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Cross-Cultural and Historical Perspectives on the Developmental Consequences of Education[1]

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Development · Education culture · Sociohistorical context

Abstract
The goal of this paper is to examine efforts to understand the developmental consequences, particularly the cognitive consequences, of children spending large amounts of time in formal schools where their activity is separated from the daily life of the rest of the community and mediated by technologies of literacy and numeracy as well as specialized uses of language. The analysis begins by examining the history of formal schooling in relation to its social and cultural circumstances and progresses through an examination of different research strategies for reaching plausible conclusions about its cognitive consequences in the sociocultural context. The discussion ends by considering two contradictory tendencies, centralized standardization versus de-centralized adaptation and separation versus embeddedness, which have characterized education since its inception and which societies around the world confront in our current historical circumstances.

My goal in this paper is to examine the complex issues that intersect in seeking to specify the impact of schooling on development. Such a task requires that I begin by establishing at least some general agreement about the key terms in my title, culture and education on the one hand and cross-cultural and historical on the other. Each pair is complex in its own right, and the combinations to which their various

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conjunctions give rise make it essential that we work from as explicit a theory of the constituents as possible when trying to ascertain how they combine to shape the outcome of schooling in development.

Fundamental Definitions

Culture and Education

Although it is famously difficult to define, at present the term 'culture' is generally used to refer to the entire body of socially inherited past human accomplishments that serve as the resources for the current life of a social group ordinarily thought of as the inhabitants of a country or region [D'Andrade, 1966]. There is evidence of the rudiments of culture in non-human species [McGrew, 1998], but human beings are unique in their dependence upon the medium of culture and the forms of organism-environment interactions that culture supports in order to sustain and reproduce themselves [Tomasello, 1999].

For purposes of thinking about culture and education, it is useful to begin by tracing the concept of culture as it has evolved since entering the English language from Latin and French many centuries ago. Contemporary English language conceptions of culture originate in terms that refer to the process of helping things to grow: 'Culture, in all of its early uses, was a noun of process: the tending of something, basically crops or animals' [Williams, 1973, p. 87]. From earliest times, this notion of culture included a general theory for how to promote growth: Create an artificial environment in which young organisms could be provided with optimal conditions to develop. Such tending required tools, both material (hoes) and mental (the knowledge that one does not plant until winter is over). These tools are perfected over generations and designed for the special tasks to which they are put. Schools, from this perspective, are institutionalized cultures for growing next generations.

From early in its history, the notion of 'culture,' like the notion of 'cultivate' to which it is closely linked, has had a second meaning which connotes a positive value to 'being cultured/civilized.' In England the term was also used to indicate 'worshipful homage' among Christians, who, within a few centuries, would seek to 'bring culture' to the 'uncultivated peoples' of the world.

When we turn to the term 'education,' which entered English from Latin at about the same time as 'culture,' we find a similar duality. Resorting to the Oxford English Dictionary (OED), we find that the primary meaning of education is 'the process of nourishing or rearing a child, a young person, an animal' [OED, 1971, p. 833]. The similarity between education, so interpreted, and culture, is obvious.

Education also has important alternative meanings that speak directly to the problem of understanding contemporary relations between culture and education:

(1) 'The systematic instruction, schooling, or training given to the young in preparation for the work of life' [OED, 1971, p. 833], and

(2) To 'educe,' the initial meaning of which was to 'elicit or develop from a condition of latent, rudimentary, or merely potential existence' [OED, 1971, p. 834].

As you can readily see, both culture and education refer simultaneously to process and product. They overlap in their emphasis upon sustaining the life of the

community by bringing about change in children. They overlap, too, in their ambivalence about how this is to be done, through training, pruning and shaping, or through induction of latent potential. Consequently, they overlap on the uncertainties surrounding what sorts of tools to use, including what sorts of institutionalized practices are most appropriate to the task.

Cross-Cultural and Historical

Equally vexing is the question of how we should view comparison across cultures and historical time in trying to envision the future of education. In the 19th century, this was not really an issue. It was widely assumed by the earliest anthropologists who studied the people to be found in Africa, the Americas and many other parts of the world, that cross-cultural comparisons were simultaneously cross-historical. So called primitive societies were taken as evidence about early stages of history for all human groups. Europeans had simply developed further faster. [Tylor, 1874, p. 69]

Enthusiasm for the equation of social evolution and progress, as it was promulgated by 19th-century social thinkers, has subsided considerably in the past century and a half. Contemporary events in the Middle East and the rise of post-modernism coincide in their revulsion for the 'master narrative' equating history and progress. James Wertsch and his colleagues [Wertsch, del Rio, & Alvarez, 1995], for example, explicitly rejected the use of the term 'cultural-historical' to characterize their ideas, many of which were inspired by Soviet psychologists who used that term, because they saw the danger that the use of Marxist ideas implied that cross-cultural variations are really cross-historical, with modern technological society as the highest rung (so far) on the ladder of history. Similarly, Robert LeVine and Merry White explicitly challenge the idea that education for life in a bureaucratized, technologically sophisticated society is in any general sense to be viewed as betterment of the human condition. They argue instead for recognition of cultural pluralism as a precondition to any effort at making general value statements [LeVine & White, 1986]. Nevertheless, the idea of socio-cultural evolution remains important in the social sciences whether viewed skeptically or not [see Feinman & Manzanilla, 2000; Hallpike, 1979; Ingold, 1986], and formal schooling mediated by written symbol systems is seen as a major contributor to both the processes of individual and social change [Goody, 1987; Olson, 1994].

Despite the well-recognized difficulties of linking schooling to its historical and social contexts on the one hand, and purportedly individual intellectual and social development on the other, recent decades have seen an unparalleled amount of scholarly research seeking to understand the consequences of different educational arrangements in different national/cultural contexts [Serpell & Hatano, 1997]. Having forewarned you that the topic is treacherous, in order to set the stage for asking questions about consequences of schooling, I will now venture into a brief synopsis of historical variations in the ways that adults organize the lives of the young so that they acquire knowledge and skills deemed essential to communal life. I hope that the mental journey may stimulate thought about the future of education, even if the evidence is ultimately inconclusive.

History, Social Differentiation, and 'Education'

In a recent monograph entitled 'Non-Western Educational Traditions' Timothy Reagan argues that the term 'education' applies equally across all societies at all times because 'one of the fundamental characteristics of human civilization is a concern for the preparation of the next generation' [Reagan, 2000, p. xiii]. While I sympathize with his criticism of thoughtless writers on the topic who assume that societies lacking formal schooling are bastions of ignorance (and there are many such commentators), an unfortunate byproduct of assuming a universal meaning of the concept of education forces Reagan, and many whose work he draws upon, to place the term in quotation marks, or to qualify it with terms such as 'informal' or 'education in the broadest sense' to indicate that the process of 'preparing the next generation' has indeed varied across time and societies. I find it more helpful to think of education as a particular form of schooling and schooling as a particular form of institutionalized enculturation. Consideration of the process of education 'broadly understood' in different kinds of societies can serve to concretize this ordering from enculturation (induction into the cultural order of the society), to schooling (deliberate instruction for specific skills) to education [in the sense of an organized effort to 'bring out' (educe) the full potential of the individual].

Small, Face-to-Face Societies

When considering small, face-to-face societies where linguistic interaction is mediated by oral language, it is widely asserted that education = enculturation = participation. For example, Jerome Bruner, in an influential monograph on culture and cognitive development, remarked that in watching 'thousands of feet of film (about life among the !Kung San Bushmen), one sees no explicit teaching in the sense of a "session" out of the context of action to teach the child a particular thing. It is all implicit' [Bruner, 1966, p. 59]. Elsewhere in the same essay he comments that 'the process by which implicit culture is "acquired" by the individual ... is such that awareness and verbal formulation are intrinsically difficult' [p. 58].

Similarly, Meyer Fortes, in his well-known monograph on education in Taleland, emphasizes that 'the social sphere of the adult and child is unitary and undivided ... As between adults and children, in Tale society, the social sphere is differentiated only in terms of relative capacity. All participate in the same culture, the same round of life, but in varying degrees, corresponding to the stage of physical and mental development ...' [Fortes, 1938, p. 8].

Echoing these descriptions, Reagan reviews ethnographic evidence from 76 societies in sub-Saharan Africa and concludes that in the African setting, education 'cannot (and indeed should not) be separated from life itself' [2000, p. 29]. In terms of Reagan's approach, enculturation is an integral part of everyday life and no separate set of practices that involve deliberate pedagogy are required for the activity to count as schooling or education. I prefer to distinguish these forms in terms of their social organization and the forms of pedagogy involved.

However, even in such small, face-to-face societies there are exceptions to these generalizations concerning the total fusion of adult and child social sphere,

such as *rites de passage*, and I am always suspicious of accounts which minimize the heterogeneity within cultural groups (with respect to sex role obligations, for example). But for purpose of argument, let us assume that this picture of undifferentiated social life and education-as-enculturation represents a rough approximation to most of life in small, face-to-face, hunter-gatherer groups or subsistence farming groups.

Rudimentary Forms of Separation between Enculturation and Schooling

Even granting such a starting point, where life and schooling/education are fused, what one encounters in many small societies where agriculture has displaced hunting and gathering as the mode of life but which remain small in size and relatively isolated from each other, are the beginnings of differentiation of child and adult life. These beginnings suggest early forms of deliberate teaching which usually involve a good deal of training, but perhaps with some degree of inducing involved as well.

In many societies in rural Africa, for example, what are casually referred to as *rites de passage* may be institutionalized activities that last for several years – and teaching is certainly involved [Reagan, 2000]. For example, among the Kpelle and Vai peoples of Liberia, where I worked in the 1960's and 1970's, children were separated from their communities for four or five years in an institution referred to in Liberian pidgin as 'bush school.' There, children were instructed by selected elders in the essential skills of making a living as well as the foundational ideologies of the society, embodied in ritual and song. Some began there a years-long apprenticeship that would later qualify them to be specialists in bone setting, midwifery, and other valued arcane knowledge.

Social Accumulation, Differentiation, and the Advent of Schooling

Shifting to the historical record, it appears that it is primarily, if not only, when a society's population grows numerous and it develops elaborate technologies which permit the accumulation of substantial material goods that the form of enculturation to which we apply the term 'schooling' emerges.

As a part of the sea change in human life patterns associated with the transition from the bronze age to the iron age in what is now referred to as the Middle East, the organization of human life began a cascade of changes which, while unevenly distributed in time and space, appear to be widely, if not universally, associated with the advent of formal schooling. In the Euphrates valley the smelting of bronze revolutionized economic and social life. With bronze it became possible to till the earth in more productive ways, to build canals to control the flow of water, to equip armies with more effective weapons, and so on. Under these conditions, one part of the population could grow enough food to support large numbers besideitself. This combination of factors made possible a substantial division of labor and development of the first city states [Schmandt-Besserat, 1975].

Another essential technology which enabled this new mode of life was the elaboration of a previously existing but highly restricted mode of representing ob-

Fig. 1. Excavation of an early classroom from Sumer.

jects by inscriptions on tokens and the elaboration of the first writing system, cuneiform, which evolved slowly over time. Initially the system was used almost exclusively for record keeping but evolved to represent not only objects but the sounds of language, enabling letter writing and the recording of religious texts [Larsen 1986; Schmandt-Besserat, 1996].

The new system of cuneiform writing could only be mastered after long and systematic study, but record keeping was so essential to the coordination of activities in relatively large and complex societies, where crop sizes, taxes, troop provisioning and multiple forms of exchange need to be kept track of for the society to exist, that these societies began to devote resources to support selected young men with the explicit purpose of making them scribes, people who could write. The places where young men were brought together for this purpose were the earliest formal schools.

Earliest Known Example of a Sumerian School

Not only the activities that took place in these schools but the architecture, the organization of activities, and the reigning ideologies within them were in many respects startlingly modern. As shown in figure 1, the classroom consisted of rows of desks, facing forward to a single location where a teacher stood, guiding them in

Table 1. List learning in school: ancient and modern

Ancient lists		Modern lists	
subject	number of items	subject	number of items
Trees	84	Presidents of US	40
Stones	12	States of the Union	50
Gods	9	Capitals of the States	50
Officials	8	Elements of periodic table	150
Cattle	8	Planets in the solar system	9
Reeds	8		
Personal names	6		
Animals	5		
Leather objects	4		
Fields	3		
Garments	3		
Words corresponded with *gar*	3		
Chairs	3		

repetitive practice of the means of writing and the operations that accompanied it. Note that instead of inkwells, the classroom contains bowls where wet clay could be obtained to refresh current tablets. In many such schools, the compiling of quantified lists of valued items was a major pastime, although some letter writing also occurred. These lists were often viewed as evidence of extraordinary cognitive achievements. Table 1 compares an ancient list with one current in American schools.

Significantly, evidence concerning early schooling indicates that more than socially neutral, technical, literacy and numeracy skills were thought to be acquired there. Learning esoteric lists and the means for creating them were imbued with special powers such as are currently ascribed to those who are 'civilized,' and it was clearly recognized that socio-economic value flowed from this knowledge. As one father admonished his son, several thousand years ago:

> I have seen how the belaboured man is belaboured – thou should set thy heart in pursuit of writing ... Behold there is nothing which surpasses writing ...
>
> I have seen the metalworker at his work at the mouth of the furnace. His fingers were somewhat like crocodiles; he stank more than fish-roe ...
>
> The small building contractor carries mud ... He is dirtier than vines or pigs from treading under his mud. His clothes are stiff with clay ...
>
> Behold, there is no profession free of a boss – except the scribe, he is the boss ...
>
> Behold, there is no scribe who lacks food from the property of the House of the King – life property, health! [Quoted in Donaldson, 1978, p. 84f]

Although some features differ, a similar story could be told for China, where bureaucratized schooling arose a thousand or so years later, and in Egypt as well as in many of the civilizations that followed. In the Middle Ages, the focus of elementary schooling shifted to what LeVine and White [1986] refer to as 'the acquisition of virtue' through familiarity with sacred texts, but a certain number of students were

taught essential record keeping skills commensurate with the forms of economic and political activity that needed to be coordinated through written records. Such is the state of schooling in many Muslim societies to this day, although there is great variation in Islamic schools, depending upon whether the local population speaks Arabic and how formal schooling articulates with the state and religion in the country in question [See Serpell & Hatano, 1997, for a discussion of these variations and their implications].

As characterized by LeVine and White [1986], the shift from schools in large agrarian societies to the dominant forms found in most contemporary industrialized and industrializing societies manifests the following set of common features:

(1) The school has been internally organized to include age grading, sequentially organized curricula based on level of difficulty and permanent buildings designed for the purpose of teaching.

(2) The incorporation of schools into larger bureaucratic institutions so that the teacher is effectively demoted from 'master' to a low level functionary in an explicitly standardized form of instruction.

(3) The re-definition of schooling as an instrument of public policy and preparation for specific forms of economic activity – 'manpower development.'

(4) The extension of schooling to previously excluded populations, most notably women and the poor.

The dominant form of schooling adopted currently around the world is based upon this European model that evolved in the 19th century and which followed conquering European armies into other parts of the world [see LeVine & White, 1986; LeVine, LeVine, & Schnell, 2001; Serpell & Hatano, 1997, for a more extensive treatment of this evolution]. However, locally traditional forms of enculturation, even of schooling, have by no means been obliterated, sometimes preceding [Wagner, 1993], sometimes co-existing with [LeVine and White, 1986] the more or less universal 'culture of formal schooling' supported by, and supportive of, the nation state. Often these more traditional forms emphasize local religious and ethical values [Serpell & Hatano, 1997]. Nonetheless, these alternatives still retain many of the structural features already evident in the large agrarian societies of the Middle Ages.

As a consequence of these historical trends, one institutional form, somewhat crudely identifiable as 'Western-style' education, has become an ideal if not a reality all over the world (the Islamic world providing one alternative in favor of adherence to religious/social laws, as written in the 'Q'uaran,' a word which means 'recitation' in Arabic). The 'Western-style' approach operates in the service of the secular state, economic development and the bureaucratic structures through which rationalization of this process is attempted; it exists as a pervasive fact of contemporary life. According to a survey conducted by UNESCO in 1998, by 1990 more than 80% of children in Latin America, Asia (outside of Japan) and Africa were enrolled in public school, although there are large disparities among regions and many children only complete a few years of schooling. Nonetheless, experience of what, for a better word, I am calling 'Western-style' schooling has become a pervasive fact of life the world over [Serpell & Hatano, 1997].

With this set of considerations as background, I now turn to the question of the consequences of this pervasive form of educational experience for the development

of individual children, their communities, and humanity more generally, in the contemporary world. I will pay special attention to the role of culture and cultural variations in shaping any such consequences.

The Consequences of Schooling in Post-Colonial Societies

Although there were some attempts to assess the cognitive and social impacts of formal schooling compared to indigenous forms of enculturation prior to World War II, by and large the beneficial effects of formal schooling were assumed to be self-evident to European and American policy makers. During the 19th century, teachers, often missionaries, followed European troops to help carry the 'white man's burden.' Asia, South America and Africa all experienced this form of cultural penetration. One participant in such work referred to women teachers sent to the Philippines in 1901 as 'a 'second wave of troops,' remarking that the school in which she taught was no different in content from what was concurrently occurring in schools across the United States [Cleaves, 1994 quoted in Rogoff, 2003].

A small sample of statements by the founders of UNESCO, a secular organization, reveals clearly the way in which the founders of the UN viewed their mission:

> ... the wide diffusion of culture, and the education of human beings for justice and liberty and peace, are indispensable for the dignity of man [UNESCO, 1951, front piece].
>
> ... ignorance is not an isolated fact, but one aspect of general backwardness which has many features, like paucity of production, insignificant exports, poor transport and communications, deficient capital and income, [etc.] [UNESCO, 1951, p. 4].

In the spirit of UNESCO's view, economist Daniel Lerner, who assumed that schooling was essential to the process of becoming modern, argued that a key attribute of modern thinking is the ability to take another person's perspective and to empathize with their point of view [Lerner, 1958]. Lerner was quite specific about the relationship between psychological modernity and modern economic activity. The ability to take another's point of view, he wrote, 'is an indispensable skill for moving people out of traditional settings ... Our interest is to clarify the process whereby the high empathizer tends to become also the cash customer, the radio listener, the voter' [Lerner, 1958, p. 50].

The inability to adopt another's point of view is, of course, the central characteristic attributed to the thinking of 3- to 6-year-old children by Jean Piaget. Some did not shrink from drawing the obvious conclusion. C.P. Hallpike summarized decades of psychological research comparing the intellectual performance of educated and non-educated people of various ages on Piagetian and a wide variety of other cognitive tasks. With very few exceptions, the schooled participants outperformed those who had not attended school. These differences between schooled and non-schooled children led him to conclude that most of the time, 'primitives' do indeed think like small children [Hallpike, 1979].

Empirical Evidence

The reader who is interested in a comprehensive survey or the intellectual and social consequences of school is referred to extant summaries by Rogoff and Waddell [1982] and Serpell and Hatano [1997]. For present purposes, two examples describing the kind of performance changes that appear to be associated with schooling illustrate the basis for such broad-reaching conclusions concerning the dependence of cognitive development on schooling.

Donald Sharp and his co-workers studied the potential impact of schooling on the way Mayan Indians on the Yucatan peninsula of Mexico organized their mental lexicons [Sharp, Cole, & Lave, 1979]. When adolescents who had attended high school one or more years were asked which words they associated with the word 'duck,' they responded with other words in the same taxonomic category, such as 'fowl,' 'goose,' 'chicken,' and 'turkey.' But when adolescents in the same area who had not attended school were presented with the same word, their responses were dominated by words that describe what ducks do ('swim,' 'fly') or what people do with ducks ('eat'). Such word associations are often used as a subscale on IQ tests, where duck-goose is accorded a higher score than duck-fly. In addition, a good deal of developmental research shows that in the course of development, young children are more likely to produce duck-fly than duck-goose. The results of this study and findings from other parts of the world [such as Cole, Gay, Glick, & Sharp, 1971] suggest that schooling sensitizes children to the abstract, categorical meanings of words in addition to building up their general knowledge.

A meticulous study by Daniel Wagner suggested that children who attend school gain memory-enhancing skills [Wagner, 1974]. Wagner also conducted his study among educated and uneducated Maya in the Yucatan. He asked a large number of people varying in age from 6 years to adulthood to recall the positions of picture cards laid out in a linear array. The items pictured on the cards were taken from a popular local version of bingo called 'lotería,' which uses pictures instead of numbers, so Wagner could be certain that all the pictures were familiar to all of his subjects. On repeated occasions, each of seven cards was displayed for two seconds and then turned face down. As soon as all seven cards had been presented, a duplicate of a picture on one of the cards was shown and people had to point to the position where they thought its twin was located. By selecting different duplicate pictures, Wagner in effect manipulated the length of time between the first presentation of a picture and the moment it was to be recalled.

Earlier research in the United States had demonstrated a marked increase in children's ability to remember the locations of cards after they reached middle childhood [Hagen, Meacham & Mesibov, 1970]. Wagner found that the performance of children who were attending school improved with age, just as in the earlier study by Hagen and his colleagues. However, older children and adults who did not attend school remembered no better than young children, leading Wagner to conclude that it was schooling that made the difference (fig. 2). Additional analyses of the data revealed that those who attended school systematically rehearsed the items as they were presented, leading to the improvement in their performance.

These findings make it appear that schooling helps children to develop a new, more sophisticated, repertoire of cognitive abilities. In the case of word associations, it appears that a more mature, scientifically organized lexicon comes into

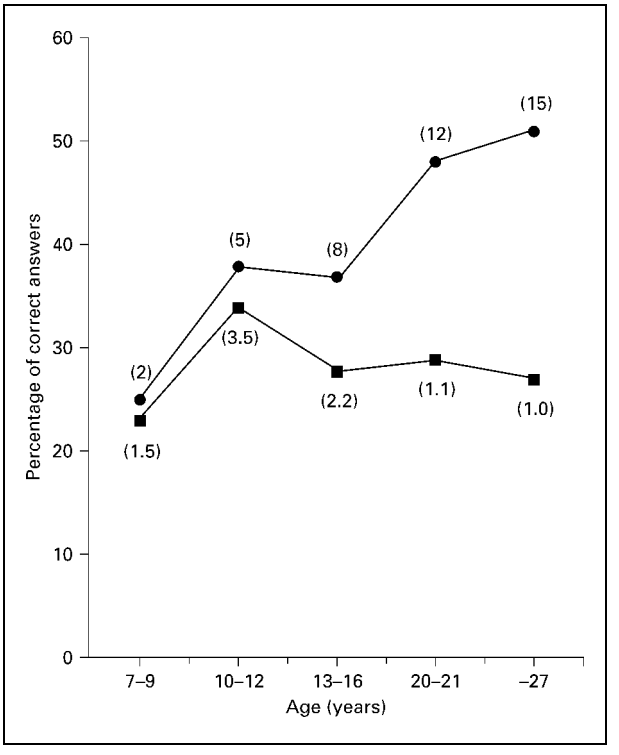

Fig. 2. Short-term memory performance as a function of age and years of education. Note that performance improves only as a function of years of schooling.

being. In the study of memory, it appears that schooling promotes specialized strategies for remembering and so enhances children's ability to commit arbitrary material to memory for purposes of later testing. Had this research been conducted in the United States, older children or adults who responded in the less sophisticated ways would have been suspected to suffer some form of mental retardation.

But there are serious reasons to doubt that differences obtained with standard psychological testing methods provide any logical evidence at all for generalized changes in classical categories of cognitive functioning. For example, it is not plausible to believe that word meaning fails to develop in children who have not attended school. The nonliterate Mayan farmers studied by Sharp and his colleagues knew perfectly well that ducks are a kind of fowl. Although they did not refer to this fact in the artificial circumstances of the free-association task, they readily displayed awareness of it when they talked about the kinds of animals their families kept and the prices different categories brought at the market. Similarly, when the materials to be remembered were part of a locally meaningful setting, such as a folk story or when objects are placed in a diorama of the subjects' town, the effects of schooling on memory performance disappear [Rogoff & Waddell, 1982; Mandler, Scribner, Cole, & De Forest, 1980].

Questioning the Validity of the Evidence

Such demonstrations led our research team to conclude that when schooling appeared to induce new cognitive abilities, it might well be because the entire structure of standardized testing procedures served as covert models of schooling practices. We noted that virtually all of our experimental tasks, modified or not, bear a strong resemblance to the tasks children encounter in school but little or no relation to the structure of the intellectual demands they face outside of school. Piagetian water conservation tasks, word associations, and remembering arbitrary arrays of objects are reasonable cases in point. When, except in school or on a quiz show, does one encounter such a task? Might it not be the case that in school children learn relatively restricted cognitive skills and do not undergo any general cognitive change?

The logic of this sort of comparative work appeared to demand that we find tasks that schooled and unschooled children from the same town encounter with equal frequency, and then demonstrate that children who go to school solve the problem in more sophisticated ways that are specifically tied to their schooling. Failure to find tasks of equal familiarity, in effect, meant that we were treating psychological tasks as neutral with respect to their contexts of use when this was patently false.

At the same time, the finding of school/non-school differences, if treated as specific forms of skill acquisition, did not mean that schooling exerts no significant impact on children. First, as many have noted, schools are places where children's activity is mediated through print, which not only adds a new mode of representation to the child's repertoire but introduces a whole new mode of discourse [Olson, 1994]. At a minimum, it seems certain that practice in representing language using writing symbols improves childrens' and adults' ability to analyze the sound structure and grammar of their language [Morais & Kolinsky, 2001], a finding which Peter Bryant and his colleagues have made good use of in the design of programs for the teaching of reading [Bryant, 1995; Bryant & Nunes, 1998]. Such metalinguistic awareness requires schooling. Vai farmers from north-western Liberia showed similar increased language analyzing abilities even though they had acquired literacy apart from schooling [Scribner & Cole, 1981]. Consequently these effects found in both economically developed, highly schooled societies and societies with limited forms of literacy and formal schooling, while not trivial, do not indicate that education produces any general influence on children that can be considered superior to the kind of enculturation that has existed in all societies throughout human history.

This realization led us on a multi-year investigation of the methodological foundations of experimental approaches to cognitive development: When and how might it be possible, we asked, to identify cognitive tasks that occur in everyday lives of villagers and townspeople in countries where modern schooling is unevenly distributed so that we could assess how schooled and non-schooled people tackled tasks of equivalent significance and familiarity? That it inculcates specific skills which may well be of economic and social value is not in dispute, although the proportion of children who achieve such valued skills while still in school is only a fraction of those who enter the institution of schooling initially.

In the intervening years, a great deal of work has been done to provide more plausible measures of the outcome of schooling. A number of investigators, for

example, studied how children and adults who attend school versus those who engage in some other activity using mathematically equivalent tasks (such as selling candy on the street, or measuring cloth, or calculating the area of a building site) make various calculations [Nunes, Schliemann, & Carraher, 1993; Saxe, 1994]. What this research has repeatedly discovered is that groups differing in their amount of school-based experience or everyday, work-related experience, approach the same task (logically speaking) in very different ways. The schooled subjects' reliance on written algorithms often lead them to make egregious errors, while the mathematical activities arising in the course of candy selling or calculating the ratio of one board length to another was both quantitatively superior and free of nonsensical answers. Moreover, in a number of cases, the procedures acquired informally in the course of work were more adequately generalized, undermining the oft-repeated idea that such knowledge was somehow bound to particular contexts of use. Rather, it has turned out that it is knowledge acquired in school that is most vulnerable to becoming encapsulated.

At the same time, one does not want to overstate the virtues of on-the-job mathematics learning. Researchers have obtained such findings only at relatively rudimentary levels of mathematics and it is unlikely that the calculus or string theory would arise without special institutions for the teaching of mathematics precisely as an abstract form of knowledge. These are important issues to pursue, but owing to lack of space, I wish instead to turn my attention in a different direction and to answer the rhetorical question, 'Where could cognitive skills and modes of discourse such as those learned in elementary school find application outside of school of equal relevance to schooled and non-schooled populations?'

A Shift in Focus: Intergenational Studies of the Impact of Schooling

Actually we provided an answer to this question in our monograph on the consequences of education in the Yucatan [Sharp, Cole, & Lave, 1979]:

> ... the information-processing skills which school attendance seems to foster could be useful in a variety of tasks demanded by modern states, including clerical and management skills in bureaucratic enterprises, or the lower-level skills of record keeping in an agricultural cooperative or a well-baby clinic. (p. 84)

While we did not follow up on the implications of this conclusion, Robert LeVine and his colleagues [LeVine & White, 1986; LeVine, LeVine & Schnell, 2001] did, in a program of research that provides what I believe to be the most convincing evidence of the cognitive and social consequences of schooling, and one that has extremely important policy implications as well.

These data focus on the ways in which formal schooling changes the behavior of mothers toward their offspring and their interactions with people in modern, bureaucratic institutions, as well as the subsequent impacts on their children. Le Vine and his colleagues start from three major changes in maternal behavior that have been widely documented by demographers over the last several decades: the children of women who have attended elementary school experience a lower level

of infant mortality, better health during childhood and greater academic achievement. These researchers propose a set of plausible habits, preferences and skills that children acquire in school which they retain into adulthood and apply in the course of raising their own children. This set includes, in addition to rudimentary literacy and numeracy skills:

(1) Discourse skills involving using written texts for purposes of understanding and using oral communication that is directly relevant to the negotiation of interactions in health and educational settings involving their children.

(2) Models of teaching and learning based on the scripted activities and authority structures of schooling, such that when in subordinate positions schooled women adopt and employ behaviors appropriate to the student role and when in superordinate positions, adopt behaviors appropriate to the teacher role.

(3) An ability and willingness to acquire and accept information from the mass media, such as following health prescriptions more obediently.

LeVine, his colleagues and others have carried out an impressive set of studies sampling many parts of the world, on the basis of which they offer a general model of how school-based learning, although it does not produce generalized socio-cognitive change at the time, does produce context-specific changes in behavior that have quite general consequences with respect to the task of child rearing, which in turn produces general consequences in the next generation (see figure 3).

A great deal more research needs to be done to clarify important causal relations hidden in the diagram in figure 3. For example, how much education of what kind produces what levels of behavioral change? How serious might selection factors be in the reported results? But at least as important are questions about what has been lost in return for the obvious benefits of reduced infant mortality or the ability to perform better in schools. As LeVine and White [1986] comment, modern schooling as part of the rationalization of technologically advanced nation states is not an unproblematic moral good. At present it rests upon forms of age-grading that alienate generations from each other and put individuals within generations into competition with each other in ways that are also alienating. It also disrupts family life by leading those who obtain high levels of schooling to migrate to the city or to other countries in search of work commensurate with their education [Serpell & Hatano, 1997]. Most ominously, the forms of production that result from schooling are part of a world-wide acceleration of the decimation of the earth as a common ecology for human life that may push human kind inescapably down the path to total extinction.

Cultural Variations and School Achievement in Technologically Advanced Nation States

Among the major modern nation states, with their well-developed state institutions and a heavy reliance on modern technologies as an essential component of economic activity, there are two kinds of concerns about the intersection of schooling and culture. The first concerns cross-national comparisons. There are marked discrepancies in achievement levels between countries when schools adopt essentially the same curricula designed to inculcate the same skills. The second concerns

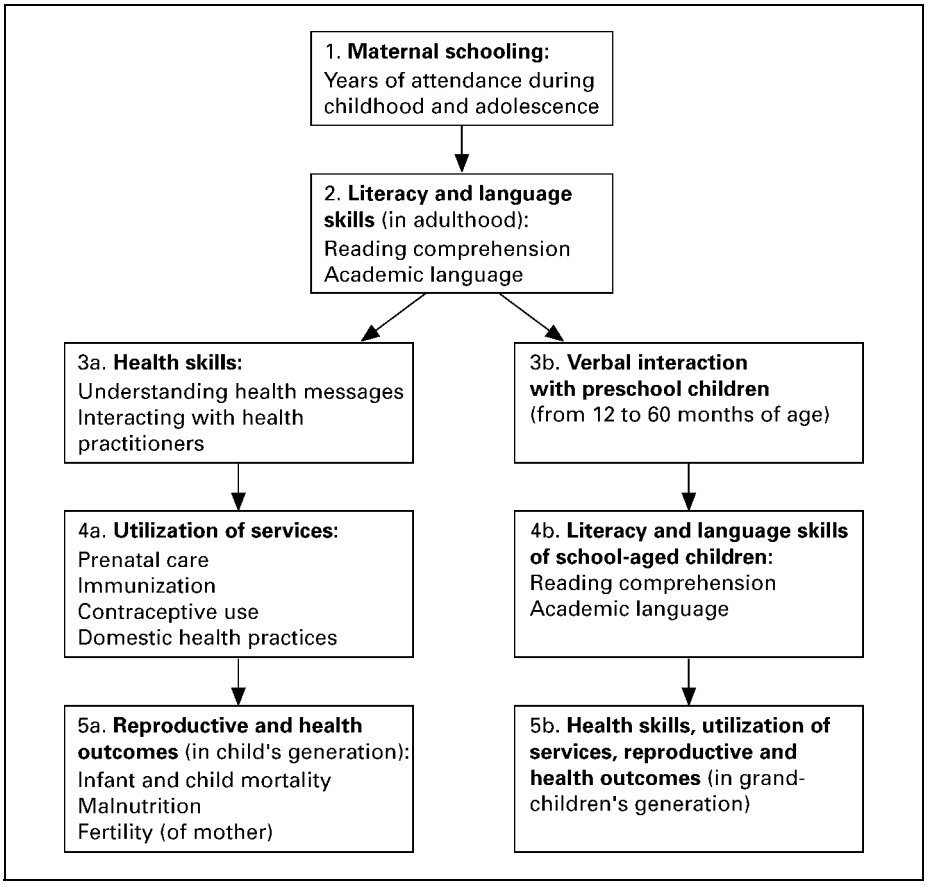

Fig. 3. Hypothetical influences of maternal literacy on health and child development [LeVine, LeVine & Schnell, 2001].

cultural variations within modern nation states among different ethnic groups, a problem long of concern in the United States, but one which has become of increasing concern in many countries owing to the de facto existence of, and in at least some cases the urgent economic need for, immigration. I will treat the two cases separately because they raise somewhat different issues.

Cross-National Comparisons

Cross-national comparisons became a matter of intense debate in the 1980's largely as a result of Japan's economic achievements, which evoked deep concern in the United States indexed by a report from the National Research Council entitled *A Nation at Risk.* The impetus of this concern resulted in a massive, and repeated, set of cross-national studies, the most systematic of which focuses on

mathematics and science at various grade levels (the Third International Mathematics and Science Study, TIMSS). The basic results of this study for 8th-grade mathematics indicate that the East Asian countries of China, Japan and Singapore score higher than Western European countries, with the US and England more or less at the bottom of the list.

While the quantitative differences are clear enough, the reasons for them, and particularly those reasons that can rightly be termed 'cultural,' are more difficult to summarize. First, there is the problem of where to look. Most of the looking relevant to characterizing cultural factors associated with performance has been done in the classroom. James Stigler and James Hiebert [Stigler & Hiebert, 1999], who conducted ethnographic research in conjunction with the 1997 TIMSS study contrast Japanese, German, and U.S. classroom cultures in this way in the following terms (pp 25ff):

- German teaching focuses on *developing advanced procedures*. The teachers lead the students through the development of procedures, including their rationale and the general classes of problems for which they are appropriate.
- Japanese teachers organize *structured problem solving*. They present demanding problems and organize the students to engage in active problem solving. Their major role is to design and orchestrate the lessons so that students are likely to use procedures from prior lessons as a starting point.
- US teachers seek to have their students *learn terms and practice procedures*. The content of the lessons is less demanding and less mathematical reasoning is expected. One observer commented wryly that in the US classrooms, 'there are the students and there is the teacher. But I have trouble finding the mathematics.'

When we look for cultural factors which might underpin these classroom differences, there are many hints that they are present, but their presence quickly leads to new questions. For example, when one American teacher viewed the tapes, he sought to implement the Japanese problem-solving approach in his classroom, but he failed. The students, gathered in small groups, waited to be told what procedures to use. Alternatively, when observers in an early study in this series scored the percentage of time during teacher-led sessions when the students were paying attention, they found that only 45% of the American children were attending to the teacher in comparison with almost 70% of the Japanese children, a difference found at both the 1st and 5th grades. [Stevenson, Lee, & Stigler, 1986]

In addition to within-classroom cultures, we also need to consider the role of the society of which the school is a part. Thus we must also take into account a variety of features that can loosely be referred to as 'social cultural' and which contribute to national differences that are relatively easily to quantify. Amount of time spent in the classroom doing mathematics is one obvious factor, as is level of teacher preparation. Performance correlates closely with such resource measures across countries. Outside the classroom the educational level of parents, amount of time spent doing homework, and respect accorded to the teaching profession are additional factors of importance. All these factors can be considered cultural in so far as they speak to the value of mathematics and science education within the society as a whole.

Perhaps the most difficult factors to specify and link quantitatively to cross-national differences performance are cultural factors that appear to operate at the level of the state, such that a 'national style' of thinking is characteristic of people in large political/geographically circumscribed 'cultural groups.' For exam-

ple, early childhood enculturation in Japan presupposes a notion of personhood which emphasizes interdependence, mutuality of trust, and the high value accorded to self-discipline and perfectionism in fulfilling one's role [Befu, 1986] – in contrast with a more individualistic mentality that is said to characterize the West.

With respect to Japan and China, which differ internally in many ways, it has been argued that these features combine with a strong belief in effort rather than innate ability as the cause of success in all fields of endeavor. The combination is a potent one when it is achieved in school. It is no wonder, for example, that while 'not in assigned seat' is a relevant variable in coding behavior of American children, in Japan it happens too rarely to be useful.

These facts speak strongly to the need to assess the consequences of schooling in relation to the whole of its parts; schooling is only one of many enculturating institutions that children routinely encounter. Thus it is not difficult to see the perplexity in the children and the difficulties teachers encounter when they seek change at the classroom level in the absence of changes in the broad socio-cultural formation of which they are a part. Some who admire Japanese classroom achievements have sometimes sought to encourage adoption of Japanese teaching methods as a means of overcoming achievement gaps, but the story of the American teacher who attempted to change an eighth grade classroom points squarely at the problem: classroom interactions are embedded in, and rest upon, an enormous amount of cultural conditioning. Schooling is only one institution in a vast complex of culturally organized institutional arrangements. Changing only one part of the system without changing other parts is at best a risky enterprise.

Moreover, as in the case of the introduction of modern schooling into agrarian low-technology societies, one has to consider the costs as well as the benefits. As Harami Befu [1986] points out, the school system which many Americans so admire also gives rise to violence and bullying in middle school, abuse of parents, glue sniffing and outright refusal to leave home for school.

The same need to adopt a polycontextual point of view applies to all efforts to understand the consequences of schooling in its national socio-cultural context. 'Western-style' schooling, while retaining certain key features, it locally adapted in a multitude of ways. If one considers it a blessing, it is a mixed blessing at best.

Within-Nations Cultural Variations

Often overlooked in cross-cultural studies of education is that studies comparing different cultural and ethnic groups that have appeared in Europe and the United States, and whose numbers in many countries are increasing, offer important ground for research into what it would mean to create mixed educational environments that capitalized on the inescapable cultural diversity [Gallego, Cole, & LCHC, 2001]. The issue of immigration, diversity, and citizenship is unavoidable in any country in Northern Europe or North America. When a previously homogenous country such as Finland is told that it *must* encourage immigration for its own economic survival, one knows that the problem of how cultural variation influences educational achievement is serious indeed.

In some respects the issue of within-country variation in culture and education is the historical consequence of the very factors that produced the spread of European-style education in the first place. Having promoted universal education as the engine of modernization and relinquishing direct political control over former European colonies, we are finding that the formerly colonial peoples 'over there' have agreed to the superiority of our way of life, at least its material aspects, and now have made their appearance 'over here.'

The reactions and counter-reactions this situation has caused permeate all aspects of society. (I confine my comments here to the American situation, which I know best and leave it to readers from other countries to make appropriate generalizations to their local circumstances.) Roughly speaking there are four approaches to dealing with the problem of cultural diversity and schooling, the first of which was outlawed in the United States in the middle of the last century, but is returning in various guises.

(1) The doctrine of separate but equal which came into effect with the end of the American Civil War, before which time most African-Americans lived in slavery and were forbidden by law to get an education. Under the separate but equal doctrine, non-Anglo children (primarily African-American and Mexicano) were segregated into their own schools and given an education that mimicked the general European model. The fact that teachers were poorly paid and trained, the facilities generally abysmal, and the families needed the children's labor for significant periods meant that such education, however separate, was never equal. And the possibility of appropriating indigenous forms was never seriously considered.

(2) The effort to modify standard curricula in a way that builds upon indigenous enculturation practices either as a supplement to standard schooling (e.g., religious schools that meet during the after-school hours or on the weekends, or Japanese 'juku,' which offer a variety of supplements, usually drill and practice in basic skills) or as a 'bridge' to standard schooling. A large, early, and apparently successful effort of the bridging sort was conducted in Hawaii, where indigenous modes of talk and interaction were blended into school lessons [Tharp & Gallimore, 1988]. Another effort has included starting high school literature classes using literature containing speech genres known and appreciated by the student body and then, once analytic grasp of these strategies has been mastered, showing students how the same techniques could be used for analyzing Euro-American literature [Lee, 1998].

(3) Efforts to break down the separation of school and community and incorporate the legitimate knowledge with which non-Euro-American children come to school by directly tapping into their local funds of knowledge. This boundary crossing is achieved by having teachers spend time in their local communities and by inviting local community adults with special expertise into the school [Moll, 1992; Gonzalez, Andrade, Civil, & Moll, 2001].

(4) The fourth approach, which reigns at present in my home state of California, is to deny any relevance to cultural variation in schooling and to mandate total immersion of immigrant children in Euro-American educational and cultural forms, outlawing the use of home languages and cultural practices in the school. This approach effectively treats home language and culture as problems to be eradicated. Owing to geographical clustering of ethnic groups within regions, this form of edu-

cation often comes to approximate de facto the de jure 'separate but equal doctrines' of the early 20th century.

As one can imagine, each of these approaches meets with various kinds of objections and there is a great deal of confusion about what part of which disparities in educational outcome are associated with cultural difference and which parts are surrogates for lack of resources, real material resources or mythical mental ones.

Looking to the Future

Having traveled through several millennia of time and across the globe in examining the past and present state of education in relation to culture, I will now offer some conclusions about the trajectory I have drawn and how it might provide some indications about the future of education.

First, it is useful to consider a handful of generalizations that appear to apply quite broadly across historical time and space:

(1) Formal schooling arises as part of the division of labor in societies when they reach a certain scale in terms of number of people.

(2) The precise content of the curriculum depends upon political-economic and ideological foundations of the society. In societies where large cities operate as centers of control, literacy and numeracy are at the heart of the curriculum and material accumulation is an important value. In large agrarian societies, while basic-skills training is not entirely absent, religious/ideological training may become the dominant form of activity for most participants.

(3) Formal schooling is never socially neutral. Even presumably neutral skill acquisition presumes the value-laden activities they were designed to accomplish, and it is usually accompanied by ideological considerations that exaggerate the actual use value of the knowledge acquired.

(4) Formal schooling mediated by print and other sign systems produces age segregation and the institutionalized forms of hierarchy that articulate with the state or ecclesiastical institutions of which they are a part in a variety of ways.

(5) Cognitive changes associated with formal schooling appear to be content and context specific for those directly involved. However, they may become general to the extent that many practices within that society demand skill in that content and the extent to which participation in schooling changes participants' orientation to modern bureaucratic structures and to the raising of their own children.

(6) Because formal school actualizes the enculturation of a society's children, schooling bears different relations to society in different countries and the culture of the classroom bears varying relationships to children's home cultures in multicultural societies. There is, at present, no agreed-upon way to deal with the difficulties that arise from the interaction of presumably universal school content and manifestly variable socio-cultural values.

This short list of generalizations makes it unlikely that we can use the cultural history of schooling to predict the future of schooling with any certainty because the future depends so crucially on the sort of societies that schooling will mediate. However, in the spirit of this essay, I can speculate about major choices facing humanity with respect to the enculturation/schooling/education of its children. Each is presented as a choice between contested tendencies.

(1) Centralized standardization versus de-centralized adaptation.

(a) For many decades and across many countries, there has been a continuing, if not escalating, movement of people away from the countryside into large, region-like cities and a parallel amplification of the model of rationalized, bureaucratized education to meet the demands of economic and political life ever more mediated by complex technologies. The intensification of this trend tends toward ever more restrictive demands for standardization, increasing value of high-level certification, and hierarchicalization of society based upon educational achievement.

(b) As standardization and centralization have reached high levels, requiring rigid adherence to prescribed curricula, there has been a counter-tendency to recover the properties of enculturation in small face-to-face societies, such as the suggestion that one adopt new technologies to support implementation of the metaphors of classrooms as a community of learners, or the use of cognitive apprenticeship as a model for formal education [Brown, Metz, & Campione, 1996; Collins, Brown, & Newman, 1989; Rogoff, Matusov, & White, 1996]. In part these efforts represent attempts to recoup the losses incurred by the overbearing control of bureaucratic institutions, in part they reflect changes in the nature of modern work in which distributed production, teamwork, and individual initiative appear essential. This contrast can also be characterized in terms of the longstanding distinction between training and education. Current technological advantages make radical decentralization/localization of schooling a practical possibility but appear to recapitulate and perhaps even exacerbate prior inequalities [Warschauer, 2003].

(2) Separation versus embeddedness.

(a) In pre-centralized, face-to-face societies, education/training and enculturation were not sharply differentiated. The rise of formal schooling, particularly in association with the rise of cities and centralized state apparatuses, has been associated with separation of the school from society. On the one hand, this produces a form of efficiency in insuring the transmission of technical skills deemed essential to the society's maintenance. On the other hand, it has encouraged the encapsulation of school-based learning and devaluation of knowledge acquired in other settings.

(b) The disutilities of this form of education (including high drop-out rates, narrow specialization, social alienation including the inability to deal effectively with cultural variation) have produced a variety of counter institutional moves, including inquiry-based curricula which take the local community's traditions, ethos, and problems as the inspiration for organizing education, in effect seeking to break down the boundaries between school and community (as manifested in notions of communities of learners, home-based education, problem-based learning, cultural-model-based education).

At present it is too early to tell whether any of the alternatives to centralized, standardized models of education will gain ascendancy and if so, where the leading edge of such changes will be: in the most highly advanced, technologically oriented parts of society as means of dealing with cultural diversity and decentralization of knowledge and industrial production, or on the technological periphery, as a mode of resistance and survival in the face of centralized globalizing forces?

To a very great extent, the outcome with respect to the two issues I have singled out to end this discussion will depend on the nature of society that emerges from the current round of globalized, just-in-time, more-or-less instantaneous inter-

actions at a distance that have come to be the hallmark of modern life. In the early 1980's, a Soviet archeologist of my acquaintance said that Sumer was the most totalitarian society of all time. If the model of education to which it gave rise continues to dominate the world, it bodes ill for us all because that form of education has brought us to the brink of self-extermination. But whether, and how, a more horizontally organized, distributed, democratic and locally controlled form of societal interaction and enabling forms of education can compete with the Leviathan of history is highly uncertain. The alternative will be, if and when it comes into being, a hybrid of new and old forms, of the standardized and the locally adapted. It will eschew the notion of human education as the preparation of children to triumph over nature and teach us how to live within, as a part of nature, including nature's multicolored, multicultural, enormously heterogeneous forms of society.

If the social sphere is to become re-integrated, it will not be by returning to the past but by creating a new kind of future in which central values of the past combine with the amazing accomplishments of the present to enable us to live in a sustainable garden, for and with our children.

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