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PHYSICAL EDUCATION: ADAPTED

See: Adapted Physical Education.

PIAGET, JEAN (1896–1980)

Director of the Institute of Educational Science in Geneva and professor of experimental psychology at the University of Geneva, Jean Piaget was the most influential developmental psychologist of the twentieth century. Many of Piaget’s concepts and research methods have become so much a part of the conventional wisdom and practice that psychologists are often unaware of their origin. The stages of development that Piaget observed and conceptualized are given extended treatment in every introductory psychology and developmental psychology textbook. In addition, much of contemporary research on infancy grows directly out of Piaget’s innovative studies of his own three infants. Moreover, a great deal of present day research and theory regarding adolescence starts from Piaget’s demonstration of the appearance of new, higher level, mental abilities during this age period. In these and in many other ways, Piaget’s research and theory continue to be a powerful stimulus in many different fields and areas of investigation.

Piaget’s work, however, has had an impact on other disciplines as well. The contemporary emphasis upon constructivism in education, for example, stems directly from Piaget’s theory of intellectual development. According to Piaget the child does not copy reality, but rather constructs it. Reality is developmentally relative; it is always a joint product of the child’s developing mental abilities and his or her experiences with the world. Piaget’s research and theory has also had considerable impact upon psychiatry. His description of the intellectual stages of development has provided a very important complement to the psychosexual stages of development outlined by the Austrian psychologist Sigmund Freud. In these, and in many other ways, the power of Piaget’s work continues to be felt in many diverse fields.

Jean Piaget was born in Neuchâtel, Switzerland. His father was a classics professor at the University of Neuchâtel while his mother was a deeply devout Christian. In his autobiography, Piaget suggests that the ongoing conflict between his father’s scientific beliefs and his mother’s spiritual convictions contributed to his theory of mental development. He came to regard the development of intelligence as motivated by the progressive resolution of conflicting ideas. Be that as it may, Piaget showed his genius early. At the age of fourteen he published his first scientific paper, his observations of an albino sparrow. He also became, thanks to the mentorship of the curator of the Neuchâtel natural history museum, a student of mollusks. He began experimenting with crustaceans and publishing his findings in the biological journals. These articles were so well received that he was offered the curatorship of a natural history museum in another Swiss canton. Piaget, however, had to refuse because he had not yet graduated from high school.

Once at the university, Piaget took courses in both philosophy and biology and struggled to find some way to reconcile his philosophical interests with his commitment to science. He hit upon a unique solution in an unexpected place. After receiving his doctorate, Piaget explored a number of different professions including psychiatry. He eventually took a position in Paris, translating some of the intelligence tests created by the English psychologist, Sir Cyril Burt, into French. As part of this endeavor, it was necessary for Piaget to test a number of children in order to ensure that his translations had not made the items easier or more difficult than they were for English children of comparable age. While administering these tests, Piaget became fascinated with the children’s wrong answers. To Piaget, these wrong answers did not seem random. Rather they appeared to be generated by a systematic way of seeing things that was not wrong, but simply reflected a different world view than that held by adults.

Piaget was fascinated by his unexpected discovery that children’s perception of reality was not learned from adults, as had heretofore been assumed, but was constructed. Children’s conception of the world, Piaget reasoned, was different than that of adults because their thought processes were different. Piaget assumed that he would pursue this problem, the development of children’s thinking, for a few years and then move on to other things. In-
stead, this pursuit of the ways in which children construct reality, became the foundation of a lifelong professional career. Piaget came to realize that the study of the development of children's adaptive thought and action, of their intelligence, was a way of pursuing both his philosophical and his scientific interests.

One field of philosophy is epistemology, the study of how people come to know the world. Most philosophers approach this topic by means of introspection and logical analysis. Piaget, however, believed that he could put epistemological questions to the test by studying the development of thought and action in children. Accordingly Piaget created his own new discipline with its own methods and problems. The field was genetic epistemology, the study of child development as a means of answering epistemological questions. Piaget's career exploration of genetic epistemology can be roughly divided into four different stages.

Stage 1: The Sociological Model of Development
During this first stage, roughly corresponding to the 1920s, Piaget investigated children's heretofore unexplored conceptions of the world, the hidden side of children's minds. To further this exploration Piaget made use of a combination of psychological and clinical methods that he described as the semiclinical interview. He began with a standardized question, but followed up with nonstandard questions that were prompted by the child's answer. In order to get what Piaget called children's "spontaneous convictions" he often asked questions that the children neither expected nor anticipated. In his study of children's conception of the world, for example, he asked children whether a stone was alive and where dreams came from. He made a comparative study of children's answers and found that for these and for similar questions there was a gradual progression from intuitive to scientific and socially acceptable responses.

During this early period, Piaget published The Language and Thought of the Child, The Child's Conception of the World, The Child's Conception of Physical Causality, and The Moral Judgment of the Child. Each of these books was highly original and they made Piaget world famous before he was thirty. In these books he elaborated his first theory of development, which postulated the mental development was fueled by a social dynamic. He proposed that children moved from a position of egocentrism (a failure to take the other person's point of view into account) to sociocentrism (the recognition that others see the world differently than they do). Children moved from the egocentric to the sociocentric position thanks to social interaction and the challenge to younger children's ideas by the ideas of those children who were more advanced. Piaget made it clear, however, that the young children's egocentric ideas were not wrong, but merely different from those of the older children. Egocentric ideas are developmentally appropriate for young children, if not for older ones.

Stage 2: The Biological Model of Intellectual Development
In 1928 Piaget married one of his graduate students and started a family in the 1930s. Having his own infant children set the stage for the second phase of Piaget's work, the exploration of the development of intelligence in infants. During this period, Piaget studied his own three offspring. The semiclinical interview was clearly not of much use with infants who could not talk. Piaget, therefore, invented a number of ingenious experiments to test the infant's knowledge about the world. For example, he placed a cloth over a toy that the infant was playing with to see whether or not the baby would try to remove the cloth to recover the toy. If the baby removed the cloth this would be evidence that he or she had some mental representation of the toy. If the baby did not remove the cloth, but merely cried in frustration, this would be evidence that the infant had not yet attained representational thought.

During this second period of his work, Piaget elaborated a biological model of intellectual development, which he combined with the sociological model of the earlier period. He now described intelligence as having two closely interrelated facets. One of these, carried over from the earlier period, was the content of children's thinking. The other, new to this period, was the process of intellectual activity. Piaget now introduced a truly powerful idea, namely, that the process of thinking could be regarded as an extension of the biological process of adaptation.

He argued, for example, that the child who sucked on anything and everything in his or her reach was engaging in an act of assimilation, comparable to the assimilation of food by the digestive system. Just as the digestive system transforms a variety of foodstuffs into the nutriments needed by the body, so the infant transforms every object into an
object to be sucked. At much higher level, whenever one classifies an object, say a dog, he or she in effect assimilates this exemplar to their more general dog concept. In so doing the particular dog is transformed into the universal, conceptual dog. At all stages of development, therefore, whenever one transforms the world to meet individual needs or conceptions, one is, in effect, assimilating it.

Piaget also observed that his infant children not only transformed some stimuli to conform to their own mental structures but also modified some of their mental structures to meet the demands of the environment. He called this facet of adaptation accommodation. At the biological level the body accommodates when, for example, its blood vessels constrict in response to cold and expand in response to heat. Piaget observed similar accommodations at the behavioral and conceptual levels. The young infant engages primarily in reflex actions, such as sucking the thumb or grasping. But shortly thereafter the infant will grasp some object and proceed to put that in his or her mouth. In this instance the child has modified his or her reflex response to accommodate an external object into the reflex action. That is to say, the infant’s instinctual thumbsucking reflex has been adapted to objects in the environment. Piaget regarded this behavioral adaptation as a model for what happens at higher intellectual levels as well. Whenever one learns new facts, values, or skills, he or she is, in effect, modifying mental structures to meet the demands of the external world.

In Piaget’s view, assimilation and accommodation are the invariant processes of intellectual processing and are present throughout life. Furthermore, because the two are often in conflict they provide the power for intellectual development. The child’s first tendency is to assimilate, but when this is not possible, he or she must accommodate. It is the constant tension between assimilation and accommodation and the need for some form of equilibrium between them that triggers intellectual growth. For example, in the “hiding the toy experiment” described above, the six-month-old infant simply cried while the one-year-old infant lifted the cloth to reveal the hidden object. This initial upset, and failure of assimilation, thus led to the infant’s construction of a mental image of the object. This new construction allows the child to solve the problem and remove the cloth from the toy. At each level of development, the failure of assimilation leads to a new accommodations that result in a new equilibrium that prepares for yet another level of disequilibrium.

Piaget published the results of these infant studies in three books, The Origins of Intelligence in the Child, The Construction of Reality in the Child, and Play Dreams and Imitation. These books continue to stimulate a wide range of investigations into the developing abilities of infants.

Stage 3: The Elaboration of the Logical Model of Intellectual Development

During the third period of his work, from the 1940s through the 1960s, Piaget explored the development of many different physical and mathematical concepts in children and adolescents. To explore the physical and mathematical conceptions of children and adolescents, Piaget returned to the semiclinical interview, but in modified form. He decided that the way to test children’s level of conceptual development was to challenge their understanding of conservation, that is, their understanding that an object’s physical or mathematical properties do not change despite a change in its appearance. Piaget based this methodology on the fact that scientific progress occurs when judgments of reason win out over judgments based upon appearance. The discovery of the roundness of the earth is a good example. The ancients believed that the world was flat. It was only from later observations and reasoning about the disappearance of ships on the horizon and the shadow of the earth on the moon that the perception of flatness could be overcome.

To test children’s understanding of conservation, Piaget presented children with a wide array of tasks in which the child had to make a judgment on the basis of either perception or reason. Only when the child made his or her judgment on the basis of reason was the child said to have attained conservation. For example, in his studies of children’s conception of number, Piaget confronted children with two rows of six pennies, one spread apart so that it was longer than the other. Young children judge the longer row to have more pennies, while older children judge both rows to have the same amount. Older children have attained the conservation of number while younger children have not.

With this conservation methodology, Piaget and his longtime colleague, Barbel Inhelder, explored how children constructed their concepts of number, space, time, geometry, speed, and much more. In
this third phase of his work, Piaget introduced a logical model to explain children's attainment of conservation in different domains and at different age levels. It is this logical model of intellectual development for which he is perhaps best known. Piaget argued that intelligence develops in a series of stages that are related to age and that are progressive in the sense that each is a necessary prerequisite of the next. There is no skipping of stages. In addition, he contended that each stage was characterized by a set of mental operations that are logical in nature but vary in complexity. At each stage of development the child constructs a view of reality in keeping with the operations at that age period. At the next stage, however, with the attainment of new mental abilities the child has to reconstruct the concepts formed at the earlier level in keeping with his or her new mental abilities. In effect, therefore, Piaget conceived of intellectual development as an upward expanding spiral wherein the child must constantly reconstruct the ideas formed at an earlier level with new, higher order concepts acquired at the next level.

The first stage, infancy or the first two years of life, Piaget described as the sensori-motor period. In the first two years of life, the baby constructs elementary concepts of space, time, and causality but these are at the visual, auditory, tactual, and motoric level, and do not go beyond the here and now. At the next stage of development, the pre-operational level, children acquire the symbolic function and are able to represent their experience. Children now begin to use words and symbols to convey their experience and to go beyond the immediate. Concepts of space, time, and causality, for example, begin to be understood with terms like now and later, as well as day and night. Once the child’s thought moves from the sensori-motor to the symbolic level, it has much more breadth and depth.

By the age of six or seven children attain a new set of mental abilities that Piaget termed concrete operations, which resemble the operations of arithmetic and which lift school-age children to a whole new plane of thinking. Concrete operations enable young children to reason in a syllogistic way. That may be the reason the ancients called these years the age of reason. Concrete operations enable children to deal with verbal rules and that is why formal education is usually begun at about this time. Following rules is in effect reasoning syllogistically. Consider the classic model of the syllogism.

All men are mortal.

Socrates is a man.

Therefore Socrates is mortal.

This is the same form of reasoning the child must employ if he or she is to follow the rule that says “when two vowels go walking, the first one does the talking.”

When two vowels go walking the first one does the talking.

In the word ate there are two vowels and the first is an a.

In this word, a does the talking.

Concrete operations enable young children to construct their conceptions of space, time, number, and causality on a higher quantitative plane. It is during the elementary years that children are able to learn clock and calendar time, map and geographical space, and experimental causality.

At about the age of eleven or twelve young people develop yet a higher level of mental operations that Piaget labeled formal. These operations are formal in the sense that they are no longer tied to the here and now and are abstract in the sense that they can be in conflict with reality. For example, if you ask a younger child to imagine a world in which snow was black and to guess what color, in that world, Mickey Mouse’s ears would be, the child would have trouble saying they were white. Adolescents who have attained formal operations have no trouble with this problem. Formal operations enable young people to understand celestial space, historical time, and multivariable causality. They can construct ideals, think in terms of possibilities, and deal with multiple variables at the same time. Formal operations move young people to a new plane of thought, which is on a level with adult thinking.

Stage 4: The Study of Figurative Thought

During the last stage of Piaget’s work, which lasted until his death in 1980, Piaget explored what he called the figurative facets of intelligence. By figurative Piaget meant those aspects of intelligence such as perception and memory that were not entirely logical. Logical concepts are completely reversible in the sense that one can always get back to the starting point. The logical addition of concepts, such as “boys plus girls equals children,” can be undone by logical subtraction, such as “children minus boys equals girls” or “children minus girls equals boys.” But perceptual concepts cannot be manipulated in
this way. The figure and ground of a picture, for example, cannot be separated because contours cannot be separated from the forms they outline. Memory too is figurative in that it is never completely reversible. Piaget and Inhelder published books on perception, memory and other figurative processes such as learning during this last period of his work.

Conclusion

Jean Piaget is clearly the giant of developmental psychology. His experimental paradigms have been replicated in almost every country in the world and with quite extraordinary comparability of results. Piaget’s observations, then, are among the hardiest, if not the hardest, data in all of psychology. No other research paradigm has received such extensive cross-cultural confirmation. In the early twenty-first century there has been a tendency of investigators to dismiss Piaget’s work as passé. This would be a mistake. While it is important to challenge Piaget and to build upon the foundation he has provided, it would be wrong to discount his work without having a comparable database on which to found such a rejection. Indeed, the opposite is more likely the case, namely, that the value of much of Piaget’s work both for developmental psychology education and for other disciplines is yet to be fully realized.

See also: Learning Theory, subentry on Constructivist Approach.

BIBLIOGRAPHY


PLATO (427–347 B.C.E.)

Plato (427–347 B.C.E.) was a prominent Athenian philosopher who posed fundamental questions about education, human nature, and justice.

A student of the famous philosopher Socrates, Plato left Athens upon his mentor’s death in 399 B.C.E. After traveling to other parts of Greece, Italy, and Sicily, Plato returned to Athens in 387 B.C.E. and founded a school of mathematics and philosophy called the Academy, which became the most prominent intellectual institution in all of ancient Greece. Plato authored a number of dialogues that often depicted Socrates engaging in the educational mode of dialectic. Like his mentor, Plato suspected that most people did not know what they claimed to know, and hence wondered why rigorous qualifications for rulers did not exist. Challenging the Sophists’ claims that knowledge and truth were relative to the perspective of each individual, Plato developed an epistemology and metaphysics that suggested an absolute truth that could only be gleaned through rigorous self-examination and the development of reason—skills crucial for enlightened political leaders.

The Ideal State

Plato’s educational ideas derived in part from his conception of justice, both for individuals and for the ideal state. He viewed individuals as mutually dependent for their survival and well-being, and he proposed that justice in the ideal state was congruent with justice in the individual’s soul.

Plato’s ideal state was a republic with three categories of citizens: artisans, auxiliaries, and philoso-