for graduation, and specific prerequisites for college admission must be rendered more flexible and process-oriented.

- The Role of the Teacher - Teachers collectively and individually have a durable impact upon the self-esteem, motivation, and differentiation of adolescents. A common theme among reports on the status of high school has been the need for better teacher training in the content areas for which they are responsible-with proportionately less emphasis on curriculum and teaching methods (Gross and Gross 1984). Surprisingly, there is little or no mention of the need for teachers to have far greater knowledge of students. While stressing how and what individual teachers are teaching, we risk ignorance of how individual learners are learning. At present, most secondary school teachers have been taught little or nothing about adolescent development. They are often blind to the parameters of individual variation, to the influence of the past upon the present, and to the internal stresses and varied coping patterns specific to the age group they teach and influence. Teachers must receive more high quality preservice and inservice education focused on adolescent variation. Moreover, teachers in specific content areas need to acquire a clearer understanding of the ways in which their particular subject matter taps specific neurodevelopmental functions. Teachers whose curricula place heavy stress on attention to detail, cumulative memory, receptive language skill, or componential thinking need to be aware of the discrete strains they are imposing, if not to minimize those pressures at least to understand faltering students who are valiantly struggling to preserve their pride. In full agreement with several other reports, this one

advocates the critical need for teachers to become better acquainted with their students in high school, which means they must teach fewer students (Sizer 1984). Adolescents are simply not ready to function independently despite the rationalizations of some administrators and teachers. Given current economic conditions, it is clear that greater contact with the teachers can only occur with the reorganization of the curriculum, so that certain subject areas are merged with others (e.g. mathematics and physics, English and history, etc.). In this way, teachers can have fewer students, assign and correct more homework and individualize their approaches based upon a more intimate awareness of particular students, their traits and their peculiar requirements. If there is a crisis in secondary education, it is not the result of a dearth of knowledge of mathematics and science; it is instead the result of a growing number of students who feel abandoned and become aimless. In the long run, students who need more biochemistry or calculus will be able to obtain it. Most students crave and need contact more than content.

- Reform of Special Services - At present, there are stringent and highly arbitrary eligibility requirements for special services in secondary schools in most communities. A clinically artificial and dangerous system of labelling students complicates matters. If an adolescent meets some (clinically irrelevant) criteria, he or she is deemed "learning disabled". If behavior problems are particularly conspicuous, he or she is declared "emotionally disturbed". If a score on an intelligence test falls just below a particular cutoff point, that student gets termed "a slow learner" or is said to be "mildly retarded". IQ tests (such as the WISC-R or the WAIS) and achievement tests are often used to justify such appellations,

but they were never designed to diagnose specific clinical conditions. If a student's particular neurodevelopmental problems do not happen to be tapped by the subtests of an IQ test, his or her true problems are overlooked. So it is that certain forms of retrieval memory weakness, attention deficit, fine motor dysfunction, or language disability may not be discovered in this process. On the other hand, if a student happens to manifest one or more dysfunctions that coincidentally fall within the purview of specific subtests of an intelligence test, that student's IQ score will be eroded; and he or she may be thought of as "a slow learner" or " mildly retarded" and perhaps even written off. It should be stressed that intelligence tests were never constructed as detectors of specific disabilities, but they are now almost universally employed for this purpose. Rather than beginning with a differential diagnosis, determining in advance the relevant neurodevelopmental dysfunctions or strengths to be sought in an evaluation, secondary schools commonly assume that a disability is defined exclusively by the results of a test. This would be akin to saying that if you have a fever, you are only worthy of treatment if your chest X-ray or blood count is abnormal! Thus, there is an urgent need for new assessment processes based upon valid conceptual models. Such models will need to obliterate false dichotomies (such as "emotional" versus "organic") and arbitrary line drawing processes. We need to recognize that many faltering students commonly harbor multiple risk factors and service needs, such that "either-or" models of evaluation are inappropriate.

- When the behavior and/or learning of an adolescent suggests that he or she is unlikely to attain a level of readiness sufficient for successful young adulthood, that student should be entitled to an assessment process

that is truly unbiased. At present, a school evaluating one of its own students begins with a set of built in conflicts of interest: 1) It can only diagnose what it can treat; if no language therapy is available, there is a tendency not to diagnose language disabilities; 2) Budgetary considerations are paramount, there may be a tendency not to diagnose conditions that will be expensive for the school to manage; 3) A school may have trouble considering the possibility that its own approach to the student has been a major precipitant of his or her problems; and 4) There may be a tendency to "blame" the home situation for all of a student's difficulty. Adolescents need protection and unbiased representation while undergoing evaluation. It is suggested that independent advocacy (originating outside of school and the political system) be made available to all such students. Any student who is faltering by definition should receive help. If someone appears to be drowning, we do not give him a swimming test before deciding whether or not to rescue him! The risk factor complex concept (see page 21) will need recognition and application. At the same time, there must be a recognition that most students with problems can be mainstreamed, that special education needs to become increasingly bonded to regular education. As regular classroom teachers become increasingly knowledgeable about adolescent developmental variation, they should assume greater responsibility for students who exhibit differing functional patterns (which include areas of deficit as well as strength). As special education is reformed in high school, it will move closer to regular education. School administrators must also be sophisticated experts on adolescents and expand their notions of normalcy and recognize the need to educate a broader range of students in the mainstream. Within this context, there needs to be a

special commitment on the part of administrators to students who are enduring chronic success deprivation, a commitment to preserve their pride, mobilize their strengths, and protect them from daily embarrassment.

- Additional High School Reforms - There has to be a marked change in the goals of high school education. In recent years, there has been a stress on basic competency requirements at the same time that there has been a call for more mathematics and science, for stringent foreign language requirements, and for other mandated standards of educational content. Advanced work in mathematics and science will undoubtedly benefit future physicists, biochemists, and perhaps even business entrepreneurs. However, for many students, additional mathematics and science will inflame festering feelings of inadequacy and alienation. We can argue that more calculus or computer science for all students might cost more than the price of thicker and denser textbooks and more highly educated teachers; the ultimate price might be more detention centers to cope with a rising delinquency rate among those adolescents whose minds steadfastly resist such content. An alternative, an option entirely consonant with pluralistic traditions in this country, can be suggested: Every student should be required to demonstrate excellence and profound depth in some particular area. It should be mandatory for a student to exhibit a progressive strengthening of his or her strengths. Out of such a process, this country might benefit from having produced the world's finest automobile mechanics, the most highly creative poets, and indeed the most rigorous scientists. To this end, it is suggested that students be required to concentrate in one or two areas of intense pursuit during high school. They would continue basic courses in skill and content

areas outside of their specializations, but grading would be heavily (nearly exclusively) weighted toward accomplishments in their specific area(s) of expertise and high personal priority. Some students may need to be guided toward specialization, while others will gravitate in a natural manner toward discrete content areas and skills. Consistent with this policy, there must be substantial support for vocational education which, in the opinion of this author, should be initiated, in part, in elementary school. Additionally, there is ample developmental justification for Sizer's (1984) recommendation that students take as much time as they need to traverse the high school years; ungraded secondary education should become a common practice. Moreover, every effort needs to be made to convince the public that not all college bound students should proceed to college at age 17 or 18 (Vignette E), that many can benefit from a period of community service, apprenticeship, enlistment in the military service, or exposure to the workplace, while they solidify their self-images, rehearse meaningful roles in the community, make determinations about future directions, and quite simply ripen into readiness.

Thus, there is a critical need to implement greater diversity of educational pathways along with far more flexibility with respect to the rate at which such pathways are navigated.

- The central goal of high school must be self-discovery, the acquisition of a keen and authentic vision of possibilities for oneself, energized by levels of idealism and optimism sufficient to sustain motivation and ambition. Schools should therefore be judged not by mean test scores or the educational credentials of their teachers but by the proportion of their students who emerge with excitement and optimism about the future and with an authentic sense of direction.

- The Adolescent's Awareness of Adolescence - Individual variation is a subject about which adolescents themselves have little or no awareness. It is suggested strongly, therefore, that adolescent development become an integral part of the secondary school curriculum. Through case studies, seminars, and readings, students can acquire far more self-knowledge. They need to gain an understanding of how development proceeds, of how development relates to specific forms of success in the present and in the future, of the ways in which developmental variation manifests itself within groups of teenagers, and of the importance of such variation for the future coverage of the diverse needs of a society. Students who are struggling to deploy attention and memory effectively need to appreciate how these processes operate. With greater insight, students will be in a better position to mobilize their strengths while devising strategies to overcome or at least bypass impediments. They also need to understand how motivation works. They need to gain insight into social cognition and the social dynamics of their age group and adulthood. In short, a critical body of knowledge is waiting to be shared with those most in need of it.
- The Needs of the Family - Parents require support in rearing adolescents. The media, the health professions, and the schools ought to collaborate to inform parents about adolescent development and to sensitize them to the unique needs of youngsters in this age group. Large numbers of books are published on the care of babies, and most parents display intense curiosity about infant development. By adolescence, any interest in development frequently wanes and gives way to confusion and guilt. In addition to education, parents need a source of support and nonaccusatory advice. It is suggested that professional

disciplines such as social work and psychology produce specialists in normal adolescent rearing - individuals who can study, advise, and promulgate ideas regarding this neglected subject, while working to fortify the parenting role.

- The Medical Role - Pediatricians, family physicians, and nurses should define more clearly their roles in the surveillance and management of adolescent development. The growth of adolescent medicine as a discipline is a sign of increased interest in this age group. Medical professionals can offer continuity of care and a comprehensive view of the adolescent that places them in a unique position to dispense individualized advice while monitoring the processes of differentiation. However, as with other disciplines, there is a need for further training of medical professionals in the subject of adolescent development and developmental variation.
- Prevention - At first glance, prevention is an awkward concept when it comes to individual variation among adolescents. Do we seek to prevent diversity? Obviously, we do not. However, it is essential that every effort be mobilized to prevent the untoward complications of neglected diversity and chronic success deprivation. This is a particular problem during the several years preceding the half decade that is the subject of this report. Junior high school is a time of significant neglect of individual variation. Students in this age group are struggling to avoid humiliation at a time when they are bewildered by intensified academic demands, physical changes in their bodies, the need to adapt to multiple teachers and unprecedented peer pressures. Just as we emphasize the need for high school teachers, parents, and professionals to become educated about late adolescence, there is a critical need for informed

awareness of the unique developmental events surrounding puberty. Better assessment techniques for struggling students in this age group, an appreciation of the issues involved in readiness for adolescence, and a willingness to be flexible with those whose maturation lags, are all likely to be key ingredients of secondary prevention. One can argue that sensitive diagnosis and monitoring through infancy, the preschool years, and elementary school is also of critical importance. However, there is a prevailing fallacy that early screening and intervention somehow lessens the need for the monitoring of older children and adolescents. This is simply not the case. With the steady evolution of demands and stresses, new problems germinate at all ages. One can see the onset of a developmental delay at age 17 or 18 or beyond. Therefore, community wide accountability for screening and assessment must be an ongoing process. It is essential that teachers, clinicians, and parents be aware of those students who bear substantial risk factor complexes. Such individuals need particularly assiduous early detection and sensitive care and follow-up. It is they who are most vulnerable to chronic success deprivation, low self-esteem, and underutilization of assets. Even so called normal children, however, are potentially vulnerable to misunderstanding. With growing awareness of the normalcy of variations and the variations of normalcy, their needs too can be met.

VII. Implications for Research

The parameters of human variation in adolescence are amenable to rigorous research. Well designed investigations are likely to yield important findings that can inform and catalyze the policy modifications proposed in section V. The following are some forms of research that are seriously needed at this time:

- Longitudinal Studies - There is a need to acquire data on the outcomes

and natural histories of specific functional profiles. For example, such research could uncover factors that potentiate success among students with attentional difficulties as well as variables associated with a negative prognosis for such individuals. Similar studies are needed to document the longitudinal impacts of language disabilities, memory problems, depression, motor dysfunctions, learned helplessness, and other variations in adolescence. At this time, it is critically important simply to document the prevalence of a condition we might term: "the Misunderstood Adolescent." How many casualties presently exist? What is the magnitude of the problem of students whose variations are unrecognized, stifled, and/or a source of lessened readiness? Studies of this type would also help us to determine whether certain combinations or clusters or findings are more or less likely to be associated with resiliency and a good prognosis during and after adolescence. It is now possible to perform sophisticated multivariate and cluster analyses that portray the contributing effects of multiple factors upon development and success in early adult life.

- Compiling a Table of Elements - Future research should be directed toward the identification of key factors that need to be accounted for in adolescence. Many possible candidates for this taxonomy have been described in this report. A "Table of Elements" would enable policy makers, clinicians, teachers, and administrators to design appropriate assessment systems and to know what to account for and think about in students who are failing as well as those who appear to be meeting demands.
- Instrument Development - Many of the techniques to assess adolescents appear to be inappropriate and potentially misleading. Based upon our

knowledge of readiness and neurodevelopmental variations, it should now be possible to develop new tools to help describe the cognitive styles, priorities, and other relevant parameters that can inform the advice giving and advocacy processes during late adolescence. The creation of new forms of assessment and description based upon current knowledge should be encouraged.

- Demonstration Models - There should be a significant investment in demonstration model research so as to show convincingly that the policies put forth in Part V are feasible and effective. There is a need to perform studies in schools, in physicians offices, and in the community to demonstrate the efficacy of new components of teacher education, flexible curriculum for students (such as concentrated study in an area of strength), special educational reform, new types of assessment, gradeless models of high school, and balanced processes of decision making rather than edict. Well designed research must be aimed at analyzing the benefits of such approaches as well as their costs, their political feasibility, and the logistics of their implementation. In order to foster research with strong policy implications, it is essential that government agencies and private foundations offer special initiatives to establish special institutes that focus on research and training directed to the 16 to 21 year-old age group. There needs to be considerable interagency cooperation in funding projects that are multidisciplinary, policy-oriented, and rigorous in design. Such undertaking should involve the active engagement of relevant community-based personnel as well as scholars.

VIII. The Hope

Extraordinary opportunities present themselves at this time. New knowledge about adolescent development and its locus in the life cycle, combined with growing

public restlessness about the disengagement of the 16 to 21 year-old citizen, should ensure openness to the generation of new concepts and practices. There is an opportunity to create change that is not at all in response to competition from Japan or the Soviet Union but out of a felt need to celebrate the promise of diversity in adolescence and to pursue what this country has always done best, namely the cultivation of innovation through individual expression. By doing what we can to accentuate the differences while steadfastly denying homogeneity and uniformity of standards, it is likely that we can, in the future, improve upon what we always do best; we can continue to be the world's prime fabricators of novel ideas and products rather than the refinishers of old ones. There is nothing new about pluralism in this country. It merely needs to be reaffirmed during this era of insidious absolutism. In a highly technological society, an egalitarian pluralistic view becomes increasingly relevant earlier in the lives of young people. If we recognize this need, we will once again be affirming a richly eclectic view of humanity, while, in all likelihood, diminishing the amount of suffering endured by young individuals whose individuality is unintentionally stifled. By widening the multiple thoroughfares toward excellence, we are most likely to encourage that elusive reciprocity through which there is a universal giving and taking that ultimately fosters meaningful individual roles in work, in the family, and in citizenship.

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BIOGRAPHICAL SKETCH

Melvin D. Levine, MD is Professor of Pediatrics and Director of the Clinical Center for the Study of Development and Learning at the Child Development Research Institute at the University of North Carolina at Chapel Hill. In that position he is responsible for conducting research and training programs in the field of developmental disabilities. He also directs a series of clinical programs for the evaluation of children and young adults with learning problems and/or behavioral adjustment.

For 14 years Dr. Levine served as the Chief of Ambulatory Pediatrics at the Children's Hospital in Boston and as Associate Professor of Pediatrics at Harvard Medical School. His major research interests are focused on the health and development of school age children and youth, particularly oriented toward the study of learning disabilities and neurological development. A Rhodes Scholar, Dr. Levine has written numerous books and articles, including Developmental Variations and Learning Disorders, published in 1987. During his leisure time, he enjoys raising multiple varieties of domestic and wild geese and studying their behavior.

A COMMENTARY

on Melvin D. Levine's

THE DIFFERENCE THAT DIFFERENCES MAKE: ADOLESCENT DIVERSITY and ITS DEREGULATION

by Michael S. Wald

I found this paper both interesting and disappointing. Dr. Levine clearly makes the case that individuals differ in their learning capacities, interests, and abilities. He somewhat less convincingly demonstrates that societal institutions, or at least schools, often ignore these differences in ways that hinder the development of some individuals. I am, however, left with a number of questions about what policy implications flow from the extensive descriptive material contained in the paper.

Most of the paper is devoted to identifying the ways in which individual differences among adolescents (and younger children as well) may affect their ability to fuction in high school. Although the paper provides relatively little data or research findings to support many of its propositions, I do not doubt that a person's biological make-up, cultural background, socioeconomic status, family, health, varied experiences, temperament, and social skills affect how the person relates to his or her environment. I also accept as proven, by extensive research not cited in this paper, that many aspects of a child's environment, including broad social and cultural forces (such as TV, cultural norms, a country's economic system), as well as specific institutions (a school, scout troop) also affect the development of each individual child and that there is an interaction between individual characteristics and environment.

The most interesting part of the paper, at least for a lawyer reader, is the extensive description of how differences in neurodevelopment can affect an individual's academic development. While it would have been useful if the paper provided some estimates of the numbers of adolescents who have attentional

problems, memory problems, language problems, difficulty with sequential organization, and problems with neuromotor functioning, the paper constantly reminds or alerts one to how varied we are as humans. Through the vignettes Dr. Levine shows how easily institutions can ignore these variations and that, as a consequence, some adolescents are damaged by educational institutions.

Although I am sure that people familiar with the various areas of development discussed in the paper would have some quibbles, and even some major disagreements, about the accuracy of one or another of his points, (I was not persuaded by the discussion in the section of sociocultural milieu, for example), I will not focus on the "scientific" merits of the paper. Even if Dr. Levine is inaccurate in some respects, the overall description of diversity is undoubtedly correct. Yet, despite its wealth of information, or perhaps because of it, Dr. Levine's paper leaves me somewhat lost. My problem is translating this information into meaningful public policy. I am not exactly clear how our systems are failing or what alternatives are available. Moreover, I believe that some of the suggested cures may actually make the situation worse.

Dr. Levine's central criticism of existing institutions (primarily schools) is that they treat all students uniformly, failing to recognize individual strengths and weaknesses and failing to provide varied channels for individuals to experience success. He does not provide much evidence for this proposition, and I am not really clear what he means by the claim that there is "a progressive trend toward policies aimed at vast presumably homogenous groups of adolescents." (p. 3). At least some critics of public schools believe that students are given too many options, rather than too few.

While Dr. Levine's concerns are not clearly spelled out in any one place, he seems to be concerned with at least four aspects of current policy. These are:

(a) Arbitrary rules which unnecessarily harm some students. Vignette A, where all students were required to master a foreign language,

exemplifies this problem.

(b) Sensible rules or policies which are not, however, sufficiently sensitive to individual cases and therefore maybe applied inappropriately. Vignette 2, the football player, falls into this category.

(c) The absence of alternative tracks for students who do not have "standard" academic interests or skills.

(d) Rules, policies, or adult expectations which pressure adolescents into being good at all things, rather than accepting their particular strengths.

I am in basic agreement with Dr. Levine that it is desirable to have a society that facilitates, as well as recognizes, the development of a wide range of talents. I also agree that as individuals, and through our institutions, we often ignore individual differences in ways detrimental to adolescents.

Yet I am less certain than Dr. Levine about the directions for public policy. The paper envisions a world of trained and sensitive professionals giving advice, guidance, and making individualized decisions that will help maximize the well-being of each person. It also recommends that schools provide a range of different programs and allow students to specialize in areas of special interest.

Perhaps it reflects a difference in our professional socialization, but I am more skeptical of our capacity to make fair and informed judgments in many situations. Individualized judgment can be a way of liberating individuals and providing new opportunities; as Dr. Levine recognizes, it also can be a way of labelling individuals, segregating them, and denying opportunities. The history of tracking in public schools, designed to provide greater recognition of different levels of abilities and needs, is an example of the dangers from efforts to differentiate students. There is substantial evidence that tracking

has been a vehicle for segregation, which has resulted in separating minorities, children with language difficulties, and children from low income families from white, middle class children. Perhaps there are ways of separating students "without creating a second class citizenry, totally separate tracks, or new pinnacles of elitism" (p. 69). The paper doesn't give any examples of successes.

I also have some doubts about the wisdom of efforts to interpret policies "based upon individuality of needs" (p. 71). Vignette 3 is a good example. Rules requiring adequate grades in order to qualify to play atheletics were adopted in order to encourage "athlete-students" to pay attention to schoolwork. Assuming that the general policy is wise, does it makes sense to allow exceptions on a case by case basis? Will students like those in Vignette B benefit or will it be the team stars who are given the exceptions? What will be the effect of granting exceptions on the overall impact of the rule? The tension between case by case "justice" and the need to have a system of rules that can be administered in a non-discriminatory non-arbitrary fashion plagues all efforts at setting up systems for individualized justice.

I do not mean to imply that we should presume that all, or most, school rules are in fact sensible. Schools adopt many arbitrary rules, rules which may relfect more concern with administrative convenience than the well-being of students. A process needs to be developed for regular review of school policies by persons outside the school administration. No such process is suggested in the paper.

Aside from the potential negative aspects of a more individualized system, I have some question about the effectiveness of most of Dr. Levine's proposals as a means of dealing with many of problems caused by being "different." Dr. Levine envisions a humane, pluralistic school that gives students a range of ways of succeeding. The vision is attractive. But how many at-risk adolescents will pluralism help? Will it help minors from families which provide little support

or stimulation? Will it help tenth graders who read at third grade level? Will it lead to a significant decrease in drop-outs? Of course, such reforms may be justified on the basis that they are humane and will help some students. But such changes require substantial resources. If individualzed assessments are to be valuable, they must be done by highly qualified people. Extensive diversity in curriculum also is costly. It is therefore essential to know who will benefit and in what ways.

I also have reservations regarding the proposal that we develop a cadre of professionals to serve as advisors and advocates for adolescent. I agree that we need more and better trained guidance counselors, doctors specializing in adolescent medicine and better trained teachers. The tone of the recommendation, however, is that these people are needed as substitutes for parents because parents may be distrusted by adolescents. I believe that research shows that adolescents are, in fact, highly influenced by parents. Dr. Levine may not mean to exclude family; my leanings would be to try to educate and involve parents as much as possible. This will require professionals to recognize the importance of paying attention to parents' value systems as well as their expertise about their children.

I also question the paper's discussion of minimum competency requirements in subjects like math and science. Dr. Levine asserts that such requirements are overly broad and require students to master material that will be unneeded in later life. Because some students cannot master these subjects, they become discouraged and drop out of school. For such students, Dr. Levine recommends alternative tracks, perhaps vocational education, starting as early as elementary school.

While curricula issues are beyond my area of any expertise, based on my discussions with people in Stanford's School of Education, I have reservations about these proposals. Basic competency in math and writing is needed in most

occupations - it is not only necessary for college bound students. Competency tests do not require knowledge of calculus; the demands are rather minimal. Moreover, in a world of rapidly changing jobs, most employers are looking for employees with basic skills and the capacity to learn new tasks. While some vocational training can supplement teaching basic skills, it cannot substitute for it. We will leave a student at real risk if he or she is trained only as an auto mechanic or is put on the path of making a living as a creative poet.

Finally, I am uneasy with the premise that seems to underlie all of the paper's proposals. While it appears that Dr. Levine values a commitment to promoting each individual's uniqueness as an end itself, he also is centrally concerned with the provision of equal opportunity for each person. (p. 68-69). This entails the opportunity "to discover, activate, and accentuate his or her own uniqueness. . . . The central purpose of education should be the facilitation of self-discovery. . . ."

I cannot, in a brief comment, explore the complexities of the concept of equal opportunity. I know that several Commission members, at least, have given a great deal of thought to this issue. I would only note here that if equal opprtunity is at all a meaningful concept, it is unlikely that it can be provided by diversifying high school curricula. The impact of education reform is going to be overwhelmed by differences in family, early education, social conditions, and our society's economic structure. In fact, despite the enormous diversity among students, most students make it through high school and successfully enter the job world. While a small percentage might fail because schools have failed to recognize and support individual differences, my impression is that much broader social factors, plus family differences, account for far more failure. It must also be recognized that in our society equal opportunity is the opportunity to fail, as well as succeed.

I believe that a more realistic goal is the development of a system that

offers each person a real opportunity to achieve at least a modest level of success in economic terms and in personal fulfillment. A more humane, sensitive - and perhaps diverse - education system can contribute to this, if we start with preschool. However, I doubt that following the paper's proposal would, to any significant degree, make opportunity more equal. We lack both the knowledge and resources to develop the type of individualized system Dr. Levine envisions. In fact, the use of resources to develop individualized plans or extremely diverse curricula might divert limited funds from more productive ways of promoting opportunity for the large majority of students.

This in no way is meant to disagree with Dr. Levine's general message that we do not do enough to recognize diversity, to build on strengths, or to identify and try to alleviate or compensate for deficiencies. At a general level, Dr. Levine's paper makes a compelling case for recognizing and responding to diversity. Some of his proposed responses seem sensible, even compelling. It would have been extremely useful if he had described some programs which had successfully helped adolescents who had special learning styles, had provided more alternatives to students who did not fit the standard mold, and had utilized individual assessments to create more sensitive educational environments. Without this type of information the paper, for the most part, overwhelmed me with the complexity of the problem, while failing to persuade me that the proposed remedies were likely to be effective, or feasible.

The comments so far have focused on what the paper says and the choices it recommends for further action. In closing I will briefly address the other questions we were requested to answer.

While the section of the paper on neurodevelopmental variation seems reasonably well based in research and experimentation, little support is provided for most of the other observations made in the paper, especially those regarding the current functioning of school systems and the impact of school policies on

children. Outside of the biological area, the author bases his comments primarily on his clinical experiences, rather than a thorough review of the research literature. The paper also does not, to any significant degree, describe new approaches that grow out of existing research.

It would have been helpful if there had been some discussion of alternative views about high school curricula. Dr. Levine criticizes current trends in education but does not indicate the reasons why these trends are occurring.

The paper does contain a section proposing some future research. I believe that the type of individual research suggested would be extremely difficult to conduct. More specific hypothesis are needed. Given the complexity of the picture presented, I am not certain that even "sophisticated multivariate and cluster analyses" would enable us to answer many of the types of questions he poses.

In sum, I found the paper better at raising questions than in providing answers. The Commission might want to explore some of the specific aspects of diversity which he identifies, determine if there are programs which seek to take account of these differences, and, if so, see if there are data indicating the impact of such programs. In examining these issues, however, it is critical to keep in mind the tension involved in recognizing difference: we can celebrate difference or we can punish it. Many of our institutions have been better at doing the latter than the former. Can they change?

MICHAEL WALD is a Professor of Law at Stanford University. He also served as the Director of the Stanford Center for the Study of Youth Development. He teaches subjects dealing with children and the law to graduate students in education, medicine, psychology, sociology, as well as to law students.

Professor Wald has written a number of articles dealing with public policy towards children, focusing primarily on policy towards abused and neglected children. He has just completed a ten-year longitudinal study comparing the development of abused and neglected children left with their biological parents and those placed in foster care. In a book describing this research, titled Protecting Abused and Neglected Children, Professor Wald and his co-authors, J. Merrill Carlsmith and P. Herbert Leiderman, examine the difficulties in using social science research as a means of developing public policy.

A former Guggenheim Fellow, Professor Wald also has been actively involved in developing public policy. He was the principal draftsman of major child welfare legislation at the federal and state levels.

A COMMENTARY

on Melvin D. Levine's

THE DIFFERENCE THAT DIFFERENCES MAKE: ADOLESCENT DIVERSITY AND ITS DEREGULATION

by **John Henry Martin**

Melvin D. Levine has prepared a most significant study. His documentation of the research concerning the differences among the 16 to 21 year-olds in our society should, given the recognition it deserves, stop the pressure to reform our schools through overly simple solutions based upon equally simplistic notions about the nature of students and young adults. We are deceived into thinking that, having divided students in our professional rhetoric according to race,ethnicity or socio-economic status and then further recognized a few of the special needs based upon their mental abilities and handicaps, our educational efforts are adequate. Levine describes biological predispositions, cultural origins, family backgrounds, temperaments, and physical health as basic conditions that are further magnified in their consequences by the impact of years of schooling. Their self-esteem, ambition, and motivation differ broadly. Their encounters with stress and their strengths and weaknesses in dealing with circumstances range from the stable to those Levine describes as high "risk factor complexes" unable to cope with the challenges of this "transitional period."

Dr. Levine points out that these differences are mediated by a series of "neuro-developmental phenomena." These include "selective attentions, memory, language, simultaneous/sequential processing and productions, higher order cognition, neuromotor function, and social skill." He points out correctly that these functions are major controllers of academic success.

Levine contends that our ignorance, or misunderstanding, of these differences

leads to mismatches between institutional and personal expectations that represent a "major cause of adolescent maladjustment and role comparison." Accordingly, he recommends that our educational system and society recognize the wide diversity of traits, talents, and dispositions among our adolescents. As a pluralistic society he urges that we learn to celebrate our differences. How beautiful that a physician examining the physical, psychological, and cultural differences invites us to construct policies that transcend mere calls for toleration! Rather, he says, human diversity is the nature of humanity. We differ greatly and we differ in many more ways than we have prepared ourselves to recognize. If we wish to improve our society, to diminish social and personal traumas, and to grow and fulfill more of us, then our policies and our practices need to cultivate our differences to avail ourselves of the broad range of talents in our young citizens. To be rich in things, we need to applaud how rich we are in talent.

Would that Dr. Levine's comprehensive taxonomy of differences could be matched quickly by an equally broad architecture of institutional services. There are obstacles. Institutions, all institutions, have an internal dynamic that drives them overtime to serve their employees at the expense of the clientele they were originally designed for. Schools are not exempt. This leads to programming and scheduling decisions that make dealing with unique talents or handicaps difficult. We have long ignored studies showing that secondary schools of over 1000 pupils in size tend to become bureaucratic and de-personalized. Crowds make control and conformity more important than humane and professional consideration.

A more serious condition handicapping our schools' recognition of differences is the historical emphasis given to the training of teachers in classroom management techniques. Teachers are trained in how to teach. They are not trained with equal emphasis in the nature of human differences. "Individual differences" as a phrase is

common in the literature of pedagogy, but the nature of those differences are painted with a brush so broad that the need for adaptations is but crudely understood. Teachers are not seen as experts in the pathologies of children. The pediatrician treats ill young; the psychologist, the emotionally disturbed; but in our society we have not recognized experts in the extraordinary range of normalcy. And so how children learn and the mediating roles of these differences in their educational success are not adequately understood to become the basis for either instructional or institutional adaptations.

Reading Levine made this reviewer aware of the plethora of handbooks for parenting the very young but the near vacuum of similar works for the parents of adolescents. The need is great and the awareness of the need is acute. Who has not heard the near helpless cry of mothers and fathers faced with the need for counseling in the normal encounters of their young about sex, jobs, and schooling? What the general public needs, our teachers and schools need in even greater degree, as do our religious leaders, our social institutions, and our courts.

An additional factor limiting our ability to deal with maladjustments is our cultural disposition to confuse increased knowledge and understanding with leniency. There is a widespread assumption that knowledge of the sources of adolescents' aberrant behavior must necessarily result in acceptance of that behavior. To understand is to forgive but to forgive is not necessarily to condone or to neglect. The cure for socially or educationally unacceptable behavior can come from the individual being helped to understand that the consequences of the act are not in harmony with his or her goals. The world's rewards and punishments are not always fair. Institutions designed to ease the passage into academic, family, and occupational success can be ignorant and neglectful or, hopefully, knowledgeable and nurturing.

Adolescence is the twilight period between dependent child behavior and adult independence. In past millennia, before the modern era, pubertal rites heralded coming of age with all the trappings and obligations of adulthood, from moral and religious responsibility in the church to the assumption of mature work and family roles. Modern societies have postponed many of these ancient customs and practices with the exception of the religious rites of confirmation and bar mitzvah. "Today I am a man" echoes in our heads with its antique, albeit sexist, tones. Because of this subtle and little noted erosion in society's expectations and opportunities to become adult at an early age, our policies and institutions do not serve the psycho-social drives of our young very well. Paradoxically, the onset of puberty comes two years earlier now than at the beginning of this century. Consequently, some of Dr. Levine's catalogue of differences among youth, particularly those that describe the ill-adjusted, are the result of a mismatch between youth's natural drives and the lack of opportunities to satisfy them. That is, the differences among youth that are traumatic are in many instances the consequence of a society whose institutions and schools do not provide vehicles and practices satisfying to the natural needs of its maturing youth. One of these needs is a consuming passion of the adolescent to be taken for an adult, to be regarded as "a serious person of worth".

The behaviors available in our society that carry the hallmark of adultness are very limited. To smoke, to drink alcoholic beverages, to get drunk, to use narcotics, to drive a car, to work, to have sex, to father a child, to become pregnant, and to give birth are the most commonly available and visible means by which the young adult can demonstrate new maturity. As most of these activities are health damaging, illegal, and immoral, the not-so-hidden message of our culture is that being an adult requires non-conformity to conventions or breaking the law.

Public policy and programs need to address this mismatch. As examples, opportunities for adult-like public service, earlier age for part-time military reservist training, equal status for night-time schooling, and strong encouragement to a greatly expanded job training program based upon apprenticeship can each contribute to the reduction in maladjustments and anti-social behavior which results from societal lack of opportunities to be legitimately adult.

Levine's emphasis upon those differences which schools and other institutions fail to serve places the emphasis for change upon highly personalized solutions. That is, better guidance counseling, more sensitive programming, and less punitive regulations regarding academic failure. All are needed, but recognizing the need to re-fashion our institutions and our practices regarding youth will be neglected if Levine's emphasis upon clinical concerns remains the sole basis for shaping new public policy. We need to recognize Levine's call for change. We need also to recognize that, to a serious degree, the high incidence of low self esteem and poor motivation and social skills is the direct consequence of the poverty of society's opportunities for young people to engage in socially acceptable adult-like behavior.

It is important to credit Dr. Levine with more than simply broadening our understanding of the extraordinary range of human differences. When medicine diagnosed packages of illnesses under the simple term "rheumatism," therapy was essentially primitive and pain easing. Research during the last 90 years has made that basket term archaic. Accordingly, treatment for bone, ligament, and muscle disorders, once lumped together as "rheumatism," has become more precise and effective. What Levine's study promises is that youth-serving agencies, including schools, may learn by a similar growth in their awareness of specific differences to diversify their programs, their policies, and their treatment of individuals. His work could be an historic beginning in the professionalism of youth serving workers and

JOHN HENRY MARTIN is an author, lecturer, and curriculum developer in education. He holds degrees from Teachers College, Columbia University (Ed.D. and M.A.) and the University of Alabama (B.Sc.). He has taught in elementary schools, including a one-room school house, high schools, colleges and graduate schools.

He has served as superintendent of schools in rural, suburban, and city school systems. During his thirty years as a teacher, principal and superintendent, he stimulated the development and adoption of many educational reforms.

As the President of JHM Corp, Dr. Martin authored the internationally used "Writing to Read" computer-based system for beginning reading, marketed by the IBM Corporation, as well as other computer-based education programs, including PALS, an inter-active video disc program for high school and adult illiterates.

From 1972 until 1974, he was Chairman and Director of the National Panel on High School and Adolescent Education of the Department of Health, Education and Welfare and U.S. Office of Education. He is the author of the Panel's report, The Education Of Adolescents.

His previous writings include Free to Learn, written with Charles Harrison, and Writing to Read, written with Ardy Friedberg. He is the author of numerous articles on the education of children in Readers Digest, Look, The Elementary School Journal, The Grade Teacher, The Journal of the National Association of Secondary School Principals, Education Leadership, The Saturday Review, and Teachers College Record.

Publications of

YOUTH AND AMERICA'S FUTURE

THE WILLIAM T. GRANT FOUNDATION COMMISSION ON WORK, FAMILY AND CITIZENSHIP

* * *

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