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## From *The Process* of Education to *The Culture* of Education: An Intellectual Biography of Jerome Bruner's Contributions to Education

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"I never felt I was going into education. If you didn't take into account this most powerful institution—schooling—how could you talk about cognitive development?" (Conversation with Jerome Bruner, October, 2000).

This quote expresses a link between the individual and the societal, between the cognitive and the cultural. Both these poles of educational thought have early roots in Bruner's undergraduate and graduate training. Bruner's early forays into the world of education were based primarily on cognitive psychology, particularly cognitive development. Over time, his educational thinking became increasingly grounded in cultural psychology and anthropology. While not forgetting Bruner's integration of these poles of the human condition, we see a shift of emphasis over time from the individual to the cultural, from psychology to anthropology.

This dynamism between psychology and anthropology provides the framework for the chapter. We organize our material chronologically, after first introducing our sources and perspectives on the material.

## SOURCES AND PERSPECTIVES

Nancy Lutkehaus' sources are books Bruner has written, most importantly, his intellectual autobiography, *In Search of Mind* (1983a) and also an interview she conducted with him in New York City in October 1996.<sup>1</sup> Lutkehaus, a visual anthropologist who has written on the history of anthropology, was introduced to Bruner through the late Tim Asch, an ethnographic filmmaker who worked with Bruner on the visual component of the elementary social science curriculum, *Man: A Course of Study* (MACOS; Lutkehaus, 2002). She is also working on a book about the development of the MACOS curriculum and Bruner's impact on psychological anthropology (Lutkehaus, 2000).

Patricia Greenfield, a developmental cultural psychologist, traced Bruner's evolution as an educational theorist through analyzing his four major books on education, *The Process of Education* (1960), *Toward a Theory of Instruction* (1966), *The Relevance of Education* (1971), and *The Culture of Education* (1996). She also drew on her shared journey with Jerome Bruner (personal communication, October 2000), beginning as an undergraduate student at Radcliffe in the early 1960s, continuing into graduate school at Harvard in the early to mid-1960s, and as a postdoctoral researcher at the Harvard Center for Cognitive Studies in the late 1960s and early 1970s. A telephone conversation in September 2000 and an in-person conversation at Bruner's Manhattan loft in October 2000, part of their ongoing relationship, provided key orienting guidance.

## PSYCHOLOGY AND ANTHROPOLOGY IN BRUNER'S BACKGROUND

Bruner was an undergraduate student in psychology at Duke University during the mid-1930s. While there he published a paper on "The effect of thymus extract on the sexual behavior of the female rat." At Harvard for graduate study in psychology, he had the psychologist Gordon Allport as an advisor. While he wrote in his autobiography that Allport "did not have a deep effect on my style of thinking" (Bruner, 1983a, p. 36), Bruner did end up sharing, in a later phase of his career, Allport's passionate interest in autobiographical narrative.

That is the more obvious psychology side of Jerome Bruner's intellectual roots. But there was an almost "underground" anthropology side as well. In his autobiography, Bruner mentions reading Malinowski and hearing Margaret Mead speak about cultural relativism (Bruner, 1983a, p. 26). He also had a roommate—Leonard Broom—who was an anthropologist.<sup>2</sup> Bruner visited him "in the field" during the summer of 1937 while Broom was studying change in dance forms among the

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Cherokee produced by contact with their white neighbors. "It never occurred to me," Bruner wrote, "that there was any conflict between what anthropologists did and what I had been doing [studying the psychology of learning through experimentation with rats]. We psychologists (I was twenty-one) knew that whatever the anthropologists found would have to be explained by the very same elementary processes we studied. The idea of the autonomy of cultural forms (one of Broom's great passions) never quite percolated into my psychologist's consciousness" (Bruner, 1983a, p. 29).

The mainstream world of psychology that I entered as a student was dominated by sensationism, empiricism, objectivism and physicalism. But when I was an undergraduate, my heroes and mentors were almost to a man swimming against that mainstream. My heart was with them: Gestalt psychology, Sigmund Freud, the cultural anthropologists . . . [who] argued for the social origin of experience itself, that what we knew and experienced took its meaning from a world of culture, symbols and myth that had little to do with the world of physics and physical stimulation. (Bruner, 1983a, p. 59)

When Bruner arrived at Harvard as a graduate student, and again after the war, Culture and Personality theory was enjoying its hey-day there. The "torch-bearer," according to Bruner, was Clyde Kluckhohn, whom Bruner describes as "a romantic, a restless believer in the power of culture to shape mind, but too subtle an intelligence to embrace any simple generalizations about how the two were related" (1983a, p. 134). Both Margaret Mead and Ruth Benedict were frequent visitors to the campus and John Whiting was hard at work correlating culture traits with presumed basic personality characteristics.<sup>3</sup> The idea of culture, as anthropologists then saw it, was a new and compelling idea to Bruner (Bruner, 1983a, p. 178).

Bruner's contact with anthropologists grew even closer when in 1946 the old Department of Psychology at Harvard split in two. One wing, the more sociotropic, joined sociology and social anthropology to found a new Department of Social Relations.<sup>4</sup> Although he continued to have contact with the old Department of Psychology and to teach some courses there, the Department of Social Relations became Bruner's new home, until he and George Miller established the Center for Cognitive Studies in 1960.

Thus, from the very start of his career as a psychologist, Bruner said, he was juggling "two sets of maps," two models for thinking about and looking at the world and human psychology: one map from psychology, the other from anthropology. These two maps were soon to be joined in his work on education. But first he had to become involved in the world of educational praxis. Political events in the broader society drew him into this world.

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## EVENTS LEADING UP TO THE PROCESS OF EDUCATION

### Jerrold Zacharias and Postwar Science Curriculum

In the aftermath of World War II and the climate of Cold War competition between the United States and the Soviet Union in the arena of science, the eminent MIT physicist, Jerrold Zacharias (who with Oppenheimer and others had worked on the development of the atomic bomb) turned his attention to the knowledge gap and the teaching of science to American school children. In 1956, with a seemingly modest proposal submitted to the president of MIT and the National Science Foundation to make short films titled "Movie Aids for Teaching Physics in High Schools,"<sup>5</sup> Zacharias launched what became known as the Physical Science Study Committee (PSSC), headed by himself and his colleague at MIT, physicist Francis Friedman (Goldstein, 1992, p. 152).<sup>6</sup>

A year later, in response to the Soviet launching of the Sputnik satellite on October 4, 1957, Eisenhower created the President's Science Advisory Committee (PSAC), of which Zacharias was a member. The next month Eisenhower established the position of special assistant to the president for science and technology and appointed James Killian, the president of MIT, to fill the position. In his State of the Union address for 1958 Eisenhower announced a fivefold increase in budget to the National Science Foundation (NSF) for science education. Shifting his focus from the study of atoms to the study of school children and how they learned science, also in 1958, Zacharias created Educational Services, Inc. (ESI), a private, nonprofit organization whose purpose was to carry out educational research and development. Funds were obtained not only from the NSF, but the Ford Foundation and the Alfred P. Sloan Foundation.

An important element of Zacharias' proposal for a new physics curriculum was that actual physicists would develop the films and the textbooks, problem books, question cards, and answer cards that were to accompany them, short-circuiting the usual role of education specialists. The success or failure of the films as teaching devices would depend to a large extent, Zacharias thought, on having the entire apparatus of the experiment really right: "Like a high fidelity phonograph," he said, "one must have besides the machine a good piece by a good composer played by an artist. The room must be good, not too noisy, and the people have to want to listen" (quoted in Goldstein, 1992, p. 152 and Bruner, 1983a, p. 179).<sup>7</sup> The scientists were to be the equivalent of the artists, the experiments the good pieces they were to play, and for the high fidelity phonograph, i.e., excellent quality films, Zacharias looked to film directors from the world of television and movies, rather than the traditional educational film industry.

Where Bruner fit into this project, he said, was to help his friends Zacharias and Friedman get people "to want to listen." The physicists, of course, hoped that

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Bruner's research on cognitive development, especially his recent study of the work of Vygotsky and Piaget, would provide expertise on the psychology of learning. Little did Bruner realize in 1958 that this invitation and challenge, which started out over a lunch conversation, would eventually lead to what became a lifelong focus on "the culture of education." But, of course, that notion came much later.

At the time, Zacharias was aware that the goal of the Physical Sciences Study Committee was as much a cultural one as it was a purely technological one:

In the minds of the committee, what they were trying to do was analogous to developing an appreciation of music, art or literature. It was commonly understood, they said, that one has to work at the liberal arts, to devote time and effort to them in order to get anything out of them. Educated people recognize the value and importance of the liberal arts, but only rarely do they appreciate science in the same way. People who would never countenance illiteracy in the liberal arts incline to a vast, unthinking tolerance of it when it comes to science. The committee had observed that parents, confronted with a child's inability to succeed at science in school, all too often react with an indulgent, "That's OK—I never understood science either." (Goldstein, 1992, p. 164)

What Zacharias and the other members of the committee meant when they spoke of wanting to develop an appreciation of science was "developing in the student the ability to distinguish knowing from opinion; to understand the meaning of probability; to recognize that uncertainty necessarily accompanies all observation and measurement, and to reject the false certainty of dogma" (Goldstein, 1992, p. 164). The goal of the PSSC curriculum was to make students familiar with the various modes of scientific reasoning. The facts of science were to serve principally as the means by which the goal was to be reached.

Thus Zacharias, Friedman, and Bruner shared a common goal—helping people learn to learn by learning how to think. As Zacharias said, "The reason I was willing to do it [PSSC] was not because I wanted more physics or more physicists or more science; it was because I believed then, and I believe now, that in order to get people to be decent in this world, they have to have some kind of intellectual training that involved knowing [about] Observation, Evidence, the Basis for Belief" (quoted in Goldstein, 1992, pp. 164–165).

### The Woods Hole Conference and Bruner's The Process of Education

In 1959 a 10-day conference was held at Woods Hole, Massachusetts, sponsored by the National Academy of Sciences at which 34 scholars and teachers from a dozen disciplines gathered to review what had been learned in the newly launched science curriculum projects, of which PSSC had been the forerunner.<sup>8</sup> The Woods Hole conference was by Bruner's own account a response to the Russians' success in getting Sputnik up before the Americans. They had won the first leg of the space

race in the Cold War, and, so went the analysis, the Americans had lost because of their inferior education in science and math. At that point, improving math and science education became a national priority, something too important to be left to the educators. Out of this context was born the Woods Hole Conference. Its purpose was "to examine the fundamental processes involved in imparting to young students a sense of the substance and method of science" (Bruner, 1960, p. vii).

The conference was primarily a gathering of psychologists and research scientists who came to discuss "the fundamental processes involved in imparting to young students a sense of the substance and method of science" (Bruner, 1960, p. vii) and to brainstorm about further applications of research science to the development of elementary and secondary school science curricula. Topics discussed at the conference included cognitive processes, the role of intuition and structure in learning, as well as aids to teaching, their relationship to intuitive and analytic thinking, and their stimulation of the motive to learn (Bruner, 1960).

Bruner was not only one of the participants at the conference, he was also asked to write a report that described the conference's findings. Out of the Woods Hole Conference came *The Process of Education*, Bruner's very personal account of the gathering (Bruner, 1960). Eventually translated into 20 languages, the book sold over 400,000 copies within 4 years and established Bruner as an international figure in educational reform. For example, in Italy, his publisher Armando positioned Bruner as the successor to John Dewey. Encouraged, indeed, rather surprised it seems, by the response to the book, Bruner decided to continue his involvement with Zacharias and his group of science curriculum reformers as a researcher with ESI.

### THE PROCESS OF EDUCATION: A STRUCTURALIST APPROACH

From an intellectual point of view, *The Process of Education* is a very structuralist account of education and cognitive development. It is structuralist because its central question is "What are the implications of emphasizing the structure of a subject, be it mathematics or history—emphasizing it in a way that seeks to give a student as quickly as possible a sense of the fundamental ideas of a discipline?" (Bruner, 1960, p. 3).

It is interesting to note that structuralism held sway in both anthropology and developmental psychology at that moment. In anthropology, the major structuralist was Claude Levi-Strauss, who, Bruner says, influenced him. The externality of the structure of a subject matter mirrors the externality of the cultural environment described by Levi-Strauss. But the idea was not just the external structure of the subject matter. The underlying notion of learning was a match between the external structure of the subject matter and the internal, cognitive structure of the learner. And the latter was seen to be a matter of cognitive development. Thus, Bruner

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wrote, "at each stage of development the child has a characteristic way of viewing the world and explaining it to himself. The task of teaching a subject to a child at any particular age is one of representing the structure of that subject in terms of the child's way of viewing things" (Bruner, 1960, p. 33).

The internal structure of cognitive development was based on Piaget's theory of cognitive development; indeed, Piaget was the major structuralist in the field of psychology (Piaget, 1970). Bruner devotes a few pages to Piaget's theory in *The Process of Education*. He saw the structured Piagetian stages of cognitive development as the bedrock of school readiness. So the two poles of Bruner's educational structuralism were subject matter structure on the outside and cognitive structure on the inside.

But there was also structure in the interaction between the two: the essence of education was, in his view, to grasp the structure of a subject: "Grasping the structure of a subject is understanding it in a way that permits many other things to be related to it meaningfully. To learn structure, in short, is to learn how things are related" (Bruner, 1960, p. 7).

The role of structure in learning and how it may be made central to teaching is the first and foremost theme in *The Process of Education*. In it Bruner argued for the importance of structure in relationship to knowledge. Knowledge is not merely performance, but understanding. Understanding consists of grasping the place of an idea or fact in some more general structure of knowledge. When we understand something, we understand it as an exemplar of a broader conceptual principle or theory.

### THE ROLE OF COGNITIVE DEVELOPMENT

During this same period, Bruner was involved with what became known as "the birth of the cognitive sciences." In 1956 he published *A Study of Thinking* with Jacqueline Goodnow and George Austin. In 1960 he and his colleague George Miller got funding for a Center for Cognitive Studies at Harvard. Between 1960 and 1972, when Bruner left Harvard for Oxford, he split his time between "practical" work at ESI on the process of education and "theoretical" research at the Center for Cognitive Studies. The two foci of course were interrelated. His theory of cognitive development was, for example, the source of the famous dictum in *The Process of Education* that any subject could be taught to any child at any age in some form that was "honest."

Bruner's theory of cognitive development featured the ordered development of three modes of representation—the enactive, the iconic, and the symbolic (Bruner, 1965). Later modes depend on earlier ones, but they are not developmental stages, for earlier ways of making and decoding meaning are not lost, and adults possess the flexibility of all three systems. In this view, youngest children use action

to represent the world; images are added later; and, last but not least, arbitrary symbol systems such as language and mathematical symbols are added to the representational repertoire. This is why and how any subject can be taught at any age: it is simply a matter of presenting a concept to children in a developmentally appropriate mode of representation.

For example, Bruner assisted the mathematician Z. P. Dienes in using balance beams and blocks to teach quadratic equations to a group of four 8-year-olds (Bruner, 1966).<sup>9</sup> Their instructional sequence incorporated an interesting mix of action (making the balance beam balance), image (use of the blocks to make equivalent squares) and symbol (developing notations to describe the images of loaded balance beam and blocks). In their instructional sequence, the separation of the different representational systems is not as clear as the integration of these systems. What is clear is the fact that 8-year-olds could not have learned quadratic equations in a meaningful way if it were not for the support of enactive and iconic representation.

### CULTURE, COGNITIVE DEVELOPMENT, AND EDUCATION

During the period 1960–61, Jerrold Zacharias began three new projects, two of which involved Bruner.<sup>10</sup> Most relevant to culture, cognitive development, and education was a project on the teaching of science and math in Africa. The Steering Committee of Zacharias' African Education Program, which began to meet in 1961, included Bruner as the only psychologist. It yielded the highly influential *The New Mathematics in an Old Culture*, a path-breaking book on culture, cognitive development, and education in Kpelleland, Liberia, by Cole and Gay (1967).

Out of this involvement in Africa, Bruner secured funding from the Ford Foundation for the Institut d'Etudes Pedagogiques at the University of Dakar in Senegal. With Simone Valantin at the Institut, Bruner traveled to Senegal and did pilot studies on the development of the Piagetian concept of quantity conservation in Wolof school children. His notion was that Piaget's theory might be more culture-bound than Piaget had imagined. In 1963, Bruner arranged for Patricia Greenfield, one of the authors of this biographical piece, to go to Senegal to follow up these pilot observations for her dissertation. For Greenfield, Bruner's thesis was an exciting one to explore and the trip to Senegal the opportunity of a lifetime. She was to do conservation experiments in the French language in the French-speaking schools (originally set up by the recently rejected French colonial government).

When she arrived in Dakar, she began to question some elements of this plan. Armed with some anthropology background from Bruner's Department of Social Relations at Harvard, she did not think it fair to test children in their second language, French, as the French educational psychologists were doing; so she set



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about to learn Wolof, the major language of Senegal and the lingua franca of Dakar. Then she made a discovery that enabled her to link culture, schooling, and cognitive development in her dissertation research: In the bush villages, there were many children who did not attend school.

Here was a natural experiment on the effect of schooling, and she seized the opportunity. The key to the design of her studies was to compare schooled and unschooled children from the same village on tests of cognitive development. These tests included both tests of quantity conservation inspired by Piaget and tests of categorization inspired by Whorf. All children, both schooled and unschooled, were tested in the Wolof language.

Greenfield's results astonished both herself and Bruner, who as a wonderful mentor, visited Senegal in the middle of the fieldwork. Greenfield found that school children in both the capital city of Dakar and in the bush village of Taiba N'Djaye were indistinguishable in their cognitive development from children in Cambridge, Massachusetts (Bruner, 1965) or Geneva, Switzerland (Piaget, Inhelder, 1962). In startling contrast were the unschooled brothers and sisters of the Taiba N'Djaye school children. Without schooling, cognitive development looked extremely different (Greenfield, 1966; Greenfield, Reich, & Olver, 1966). The insight relating to education was that cognitive development as Piaget had described it might be neither "natural" nor universal. Instead, it looked like a progression that unfolds in a particular cultural environment, the environment of the school.

These findings were a powerful experience that pushed Bruner toward seeing schooling as a cultural institution (Bruner, 1966). Chapter 2 of *The Relevance of Education* (Bruner, 1971) is a collaborative article originally published in 1967 (Greenfield & Bruner, 1967/1968/1971) called "Culture and Cognitive Development," where the findings from Senegal are discussed from a theoretical point of view.

Included in the article is one of Greenfield's most startling discoveries. This discovery, an incidental one, marks the beginning of Bruner's involvement in folk psychology or theories of mind, although these terms were unknown at that time. Greenfield found that unschooled children could not respond to questions (in Wolof) about their reasoning of the form, "Why do you *think* X is the case?" or even "Why do you *say* X is the case?" But if she asked the exact same question, but in the form, "Why *is* X the case?," they answered in completely meaningful ways, along the lines she had expected.

Greenfield and Bruner understood the absence of response to questions about "thinking" as a lack of awareness of a distinction between thought and the object of thought; they saw it as a worldview or cultural logic that, instead, privileged self or person-in-world, a monistic worldview that lacked the dualism between the psychological and the physical self that is so fundamental to Western modes of thought (Greenfield & Bruner, 1967/1968/1971). They also concluded that literacy, as a mode of representation that physically separates thought (on paper) from the

object of thought (in the world) was what caused the rapid change to the ability to talk about one's own thinking.

Greenfield and Bruner therefore wrote about the power of schooling (and literacy) to not only change the course of cognitive development, but also to put its stamp on naïve psychology or theory of mind (Greenfield & Bruner, 1967/1968/1971). Thus, both the power of schooling as a cultural institution and naïve psychology appear in one form in *The Relevance of Education* in 1971; they reappear in new transformations in Bruner's most recent book on education, *The Culture of Education* (Bruner, 1996).

In that book, folk pedagogy, the teacher's concern with how her students think, is a key element of teaching. And one aspect of describing how children think is metacognition—children's thoughts about their own thinking. Based on Ann Brown's pioneering study, Bruner attributes great educational value to children's ability to turn their inner eye to their own strategies for thinking and remembering. What Greenfield and Bruner wrote about in *The Relevance of Education* (but which may have been forgotten in the 25 years between the two books) is that metacognitive strategies are themselves a cultural construction brought about by schooling and external representations such as literacy.

This conclusion constitutes an integration between individual cognitive development and the cultural construction of mind that Bruner is searching for in *The Relevance of Education*. There he talks about the struggle between context-free conceptions of mind and context-sensitive ones:

I suspect that both kinds of theory are necessary . . . The strength of a context-free view is that it searches for universal structures of mind; its weakness is its intrinsic anti-culturalism. . . . The weakness of most context-sensitive views of development is that they give too much importance to individual and cultural differences and overlook the universals of growth. Their strength, of course, is in a sensitivity to the nature of the human plight and how this plight is fashioned by culture. (Bruner, 1971, pp. 153–154)

### MAN, A COURSE OF STUDY (MACOS)

During the 1960s, Bruner also became involved with the development of an elementary-level social science curriculum called *Man, A Course of Study*, or MACOS as the curriculum came to be known. This project related anthropology and education in completely different ways. Under the directorial guidance of Jerome Bruner the curriculum used the subject matter of comparative anthropology as its core and engaged the participation of several major anthropologists of that era, including Robert Adams, Asen Balikci, Irvén DeVore, Richard Lee, Lorna Marshall, Elsa Miranda, and Douglas Oliver, as well as filmmakers John Marshall and Timothy Asch.

## History of MACOS and Bruner's Involvement with the Curriculum

Simultaneously with the work in Africa, Bruner had become involved in Zacharias' second project, an elementary school education program, which began as the Elementary Science Study (ESS) and later developed into MACOS by way of the Social Studies Curriculum Program. It became one of the largest and most influential—as well as most controversial—curriculum projects ever developed by Educational Services, Inc. (ESI).<sup>11</sup>

Zacharias' concern with elementary school science study resulted from the discovery of the teachers and developers of PSSC that if young people had not learned by high school age to explore and experiment, they were unlikely ever to do so. A focus on the practice and logic of science had to begin much earlier. Whatever program they might develop at the elementary school level, Zacharias insisted, "must manage to keep the essence of real science: the programs must be based on experiment and discovery, on learning by doing" (Goldstein, 1992, p. 200).

Bruner, who had been in charge of the Instructional Research Group at ESI, was trying to determine, by listening to children, which of the ESI materials were most effective. He had also spent many hours observing the teachers working with the early units. When the original director of MACOS, anthropologist Douglas Oliver, resigned in 1964, Bruner agreed to take over as project director (Dow, 1991, p. 71).<sup>12</sup>

## Principles of the MACOS Curriculum and Pedagogy

The MACOS curriculum was built around the fundamental question, "What is human about human beings?" It was essentially a course in evolution and anthropology based on the comparative examination of the social behavior of salmon, herring gulls, free-ranging baboon troops, and a tribe of Netsilik Eskimos. According to Bruner, three basic questions recurred throughout the curriculum: In addition to "What is human about human beings?," there were also the questions, "How did they get that way?" and "How can they be made more so?" Thus, the course was also an exploration of human evolution and, specifically, the evolution of culture as human adaptation. The curriculum identified and focused on five great humanizing forces: tool-making, language, social organization, prolonged childhood, and the urge to explain one's world (Bruner, 1966, p. 87). The curriculum developers' interest in focusing on anthropology and other behavioral sciences, rather than the traditional subject matter of history in the elementary curriculum, was to be able to impart to students an understanding of general principles rather than overwhelming them with specific historical details. It was also, for Bruner, a challenge to present a body of knowledge in a form simple enough that any 10-year-old child could understand it.

Bruner identified the most persistent problem in social studies as the necessity to rescue the phenomena of social life from familiarity while at the same time not making it all seem either "primitive" or "bizarre" (1966, p. 92). To that end the curriculum developed four useful techniques, based on observations that Bruner had already ascertained and described in *The Process of Education*:

1. **The use of contrast:** The MACOS curriculum was based on four principal sources of contrast: humans versus higher primates, humans versus prehistoric humans, contemporary technological societies versus so-called primitive societies, and adults versus children. These contrasts were important in establishing conceptual categories. They can be seen as an application of his first book on cognition, *A Study of Thinking* (Bruner, Goodnow, & Austin, 1956), which equated thinking with the cognitive creation of categories based on binary contrasts. But the ultimate goal of contrast was to understand continuity and similarity—that what seemed like contrast at first is finally understood, at another level of abstraction, as continuity.

2. **Simulation and use of informed guessing, hypothesis-making, and conjectural procedures:** Here was where the introduction of scientific modes of thought would be developed, and film was an important tool in presenting information that could be used as the basis for guessing and hypothesis-making.

3. **Participation:** Stimulated by the use of games, role playing, and the creation of models of reality. In a sense, Bruner said, a game is like a mathematical model, an artificial but often powerful representation of reality. And participation allows one the experience of learning by doing. It could be seen as an application of his theory of cognitive development, the use of enactive representation as a foundation for the iconic and symbolic modes of representing a particular domain.

4. **Stimulation of self-consciousness about thinking:** To be learned through mastering the art of getting and using information. This principle could be seen as an intensification of the self-consciousness about thinking engendered by schooling more generally, as discovered by comparing schooled and unschooled children in Senegal.

### The Use of Film in the MACOS Curriculum

All four techniques, following Zacharias' lead with the PSSC curriculum, relied heavily on the use of film. First of all, film captured children's attention and facilitated the perception of contrast in teaching anthropology. In conjunction with anthropologists Irven DeVore and Asen Balikci, in the early 1960s film director Kevin Smith's ESI film studio began pioneering film studies of baboon troops in East Africa and Netsilik Eskimos of Pelly Bay, Canada, covering more than a year of their lives. Film could also be seen as a way of activating the iconic mode of representation, of grounding symbolic thought in an iconic reality. At the same time, Bruner also got a contract from John Wiley, the publisher, to make a series

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of films about cognitive development based on research going on at the Center for Cognitive Studies. Bruner hired Allegra May, the daughter of Rollo May, the famous clinical psychologist, to serve as filmmaker.

But Bruner was worried that too often films had a way of producing passivity. "How do you use film to get people to ask questions rather than to accept the surface of things?" Bruner pondered. Ruminating on the problem, he consulted his friend and colleague linguist Roman Jakobson, asking him how one could ask questions in film.

Jakobson replied "Look at the conventions of film-making, the sequences that are taken for granted. Perhaps that is what you can vary to make the viewer come awake in the mind. Go again to see Robbe-Grillet's *Last Year at Marienbad*. It is full of questions" (Bruner, 1983a, p.192).

And that is what Bruner did. After viewing the film, he decided to keep the films silent. There was sound, but it was the wind or the cracking of the spring ice or the laughter and animated talk of a Netsilik storyteller talking in Eskimo. He suggested the creation of short sequence films, 4-minute loops of film constructed from Eskimo, Bushman, and baboon footage with the intention of asking questions or posing riddles. For example, a loop might raise the question, "Why did the Eskimos gather moss, and what did they use it for?" This could then be followed by further material that illustrated how moss was used. Bruner called these films "*Marienbad* teasers" after the enigmatic French film. After some experimentation, a method of editing unnarrated films that depicted sequences of complete activities was developed that provided enough information to allow the viewer to follow a complex event involving several participants from beginning to end. The method also generated an interest in viewers in asking questions about what they had seen.<sup>13</sup>

There were sequences that violated American children's expectations as to how the world works. For example, a Netsilik child builds a bird snare, catches a seagull in it, and stones it to death. Later, Bruner recounts, "When Boston school children argued bitterly over whether little Zachary was a nasty brute, one of them said, 'Listen, he's got to grow up to be a hunter'" (1983a, p. 193). One assumes from this comment that this was neither the only nor the first film about the Netsilik that the children had seen. Rather, the comment was a logical conclusion drawn by the child based on previous observations and information about the life of the Netsilik in their particular environment. It was also exactly the kind of thinking that Bruner hoped the curriculum would develop in the children.

## PROJECT HEADSTART AND THE SIXTIES

But let us now return to the political arena of education. The 1960s changed everything. We arrive at Project Headstart, the famous antipoverty educational program on which Bruner consulted. It was the Headstart experience, Bruner said recently (personal communication, October 2000) that made him see education

as a cultural resource with relevance for social equity. He says that was when he began to realize that you cannot just look at education as curriculum but as an aspect of culture. Here culture takes on a more sociological meaning: For the first time in Bruner's work, it is related to power.

In the introduction to *The Relevance of Education* Bruner draws out the relevance of "our ruinous and cruel war in Vietnam" for education:

How [could our society] wage a war in the name of a generous way of life while our own way of life included urban ghettos, a culture of poverty, racism, etc. We looked afresh at the appalling effects of poverty and racism on the lives of children and the extent to which schools had become instruments of the evil forces in our society. Eloquent books like Jonathan Kozol's *Death at an Early Age* began appearing. (1971, p. x)

Bruner concludes *The Relevance of Education* with a chapter entitled "Poverty and Childhood." He couches the problem in cultural terms, referring to induction into "the culture of failure." In this chapter he is very concerned with interventions that can counteract or prevent the destructive effects of poverty and racism. Chief among their characteristics, one stood out: "the importance of initiative in the community as a means of activating parents and caretakers to do something for their children" (1971, p. 157).

In line with this belief, Bruner supported an action project in community development at the Center for Cognitive Studies. In 1971 two center fellows, Edward Tronick and Patricia Greenfield, in consultation with a third Center Fellow, pediatrician T. Berry Brazelton, and under the guidance of Marilyn Clayton Felt at Educational Development Center, Inc. (EDC),<sup>14</sup> helped start a community-controlled infant childcare center in the Bromley-Heath Housing Project in Jamaica Plain. It was the first infant childcare center in the Boston area.

With Tronick and Greenfield as technical advisors, the community, comprised mainly of welfare mothers, started their center. In the course of training these mothers to be infant teachers, Tronick and Greenfield wrote a book called *Infant Curriculum: The Bromley-Heath Guide to the Care and Development of Infants* (1973). It applied the best developmental psychology of the day, including infancy research that was then the focus of the program led by Bruner at the Center for Cognitive Studies. Bruner's support for this project was expressed in a foreword to the book.

A description of the principles behind this curriculum closes Bruner's chapter on poverty and childhood in his book, *The Relevance of Education*. This theme of a curriculum representing a community who organizes their own cultural institution, the school, remains strong in his last book on education, *The Culture of Education*. For example, near the beginning of *The Culture of Education*, Bruner writes that "education is a major embodiment of a culture's way of life, not just a preparation for it" (Bruner, 1996, p. 13).

### THE DEMISE OF MAN, A COURSE OF STUDY (MACOS)

From 1967 the MACOS curriculum began to be used in classrooms across the country from Boston to California and internationally in such far-flung places as Australia. By 1971, however, a backlash began among conservative parents in Florida, Maryland, and Arizona who challenged MACOS, saying it was not appropriate for the instruction of elementary school children.

By 1975 the issue of MACOS had reached the floor of the House of Representatives. Congressman John B. Conlan of Arizona, who represented a conservative district in Phoenix, charged on the House floor that the curriculum offered "stories about Netsilik cannibalism, adultery, bestiality, female infanticide, murder, incest, wife-swapping, killing old people, and other shocking condoned practices" (Dow, 1991, p. 200; Goldstein, 1992, p. 296). In Conlan's eyes the MACOS curriculum ultimately represented "a dangerous plan for the federally-backed takeover of American education" (Dow, 1991, p. 211). He introduced an amendment to the authorization bill for the National Science Foundation (NSF) budget that required Congress to review all NSF curriculum projects prior to implementation, shifting the argument from the content of the MACOS curriculum to the question of freedom of choice within the educational community.

The result of the controversy in Congress was the premature decline of the MACOS curriculum and of NSF's termination of several of its science and social science curriculum projects. Later Bruner concentrated his educational reform efforts in Europe, notably in England (while he was a professor at Oxford) and, most recently, in Italy (in Reggio Emilia).

### NARRATIVE AND CULTURAL PSYCHOLOGY

We end this biographical essay with the most recent element in Bruner's cultural psychology and educational thinking: narrative. Still holding firmly to his earlier views about subject-matter teaching, he states:

I want finally to leapfrog over the issue of school "subjects" and curricula in order to deal with a more general matter: the mode of thinking and feeling that helps children (indeed, people generally) create a version of the world in which, psychologically, they can envision a place for themselves—a personal world. I believe that story making, narrative, is what is needed for that . . .

There appear to be two broad ways in which human beings organize and manage their knowledge of the world, indeed structure even their immediate experience: one seems more specialized for treating of physical "things," the other for treating people and their plights. These are conventionally known as *logical-scientific* thinking

and *narrative* thinking. Their universality suggests that they have their roots in the human genome or that they are . . . givens in the nature of language." (Bruner, 1996, p. 39)

This conceptualization nicely captures two cognitive cultures. Bruner makes it clear, furthermore, that schools privilege the logical-scientific mode. This conceptualization has broad applicability to cross-cultural issues in education. Recently, for example, in the course of a project called Bridging Cultures, Greenfield and colleagues discovered that Latino immigrant children use narrative in an omnipresent way to affirm and confirm their connections with their families. From the standard teaching perspective, it turns out that teachers do not know how to cope with these "stories," and they try to nip them at the bud, often in favor of the logical-scientific mode, which they recognize and reward. For example, in one observation in a public prekindergarten class, a teacher trying to teach a science lesson about eggs held up an egg about to hatch and asked the children to describe eggs by thinking about the times they had cooked and eaten eggs. One of the children tried three times to talk about how she cooked eggs with her grandmother, but the teacher disregarded these comments in favor of a child who explained how eggs are white and yellow when they are cracked (Greenfield, Raeff, & Quiroz, 1996).

The two features of this incident, the child's emphasis on a family-based story and the teacher's disregard and devaluation of the child's seemingly unscientific answer are a frequent occurrence in Latino immigrant classrooms. The child is responding in the narrative mode; the teacher expects the logical-scientific mode. As Bruner says, the value of logical-scientific thinking "is so implicit in our highly technological culture that its inclusion in school curricula is taken for granted" (Bruner, 1996, p. 41). It is so taken for granted that the other mode becomes invisible to the teacher.

Bruner hits on another point that is most relevant to this incident and its analysis: "Feeling at home in the world, knowing how to place oneself into self-descriptive stories, is surely not made easier by the enormous increase in migration in the modern world" (Bruner, 1996, p. 41). This is particularly so when one's stories are systematically devalued by the school, as Greenfield and colleagues have found them to be. Of the immigrant Latino children's stories, teachers typically say things like, "I can't stand it," etc. A major response to the Bridging Cultures teacher training project has been for teachers to revalue and use these stories in the educational process. They do so in writing, by giving writing prompts that use these children's strong motives to identify themselves by relating themselves to their families and their family activities (Rothstein-Fisch, in press). They do so in science by consciously constructing bridges between the narrative mode and the logical-scientific mode of thinking. For example, after a wetlands field trip, one Bridging Cultures teacher helped children make connections between narratives about family experiences with flora and fauna (e.g., watching a hummingbird



stand still in the air) and relevant scientific facts (e.g., hummingbird wings beat very quickly) (Greenfield & Rothstein-Fisch, 1999).

In sum, Bruner's incorporation of the narrative mode of thought into a book about education provides an important theoretical rationale to make the many immigrant and other minority children who come from cultures that privilege the narrative mode over the scientific-logical feel at home in the world of the school.

Proving once again the breadth of his intellectual interests as well as the wide applicability of his theoretical insights into the role of narrative in human cognitive and social behavior, in his most recent book, *Minding the Law* (2000), written in collaboration with legal scholar, Anthony Amsterdam, Bruner demonstrates the importance of narrative to the way in which our legal system works. Through the analysis of key Supreme Court opinions, Bruner and Amsterdam explain how the tactics of narrative and rhetoric, along with the psychological appeal of deeply rooted mythic structures central to American culture, have shaped the Court's decisions about race, family law, and the death penalty. In doing so they also suggest that implicitly, as well as sometimes explicitly, the skillful use of the narrative mode of thought and discourse have been fundamental to the education of successful lawyers and Supreme Court justices.

### LINKS BETWEEN EDUCATION AND CULTURAL PSYCHOLOGY

In the preface to *The Culture of Education*, Bruner suggests retrospectively how closely linked he came to see the problems of education and the questions that loomed large in creating a cultural psychology: "questions about the making and negotiating of meanings, about the construction of self and a sense of agency, about the acquisition of symbolic skills, and especially about the cultural 'situatedness' of all mental activity" (Bruner, 1996, p. x). Most importantly, education "presupposes that human mental activity is neither solo nor conducted unassisted, even when it goes on 'in the head'" (Bruner, 1996, p. x).

As Bruner has noted, during the late 1950s and 1960s, when the curriculum reforms we have described were being developed, little attention was paid by him or other reformers involved to the environment or cultural context in which kids in school were learning. It was assumed that students lived in some sort of "educational vacuum," untroubled by the ills and problems of the culture at large. Although Bruner writes that the "discovery of poverty" and the civil rights movement of the 1960s led him to become aware of the impact of poverty, racism, and alienation on the mental life and growth of children, the controversy surrounding *Man, A Course of Study* (MACOS) itself must also have provided a telling indication that what children were taught was also part of a larger social, political, and cultural context.

Even before the controversy erupted, MACOS prodded or forced Bruner out of his laboratory and into the observation of the real world, as far as learning and education were concerned. He began to observe teachers and students using the curricula developed by ESI in general and MACOS in particular. Thus, he was beginning to observe the cultural setting in which learning was taking place, as well as the interpsychic mode in which knowledge was being constructed and conveyed.

At the same time, his trip to Africa and the research it inspired moved him out of the mindset of Western thinking and developed an appreciation of cross-cultural variability in cognitive development. Most important of all, no longer could schooling be taken for granted as an unrecognized partner in cognitive development. In Africa, where schooling could not be assumed, its crucial role as a mind-developing cultural institution became clear.

Some of the tenets that Bruner describes as guiding a psychocultural approach to education have roots in the principles that underlay the MACOS curriculum or its praxis. These tenets were also highlighted by opportunities to observe children in African schools and, finally, to learn how children thought in a culture for which schooling was a foreign influence. Other tenets may stem from Bruner's studies at Oxford on the creation of joint meanings and culture in the mother-infant dyad. Still other tenets echo Vygotsky, whom Bruner introduced to American audiences in the early 1960s (Vygotsky, 1962). Finally, others were very much influenced by his observations of the classrooms set up in Oakland by Ann Brown and Joseph Campione and by his experiences observing the progressive public schools in Reggio Emilia, Italy.

The guiding tenets for a psychocultural approach to education are:

1. **The perspectival tenet:** That the meaning of any fact or encounter is relative to the perspective or frame of reference in terms of which it is construed.
2. **The constraints tenet:** That the forms of meaning making accessible to human beings in any culture are constrained. In sum, that "thinking about thinking" has to be a principal ingredient of any empowering practice of education (Bruner, 1996, p. 19).
3. **The interactional tenet:** Passing on knowledge and skill, like any human exchange, involves a sub-community in interaction.
4. **The externalization tenet:** The benefits of externalizing joint projects, or "oeuvres," as Bruner refers to them.
5. **The narrative tenet:** The mode of thinking and feeling that helps children create a version of the world in which, psychologically, they can envisage a place for themselves. This was indeed the primary thrust of the MACOS curriculum, to teach children what was human about being a human being. Bruner believes that story making and narrative is what is needed for that. An important aspect of the MACOS curriculum was to look at the myths and legends of other cultures and to understand the concepts of myth and narrative in our own culture.

## BRUNER'S LEGACY TO EDUCATIONAL PSYCHOLOGY

Jerome Bruner's legacy to educational psychology is twofold. First, he was one of the first North American psychologist to utilize a cognitive approach to education and educational psychology. He drew attention to the importance of the structure of the subject matter, the representational skills of the learner, and the fit between them (Bruner, 1960, 1966). He also introduced Piaget to the educational community in the United States (Bruner, 1960), while later providing a critique of Piaget that opened up cognitive thinking in education to the role of the environment (Bruner, Olver, Greenfield, 1966). Through Bruner, the cognitive revolution hit educational thinking in the United States and around the world.

Second, Jerome Bruner called attention to education as a sociocultural enterprise. He began this enterprise in the 1960s when he wrote the preface to the first English translation of Lev Vygotsky's, *Thought and Language*, published in 1962. Vygotsky has since become a watchword in educational psychology, and his developmental theory is treated on a par with that of Piaget. The sociocultural thrust in education expanded with Bruner's use of cross-cultural data in the 1960s (Greenfield & Bruner, 1967), his role in the development of the MACOS curriculum, and his analyses of the role of poverty in educational development in the 1970s (Bruner, 1971). Finally, with the publication of *The Culture of Education* in 1996, Jerome Bruner firmly established educational psychology as part and parcel of cultural psychology. This gives it a pivotal position from which to address issues of educational psychology in a postmodern, multicultural world.

## NOTES

1. Bruner wrote *In Search of Mind: Essays in Autobiography* (1983) as part of a series of books written by scientists that was sponsored by the Alfred P. Sloan Foundation to encourage a public understanding of science.
2. Broom, Bruner says, informed him of the parochial, culture-bound nature of Freud's view of the family, very "fin de siecle." (Bruner, 1983a, p. 134).
3. During the 1940s Bruner frequently interacted with anthropologists of the "Culture and Personality" group at conferences as well as at Harvard. For example, in a biography about Betty Friedan, Daniel Horowitz notes that Bruner as well as both Margaret Mead and Gregory Bateson were at a conference of the Topological Society in Northampton in December 1942 that Friedan, then a graduate student in psychology herself at Berkeley, attended with her mentor, Edward Tolman (Horowitz, 1998, p. 100). During the 1940s Bruner also worked with Mead on a Naval Research Panel, an interdisciplinary team assembled by Admiral Solberg, the Chief of Naval Research (Bruner, 1983a, p. 63).
4. Members of the new Department of Social Relations included Talcott Parsons, Gordon Allport, Clyde Kluckhohn, Pitirim Sorokin, and Henry Murray, among others.
5. Zacharias' memo, written to the president of MIT and then submitted to the National Science Foundation, stated that "In an effort to improve the teaching of high school physics I want to propose an experiment involving the preparation of a large number of moving picture shorts. In

- order to present one subject, say physics, it is proposed that we make 90 films of 20-minute duration, complete with textbooks, problem books, question cards and answer cards" (Goldstein, 1992, p. 152).
6. The story of the development of the Physical Science Study Committee's (PSSC) physics curriculum is one that includes the role of the National Science Foundation (NSF), which funded the curriculum development. It also exemplified a quintessential "old boys" network at work as the individuals involved included scholars from MIT and Harvard and government officials in Washington, D.C. who knew one another from their earlier days of collaboration during WWII. In some cases, as with NSF, the officials there had been scholars at MIT themselves, or they conferred with the President's science advisors, who were MIT scholars. However, by its end, some 60 physicists, high school teachers, writers, editors, and filmmakers had taken part in the project (Goldstein, 1992, p. 168).
  7. In the course of making the proposed films, Zacharias and his associates learned much about the difficulties of transferring on to film the excitement of doing science, as well as the difficulties of conveying the content. Cf. Goldstein for a discussion of the difficulty of getting physicists to appear interesting on film (1992, p. 152).
  8. By the end of 1962 secondary school education in the U.S. included new curricula devised by the Physical Science Study Committee (PSSC), Biological Sciences Curriculum Study (BSCS), Chemical Bond Approach Project (CBA), Chemical Education Materials Study (CHEMS), Earth Sciences Curriculum Project (ESCP), School Mathematics Study Group (SMS), and University of Illinois Committee on School Mathematics (UICSM). All of these were well-established NSF-sponsored programs aimed at improving science and math education in the high schools. What these programs had in common, besides NSF funding, was the use of professional scientists and mathematicians, often drawn from the highest level, working alongside high school teachers and other educators to prepare new materials (Goldstein, 1992, p. 185).
  9. S. Anderson, E. Duckworth, and J. R. Hornsby also participated in the study.
  10. The third project was the development of a new college physics course.
  11. Thus, the Social Studies Curriculum program was the intellectual heir of the Physical Science Study Committee. Support came from NSF, the Sloan Foundation, and the Victoria Foundation. Francis Friedman and Zacharias were among the signatories to the original proposal (Goldstein, 1992, p. 202).
  12. When Oliver's wife died in 1964, he lost enthusiasm for the project (Dow, 1991, p. 71).
  13. After initial problems with films of such short length, film editor Quentin Brown and anthropologist Asen Balikci abandoned the short loops and put together a longer film of 30 minutes, still without narration, titled *Fishing at Stone Weir* (1963). Pleased with the positive results the film received from both children and adults, Brown and Balikci continued to construct films from unnarrated sequences of complete activities. The key was to show complete activities that were designed to provide enough information to allow the viewer to follow a complex event involving several participants from beginning to end (Dow, 1991, p. 64).
  14. In 1965 the Educational Services, Inc. merged with the Institute for Educational Innovation to form a new, enlarged corporation named Educational Development Center, Inc. (Goldstein, 1992, p. 262).

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