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# CHAPTER 12

## THE SCHOOLCHILD'S INTELLECTUAL DEVELOPMENT

### APPROACHES TO INTELLECTUAL DEVELOPMENT

Piagetian Approach

Information-Processing Approach:  
Development of Memory

Psychometric Approach: Measuring  
Intelligence in Schoolchildren

### DEVELOPMENT OF LANGUAGE

Grammar: The Structure of

Language

Communication Ability

### DEVELOPMENT OF CREATIVITY

Measuring Creativity

Family Influences on Creativity

Developing Children's Talent

### THE CHILD IN SCHOOL

Changes in Education

Teachers

Some School-Related Issues

Childhood is a world of miracle and wonder: as if creation rose, bathed in light, out of darkness, utterly new and fresh and astonishing. The end of childhood is when things cease to astonish us. When the world seems familiar, when one has got used to existence, one has become an adult.

—Eugene Ionesco, *Fragments of a Journal*, 1967

Proudly carrying his shiny new pencil case, Jason walks into his first-grade classroom. A veteran of both preschool and kindergarten, he is not shy or anxious about entering the unfamiliar room. On the contrary, like most new scholars, he finds the idea of school exhilarating, for that first day of school is indeed a milestone signaling to all that Jason has entered a distinctly new stage of development. He feels the change, and he looks forward to going to regular school.

At age 11, Vicky trots off to school without giving the routine a second thought. Learning is what she does. She reads, thinks, talks, and imagines things in ways that were well beyond her when she started school.

In this chapter we examine the changes that occur in children during the first 6 school years. We'll consider intellectual development according to the three approaches introduced in Chapter 6. First, we'll discuss the Piagetian approach to cognitive development; second, the information-processing approach; third, the psychometric approach. Then we'll look at two important aspects of schoolchildren's intellectual development: language and creativity. In the final portion of the chapter, we'll discuss the role of school in a child's life.

## *Approaches to Intellectual Development*

In this section, we'll consider the Piagetian approach, the information-processing approach, and the psychometric approach to intellectual development.

Piaget considered the entire period of middle childhood as one stage, that of concrete operations; he also focused on children's moral development at this stage, and his thoughts on moral development were expanded by Kohlberg. Moral reasoning becomes increasingly important during these years, as children acquire the cognitive ability to discuss right and wrong.

To researchers who favor the information-processing approach, memory is of particular interest. The discussion of this approach will consider three aspects of memory: capacity, strategies for remembering, and metamemory.

The psychometric approach is especially important during this period, since many schools routinely give children standardized tests. By adolescence, most American children have taken some intelligence tests; we discuss these tests and also the difficulties of comparing IQ scores across cultural and racial boundaries.

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## PIAGETIAN APPROACH

### Concrete Operations (6 to 11 Years)

**What Are Operations?** Somewhere between the ages of 5 and 7, Vicky becomes capable of what Piaget calls *operational thinking*; that is, she can perform mental operations, and she develops the ability to base her thinking on the manipulation of symbols. Previously she had a symbolic function (that is, the ability to make one thing represent something else which is not present), but she continued to learn almost exclusively through experience. Mental operations make children in the concrete-operations stage more proficient at classifying, dealing with numbers, understanding concepts of space and time, distinguishing reality from fantasy, and understanding the principles of conservation.

We can understand these new mental abilities better if we consider Vicky's growing ability to play chess. Although considered by many to be a game of intellectuals, chess is concrete enough to capture the interest of many second- and third-graders. Most children of this age, of course, play badly, but if they are encouraged, they can keep at it long enough to become good. On her seventh birthday, Vicky receives a chess set, and she soon learns the rules. She thinks of it as fun, not as education; but slowly, through practical experience, she learns the importance of thinking operationally.

One important operational skill is the capacity to *decenter*, or to take many aspects of a situation into account at the same time, rather than focusing

✓ *Operational thinking* In Piaget's terminology, the logical manipulation of symbols and signs.

capably  
strategies for remembering  
metamemory

✓ *Decenter* In Piaget's terminology, the ability to include several aspects of a situation in one's thinking.



Charles Gutwood/Image Works

This youngster's ability to play a complicated game like chess reflects the many new abilities children acquire in the concrete operations stage of concrete operations.



on just one, as was typical during the preoperational stage. Vicky learns that in chess, even though a move may look good at first glance, she must make sure that she has not overlooked some dangers as well.

During the preoperational stage Vicky was egocentric, but egocentricity diminishes during middle childhood, and this helps her play chess well. It is not enough for Vicky to have a good idea on her own. She has to watch out for her opponent's plan as well. Still another important feature of operational thinking is **reversibility**, the realization that an action can be undone, at least in the imagination. With this skill Vicky can consider a move, see its flaws, and, in her head, take the move back.

None of these skills will come easily to Vicky. At first she makes too many moves that look good but turn out to have a fatal flaw. Often her opponent surprises her with an attack she never saw coming. And it takes her a long time to select a move, imagine a second move, see its flaw, take it back, and find a better second move. Yet, by the time she is 10, Vicky can do all these things reasonably well. There are still moments when she sees a fatal flaw only after she has made a move. But more often it is Vicky's opponent who pleads to be allowed to take a move back. Vicky considers such begging "childish."

These skills rely on **concrete operations**. They concern the here and now: the chessboard and its pieces sit before Vicky. According to Piaget, the stage of manipulating symbols that represent abstract concepts—what he calls *formal operations*—usually is not reached until adolescence.

**What Is Conservation?** Probably the best known part of Piaget's work is his study of **conservation**, or the ability to recognize that two equal quantities of matter remain equal (in substance, weight, length, number, volume, or space) even if the matter is rearranged, as long as nothing is added or taken away. The principle of conservation can be applied to a number of attributes. For example, in conservation of *substance*, a child is shown two equal balls of clay and agrees that they are equal. The child is said to conserve substance if he or she then recognizes that even after one of the balls has been rolled into the shape of a worm, both lumps of clay contain equal amounts of matter. In conservation of *weight*, the child is asked whether the ball and the worm weigh the same. And in conservation of *volume*, the child is asked to judge whether both the ball and the worm displace an equal amount of liquid when placed in glasses of water.

Children develop different types of conservation at different times. At age 6 or 7, they are able to conserve substance; at 9 or 10, weight; and at 11 or 12, volume. **Horizontal décalage** is the term Piaget used to describe this phenomenon of children's inability to transfer what they have learned about one type of conservation to a different type, even though the underlying principle is identical for all three kinds of conservation. Thus, we see what concrete reasoning is like at this stage. It is tied so closely to a particular situation that children cannot readily apply the same basic mental operation to a different situation.

Children go through three stages in mastering conservation. We can see how this works in relation to the substance conservation task described above.

In the *first* stage, children fail to conserve. They focus on one aspect of the situation (that the clay ball which has been rolled into the shape of a worm

† **Reversibility** In Piaget's terminology, the realization that an action can be undone and an item returned to an earlier condition.

† **Concrete operations** In Piaget's terminology, the third stage of cognitive development, during which children develop the ability to think logically about the here and now, but not about abstractions.

† **Conservation** In Piaget's terminology, the awareness that two stimuli that are equal (in length, weight, or amount, for example) remain equal in the face of perceptual alteration, so long as nothing has been added to, or taken away from, either stimulus.

† **Horizontal décalage** In Piaget's terminology, the inability of a child to transfer the principle of conservation from one type of conservation to another type; thus a child can conserve substance before weight and can conserve substance and weight before volume.



## A CHILD'S WORLD . . . PROFESSIONAL VOICES



PIAGET: It's just that no adult ever had the idea of asking children about conservation. It was so obvious that if you change the shape of an object, the quantity will be conserved. Why ask a child? The novelty lay in asking the question.

I first discovered the problem of conservation when I worked with young epileptics from 10 to 15. I wanted to find some empirical way of distinguishing them from normal children. I went around with four coins and four beads, and I would put the coins

and beads in one-to-one correspondence and then hide one of the coins. If the three remaining coins were then stretched out into a longer line, the epileptic children said they had more coins than beads. No conservation at all.

I thought I had discovered a method to distinguish normal from abnormal children. Then I went on to work with normal children and discovered that all children lack conservation.

Q: Isn't it fortunate that you checked?

PIAGET: A biologist would have to verify; a philosopher would not have checked.

Source: E. Hall, 1970, pp. 27-28; photo: Yves de Braine/Black Star.

is longer) and do not realize the importance of the fact that the worm is also narrower now. Fooled by appearance, they decide that the worm contains more clay. They cannot recognize that they could restore the original equality by rolling the worm back into a ball. In other words, they do not understand the logic behind, or the implication of, the perceptual transformation.

The *second* stage is a transitional stage, when children vacillate, sometimes conserving and sometimes not. They may concentrate on more than one aspect of a situation but fail to recognize the relationship between dimensions such as height and width or length and thickness.

In the *third* and final stage in conservation, children conserve and give logical justifications for their answers. These justifications may take the form of *reversibility* (such as, "If the clay worm were shaped into a ball, it would be the same as the other ball"); *identity* ("It's the same clay; you haven't added any or taken any away"); or *compensation* ("The ball is shorter than the worm, but the worm is longer than the ball, and so they both have the same amount of clay"). Operational children in middle childhood show a qualitative cognitive advancement over preoperational preschoolers. Their thinking is reversible, they decenter, and they are aware that transformations are only perceptual alterations.

Piaget stressed the maturational components of conservation, saying that children will show this ability when they are mature enough neurologically and that it is only minimally affected by formal training. However, factors other than maturation also affect conservation. Children who learn conservation skills earliest get high grades and have high IQs, high verbal ability, and nondominating mothers (Almy, Chittenden, & Miller, 1966; Goldschmid & Bentler, 1968). Children from various countries—Switzerland, the United States, Great Britain, and others—achieve conservation at different ages, which suggests that this ability has a cultural aspect, rather than relating to maturation alone. We discuss this issue more fully in "Around the World."



(Mimi Forsyth/Monkmeier)

A child who has developed conservation can understand that even though the shape of a liquid changes, the amount may remain the same.



## A CHILD'S WORLD . . . AROUND THE WORLD



Is conservation universal? The Wolofs are members of the dominant ethnic group in Senegal, on the westernmost tip of what used to be French West Africa. Wolof children who live in Dakar, the capital city, live in a cosmopolitan environment and go to French-style schools. However, Wolof children who live in Taiba N'Diaye, which is in the bush country, live in isolation; some attend French-style schools, and some don't go to school at all.

When a Harvard University researcher (Greenfield, 1966) conducted tests of conservation on Wolof children who lived and went to school in Dakar, on those who lived and went to school in the bush country, and on those who lived in the bush country but had never gone to school, she found a wider difference between schooled and unschooled rural children than between schooled urban and schooled rural children. By the age of 11 or 12, virtually all the schooled children could conserve liquid quantity, compared with only half the unschooled children.

Obviously, something the children were learning

in school was helping them understand the principles of conservation. This study, like others on uneducated adults, indicates that maturation alone cannot account for the development of conservation. Greenfield suggests, in fact, that "without school, intellectual development, defined as *any* qualitative change, ceases shortly after age nine" (1966, p. 234).

Greenfield's work indicates that the education children receive probably affects conservation more than other aspects of the culture do. In her analyses of the Wolof children's thinking, as revealed in the explanations they gave for their answers, she concluded that cognitive thinking was quite different from that of American children, that the reasons they gave for their answers tended to be quite different from those given by western children, and that some of these differences were dramatically reflected in their native language, which contains no words for some of the concepts taken for granted in previous studies of conservation. And yet the educated Senegalese children still achieved conservation, illustrating how "different models of thought can lead to the same results" (1966, p. 255), although some modes of thinking may be better suited to one type of lifestyle than others.

### Moral Development

Personality, emotions, and society all contribute to moral behavior. Moral reasoning, however, depends on intellectual development. The most influential theorists on the development of moral reasoning are Jean Piaget and Lawrence Kohlberg. They maintain that children cannot make sound moral judgments until they achieve a certain level of cognitive maturity.

This approach, of course, does not imply that the most intelligent people are necessarily also the most moral. World history forbids such an idea. Hitler's government had some of Germany's most evil men at its head, but these leaders might well have scored high on an IQ test. Meanwhile, ordinary people with ordinary IQ levels showed a high moral sense by risking their own lives to help those in danger.

The link between morality and cognition concerns moral reasoning. Intellectual prowess does not guarantee moral behavior, but the highest levels of moral reasoning are impossible before cognitive maturity has been attained. At age 9, Vicky has a greater moral imagination than she had at age 5. Whether she acts on her increased understanding is another question.

**Role-Taking** The golden rule, "Do unto others as you would have them do unto you," provides an important justification for linking moral development to cognitive growth. This moral principle requires that a person be able to



step into someone else's shoes and imagine how that person would feel. But we have seen that small children are egocentric. The golden rule is difficult for them to follow, not because they are evil, but because they have a hard time imagining how another person feels.

The ability to assume another person's point of view is called **role-taking**. Selman (1973) divided the development of role-taking into five stages (0 to 4).

*Stage 0* appears approximately between the ages of 4 and 6. At this stage children think that their own point of view is the only one possible, and they judge accordingly.

At *stage 1*, from about age 6 to age 8, children realize that other people may interpret a situation differently. Suppose that we tell Vicky a story and ask for her opinion on what to do. The story is about a little girl who has promised her father not to climb trees but then sees a kitten trapped up in a tree. What should the little girl do? At stage 0, Vicky sees no problem. Since she likes kittens herself, she assumes that everyone else will automatically favor climbing the tree to save the kitten. But in stage 1 Vicky can see a problem and says, "If the father doesn't know why she climbed the tree, he will be angry. But if he knows why she did it, he will be glad." This answer shows that Vicky now realizes the importance of intention.

Reciprocal awareness marks *stage 2*, from 8 to 10 years of age. At this stage a child knows both that other people have their own points of view (stage 1 understanding) and that other people know that the child has a particular point of view. At this stage children can understand the importance of letting another person know that he or she has not been forgotten. Vicky in stage 2 knows that besides telling the father about the kitten in the tree, the little girl should also let her father know that she did not forget the promise about not climbing trees.

In *stage 3*, from about age 10 to age 12, Vicky can imagine a third person's perspective, taking several different points of view into account.

*Stage 4* arrives, usually during adolescence, when a person realizes that mutual role-taking does not always resolve disputes. There might be rival values that simply cannot be communicated away.

Selman's analysis of role-taking development was inspired by the ideas of Piaget and Kohlberg that moral development cannot occur independently of intellectual growth. Let's look at their theories more closely.

**Piaget's Theory** Piaget divides children's moral reasoning into two major stages: the *morality of constraint* (also called *heteronomous morality*) and the *morality of cooperation* (also called *autonomous morality*). In the first stage a child deals with moral concepts in a rigid way, while the second stage is characterized by moral flexibility. Table 12-1 (page 384) shows how children in these two stages differ on a number of moral concepts studied by Piaget, such as rules, intention, and punishment.

As children mature and interact more with other children and adults, they think less egocentrically. They have ever-increasing contact with a wide range of viewpoints, many of which contradict what they have learned at home. Children conclude that there is not one unchangeable, absolute moral standard, but that people can formulate their own codes of right and wrong. They decide which rules they are going to follow, and they are on the way to formulating their own moral codes.

**Role-taking.** The ability to imagine another person's situation or point of view.



*Table 12-1 Piaget's Stages of Moral Development*

	STAGE 1	STAGE 2
Moral concepts	Morality of constraint	Morality of cooperation
Point of view	Child views an act as either totally right or totally wrong, and thinks that everyone sees it the same way. Cannot put self in place of others.	Child can put self in place of others. Is not absolutist in judgments; sees possibility of more than one point of view.
Intentionality	Child judges acts in terms of actual physical consequences, not the motivation behind them.	Child judges acts by intentions, not consequences.
Rules	Child obeys rules because they are sacred and unalterable.	Child recognizes that rules were made by people and can be changed by people. Considers self just as capable of changing rules as anyone else.
Respect for authority	Unilateral respect leads to feeling of obligation to conform to adult standards and obey adult rules.	Mutual respect for authority and peers allows child to value own opinion and ability and to judge other people realistically.
Punishment	Child favors severe punishment and feels that the punishment itself defines the wrongness of an act; an act is bad if it will elicit punishment.	Child favors milder punishment that compensates the victim and helps the culprit recognize why an act was wrong, thus leading to reform.
"Immanent justice"	Child confuses moral law with physical law and believes that any physical accident or misfortune that occurs after a misdeed is a punishment willed by God or some other supernatural force.	Child does not confuse natural misfortune with punishment.

Sources: Adapted partly from Kohlberg, cited in M. L. Hoffman & Hoffman, 1964; and M. L. Hoffman, 1970.

### Kohlberg's Theory How do you respond to this classic moral dilemma?

In Europe, a woman was near death from a special kind of cancer. There was one drug that the doctors thought might save her. It was a form of radium that a druggist in the same town had recently discovered. The drug was expensive to make, but the druggist was charging 10 times what the drug cost him to make. He paid \$200 for the radium and charged \$2,000 for a small dose of the drug. The sick woman's husband, Heinz, went to everyone he knew to borrow the money, but he could only get together about \$1,000, which is half of what it cost. He told the druggist that his wife was dying, and asked him to sell it cheaper or let him pay later. But the druggist said, "No. I discovered the drug and I'm going to make money from it." So Heinz got desperate and broke into the man's store to steal the drug for his wife. Should Heinz have done that? Why or why not? (Kohlberg, 1969)



A CHILD'S WORLD . . .  
**PROFESSIONAL VOICES**



**LAWRENCE KOHLBERG:** Morality is not taught to children by their parents or their teachers or anybody else. They work out their own systems.

At the age of 4, for example, my son became a vegetarian because he felt that it was bad to kill animals. At that time his thinking was in the premoral stage: "an eye for an eye, a tooth for a tooth." I was reading him a story about Eskimos going on a seal-hunting expedition, and at the end of the story he said, "There is one kind of meat I would eat—Eskimo meat. It's bad to kill and eat animals, so it's all right to eat Eskimos."

The reason I like to tell this story is that it indicates that children construct their own moral values according to their own principles. Nobody taught my son that he should be a vegetarian or that it was wrong to kill animals. In fact, his mother and I tried very hard to talk him into eating meat, without any luck. And,

of course, nobody taught him that it was all right to eat Eskimos.

Like every young child, my son was a philosopher who wondered about things that most grown-ups take for granted. His response was very different from the way most adults think, and yet it has universal elements. Every child believes that it is bad to kill. In this case the value of life led both to vegetarianism and to the desire to kill Eskimos. This desire also comes from a universal value tendency: a belief in justice here expressed in terms of revenge or punishment. At higher levels, it's expressed in the belief that those who infringe upon the rights of others cannot expect their own rights to be respected.

Piaget discovered that if you listen to children, you will find that they ask all the great philosophic questions but that they answer them differently from the way adults do. This way is so different that Piaget called it a *difference in stage* or *quality of thinking*, rather than a difference in amount of knowledge or accuracy of thinking. The difference in thinking between you and my son, then, is basically a difference in stage.

*Sources:* Interview by S. W. Olds, Cambridge, MA, Nov. 24, 1975, and a paper presented at the eighteenth summer conference of the Institute on Religion in an Age of Science, at Star Island, NH, August 1971; *photo:* Lawrence Kohlberg.

The problem of Heinz and the drug is the most famous example of Kohlberg's approach to moral development. For some 20 years Kohlberg studied a group of 75 boys who varied in age from 10 to 16 years when he began working. Kohlberg told them stories that posed moral problems, dilemmas of the sort that Heinz faced, and asked the boys how they would solve them. At the center of each dilemma was a concept of justice and its relation to 25 basic moral ideas such as the value of human life, motives behind actions, individual rights, and the basis of respect for moral authority.

After telling the stories, Kohlberg and his colleagues asked the boys a number of questions designed to show how they arrived at their decisions. Kohlberg was less interested in the answers themselves than in the reasoning used to reach them. From the responses he received, Kohlberg concluded that the level of moral reasoning is related to a person's cognitive level. The reasoning behind the boys' answers convinced Kohlberg that people arrive at moral judgments in an independent fashion, rather than merely "internalizing" the standards of parents, teachers, or peers. On the basis of the different thought processes shown by the answers, Kohlberg described three levels of moral reasoning, divided into six stages, as shown in Table 12-2.



**Table 12-2 Kohlberg's Six Stages of Moral Reasoning**

LEVEL 1: PRECONVENTIONAL MORALITY (AGES 4 TO 10)	
<p>Emphasis in this level is on external control. The standards are those of others, and they are observed either to avoid punishment or to reap rewards.</p>	<p><i>Stage 1: Punishment and obedience orientation.</i> "What will happen to me?" Children obey the rules of others to avoid punishment.</p> <p><i>Stage 2: Instrumental purpose and exchange.</i> "You scratch my back and I'll scratch yours." They conform to rules out of self-interest and consideration for what others can do for them in return.</p>
LEVEL 2: MORALITY OF CONVENTIONAL ROLE CONFORMITY (AGES 10 TO 13)	
<p>Children now want to please other people. They still observe the standards of others, but they have internalized these standards to some extent. Now they want to be considered "good" by those persons whose opinions count. They are now able to take the roles of authority figures well enough to decide whether some action is "good" by their standards.</p>	<p><i>Stage 3: Maintaining mutual relations, approval of others, the golden rule.</i> "Am I a good girl?" and "Am I a good boy?" Children want to please and help others, can judge the intentions of others, and develop their own ideas of what a good person is.</p> <p><i>Stage 4: Social system and conscience.</i> "What if everybody did it?" People are concerned with doing their duty, showing respect for higher authority, and maintaining the social order.</p>
LEVEL 3: MORALITY OF AUTONOMOUS MORAL PRINCIPLES (AGE 13, OR NOT UNTIL YOUNG ADULTHOOD, OR NEVER)	
<p>This level marks the attainment of true morality. For the first time, the person acknowledges the possibility of conflict between two socially accepted standards and tries to decide between them. The control of conduct is now internal, both in the standards observed and in the reasoning about right and wrong. Stages 5 and 6 may be alternative types of the highest level of reasoning.</p>	<p><i>Stage 5: Morality of contract, of individual rights, and of democratically accepted law.</i> People think in rational terms, valuing the will of the majority and the welfare of society. They generally see that these values are best supported by adherence to the law. While they recognize that there are times when there is a conflict between human need and the law, they believe that it will be better for society in the long run if they obey the law.</p> <p><i>Stage 6: Morality of universal ethical principles.</i> People do what they as individuals think is right, regardless of legal restrictions or the opinions of others. They act in accordance with internalized standards, knowing that they would condemn themselves if they did not.</p>

Source: Adapted from Kohlberg, 1976.

Role-taking is a basic component of moral reasoning in Kohlberg's theory. The better a person is at role-taking, the more complicated the dilemma of Heinz and the drug becomes. Vicky in Selman's stage 3 of role-taking development says that if Heinz were caught, a judge would listen to his explanation, see the validity of his argument, and let him go. But in Selman's stage 4, Vicky



realizes that no matter how good the explanation seems to Heinz, the judge has sworn to uphold the law and will not defend the theft.

*Implications of Kohlberg's theory.* If moral development is a function of cognitive development, might it be possible to improve social behavior by teaching better intellectual skills? Research into this question has produced tantalizing but inconclusive answers.

In one study (Chandler, 1973) forty-five 11- to 13-year-old chronic delinquents and forty-five boys who had never been in serious trouble were shown cartoon sequences that told a story. They were then asked to relate the stories from the point of view of a person who had arrived late and had not seen all the events the boys knew about. Chandler found that the delinquent boys were less able than the others to put themselves in the place of the person who arrived late.

The delinquent boys were divided into three large groups. Those in the first group were enrolled in a 10-week summer program at a storefront, where staff members helped them develop their role-taking skills by making up and filming skits about people their own age. The staff members helped the boys in the second group to film cartoons and documentaries that did not portray the boys themselves. The third group did not take part in the program at all. At the end of the summer, all the boys were retested on role-taking ability. Only those who had received the role-taking training had improved. A year and a half later, Chandler reviewed police and court records and found that the boys who had received role-taking training had committed far fewer reported antisocial acts than those who had not had the training.

This approach, then, offers a new way to look at young offenders, enabling us to see their delinquency as the result of a developmental lag and to try some new approaches to help them act in more socially appropriate ways. Chandler, though, conscientiously includes several disclaimers, which are good models that point up the need for caution in evaluating all experimental data. In any study, we need to determine exactly what it is we are studying, to be extremely careful in seeing cause-and-effect relationships in correlations, and to look at our findings with a healthy grain of skepticism.

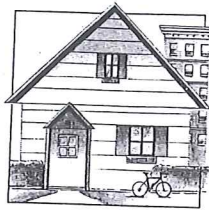
In considering this study, we need to remember that this was a special subgroup of antisocial youths—those who had been caught. Chandler says:

The possibility exists that the persistent egocentrism which characterized this group was an index of their ineptitude rather than their antisocial orientation. If such were the case, the apparent reduction in delinquent behavior . . . might only reflect an improved ability to avoid detection and what looked like a promising intervention technique might prove only to be a "school for scoundrels." (1973, p. 15)

*Evaluation of Kohlberg's theory.* Kohlberg's theory has generated many research projects, which have confirmed some aspects but have left others in question. In a 20-year-long study of 58 American boys (aged 10, 13, and 16 at the first testing), Kohlberg and his colleagues found that the boys progressed through the Kohlbergian stages in sequence and that none skipped a stage. Furthermore, moral judgments correlated positively with the boys' age, education, IQ, and socioeconomic status (Colby, Kohlberg, Gibbs, & Lieberman, 1983).



## A CHILD'S WORLD . . . THE EVERYDAY WORLD



Many teachers, parents, and other adult leaders make use of an approach called *values clarification*, which was designed to help children make moral judgments by giving them a set of skills that help them analyze the values they say that they hold and the values they actually live by—in other words, skills that help them coordinate their moral thinking and their moral behavior.

These skills involve seven steps: (1) choosing a belief or a behavior from among various alternatives; (2) considering the possible consequences of the choice; (3) making the choice on one's own, rather than going by what others say is the right thing to do; (4) feeling good about the choice; (5) being willing to make the choice public, to let everyone know about it; (6) translating the beliefs into action; and (7) acting on one's values over and over until they form a pattern in one's life (Simon & Olds, 1976).

Values clarification uses gamelike exercises called *strategies* that pose provocative questions and ask children to make judgments. The object is not to teach a prescribed set of values, but rather to teach children how to form their own values. The following strategies are typical (Simon & Olds, 1976):

*Provocative question.* Children are asked to re-

spond to questions like "Are there ever times when lying is justified?" "What would the world be like without cars?" and "What are some things that take courage?"

"Are you someone who . . . ?" Children are asked to answer questions like the following with "Yes," "No," "Sometimes," or "I don't know" and then to discuss their answers: "Are you someone who would take part in a protest demonstration?" "Are you someone who would ever smoke pot with your children?" "Are you someone who throws candy wrappers on the sidewalk?" and "Are you someone who says what you think even when it gets you in trouble?"

*Values spectrum.* Children are asked to place themselves somewhere on a continuum between two extremes:

**FAMILY A**  
Believes that no one of any age should ever drink any alcohol because drinking is wicked and harmful.

**FAMILY Z**  
All the family members love to drink, and the parents give their 5-year-old daughter a drink every day so that she'll learn how to handle alcohol.

This approach applies the theories of Piaget and Kohlberg by encouraging children to reflect on values and get practice in making moral judgments.

Cross-cultural studies confirm this sequence up to a point. Although older subjects from countries other than the United States do tend to score at higher stages than younger subjects, people from nonwestern cultures rarely score above stage 4 (Edwards, 1977; Nisan & Kohlberg, 1982; Snarey, 1985). It's possible that these cultures do not foster higher development—but it's also likely that Kohlberg's definition of morality as a system of justice is not as appropriate for nonwestern as for western societies. The appropriateness of Kohlberg's definition of morality for women in American society has also been questioned (Gilligan, 1982). Furthermore, Kohlberg's procedures may miss higher levels of reasoning in some cultural groups (Snarey, 1985).

The potential influence of experience on moral judgments is also seen in research indicating that moral judgments are strongly influenced by education and by simply telling children the "right" answers to questions involving moral reasoning (Carroll & Rest, 1982; Lickona, 1973). Findings like these contradict the traditional cognitive-developmental position that children become "moral philosophers," actively working out their moral systems through self-discovery.

Other problems with Kohlberg's system lie in the testing procedures themselves. The standard tasks (like the story of Heinz) need to be presented individually and then scored by trained judges.



One alternative test is the Defining Issues Test (DIT), which presents a subject with six moral dilemmas and then, for each dilemma, asks him or her to respond to 12 statements about the moral issues involved (Rest, 1975). The DIT can be administered to a group and scored objectively, and it still correlates moderately well with scores on the traditional tasks.

Finally, studies on the relationship between moral judgments and moral behavior suggest that people at the postconventional level of thought do not behave more morally than those at lower levels (Kupfersmid & Wonderly, 1980). This isn't surprising in view of classic research done to determine whether and under what circumstances children will cheat (Hartshorne & May, 1928-1930). These researchers found that they could not divide children into groups of "cheaters" and "noncheaters." Almost all the children cheated at some point, although some were more inclined to cheat than others and some situations brought out more cheating than other situations (if the children's grades were likely to be posted publicly, for example, cheating was more probable). Furthermore, children who cheated were just as likely to say that cheating was wrong as those who did not cheat; there was a big difference between moral judgment and moral behavior.

children - punishment

While Kohlberg's stages do, then, seem to apply to American males, they are limited in their applicability to women and to people in nonwestern cultures. Questions about the testing methods themselves and about establishing a link between moral judgments and moral behavior raise serious problems regarding some aspects of the theory. Nevertheless, Kohlberg has had a major impact. His influential theory has enriched our thinking about the way moral development occurs, has furthered an association between cognitive maturity and moral maturity, and has stimulated both research and the elaboration of theories of moral development.

#### INFORMATION-PROCESSING APPROACH: - perception, in DEVELOPMENT OF MEMORY

storage retrieval

When the police showed a 3-year-old girl who had been kidnapped and sexually abused a set of 12 photographs, she gasped at one and identified the man shown as her abductor. The man was arrested and confessed to the crime (Goodman, 1984). In this case, a very young child seemed to be an accurate witness, but in other instances children's testimony has turned out to be unreliable, mixing fact with imagination or being fuzzy about details. The accuracy of children's memory has been a controversial issue ever since the turn of the century. Recent research shows that very young children can sometimes recall details better than adults can, but that at other times their memories are poorer. They have the most trouble remembering events they don't understand, apparently because they can't organize such events in their minds. As cognitive development advances, so in most cases does memory.

The information-processing approach to cognitive development pays particular attention to memory. The ability to remember improves greatly in middle childhood, in part because children can now think up and use a variety of strategies, or deliberate plans, to help them remember. Another ability that develops at this age is metamemory, or insight into the way memory works.

Metamemory Knowledge of the processes of memory. ?



**Encoding** The process of classifying information in memory.

**Storage** In information processing, the preservation of information in memory.

**Retrieval** In information processing, the recovery and use of information stored in memory.

**Sensory memory** A fleeting awareness of a sensation; it disappears quickly unless it is transferred into short-term memory.

**Short-term memory** Working memory, which has a limited capacity; the content fades rapidly unless it is stored or actively preserved through rehearsal.

**Long-term memory** Stored memories; the capacity seems unlimited, and the duration of a memory may be permanent.

The information-processing theory assumes that memory operates through four basic steps; *perception, encoding, storage, and retrieval*. First, we have to *perceive* something—see it, hear it, or become aware of it through another sense. Then we need to *encode* it, or *classify* it—as we sort names into people and places. Next, we *store* the material so that it stays in our memory. Last, we need to *retrieve* information—get it out of storage.

In this section we'll look at three aspects of memory: (1) capacity, (2) strategies for remembering, and (3) metamemory.

### Memory Capacity

According to one theory, we have three different types of memory: *sensory memory, short-term memory, and long-term memory* (Atkinson & Shiffrin, 1968, 1971). **Sensory memory** is a fleeting awareness of images that lasts about 1 second. **Short-term memory** is our working memory, the active repository of information we are currently using. And **long-term memory** is a storehouse of memories. Our ability to retrieve information from long-term memory depends on how well it was perceived, organized, and stored in the first place.

The capacity of short-term memory increases rapidly in middle childhood. One classic paper states that short-term memory is limited to seven pieces ("chunks") of information, plus or minus two. Thus, some people in some circumstances can hold only five items in short-term memory, while others at other times can hold up to nine (G. A. Miller, 1956). We can see how children develop the capacity for short-term memory by asking them to recall a series of digits in the reverse order in which they heard them (to recite, for example, "8-3-7-5-1" if they heard "1-5-7-3-8"). At ages 5 to 6, children can typically remember only two digits; by adolescence, they can remember six digits.

Young children's relatively poor short-term memory can help to explain why they have trouble solving certain kinds of problems (such as conservation) They may not be able to hold all the relevant pieces of information in their working memory (Siegler & Richards, 1982).

### Strategies for Remembering

Seven-year-old Jason has gone with his family to a lake for the summer. He loves to ride in a canoe out to the sandbars that lie offshore. There are too many sandbars for Jason to keep straight, but one day as he and his father paddle toward a sandbar, Jason's father says, "We are heading toward Jason Island," and on Jason Island he points to a nearby sandbar and says, "And that one is Mommy Island."

"And that's Timmy Island," Jason says, naming a third sandbar after a playmate. Although the names are arbitrary, after playing this little game Jason can always tell which sandbar is which, and he can remember the spatial relations between them. Giving names to the islands has not provided Jason with any new insights into their nature, but it has helped him organize his experience so that he can remember it easily.

During middle childhood, children discover that they can take deliberate actions to help them remember things. Techniques that improve memory are



called *mnemonic strategies*. As children get older, they develop better strategies and tailor them to meet the need to remember specific things. But these techniques need not be discovered haphazardly. Children can be taught to use them earlier than they would spontaneously come up with them. Let's take a look at some of the most common strategies: rehearsal, organization, elaboration, and external aids.

*Mnemonic strategy* A device to aid memory.

**Rehearsal** When you look up a telephone number, you may repeat it over and over in your mind on your way from the directory to the phone. Such *rehearsal* keeps something in short-term memory. When do people first use rehearsal? Not in the first grade, according to classic research (Flavell, Beach, & Chinsky, 1966). When an experimenter pointed to seven pictures that children knew they would be asked to recall, first-graders just sat, waited till they were asked for the information, and then tried to recall the pictures in the order in which they had seen them. Second- and fifth-graders moved their lips and muttered almost inaudibly between the time they saw the pictures and the time they were asked to recall them. Not surprisingly, the older children remembered the material better. When the experimenters asked first-graders to name the pictures out loud when they first saw them (a form of rehearsal), the children recalled the order in which they were presented better. A later study showed that young children who were taught to rehearse before they did it spontaneously applied rehearsal to a situation in which they were taught but didn't generalize the learning; that is, they didn't carry it over to new situations (Keeney, Cannizzo, & Flavell, 1967).

*Rehearsal* A mnemonic strategy to keep an item in short-term memory through conscious repetition.

Children pass through three stages in the use of rehearsal. Preschoolers don't think of using it and can't be taught to use it effectively; young schoolchildren don't think of it on their own but can be taught to use it; and children over age 10 use it spontaneously and keep getting better at it.

**Organization** It's much easier to remember material if we *organize* it in our minds by putting it into categories. Adults tend to organize their memories automatically, making it difficult for them to recall things in the original order presented. Children younger than 10 or 11, however, do not organize things. If they are shown randomly arranged pictures of, say, animals, furniture, vehicles, and clothing, they do not mentally sort the items into categories. If shown how to do so, they recall the pictures as well as older children do; but they don't generalize the learning to other situations.

Precisely because young children don't organize what they see as systematically as adults do, they sometimes notice and remember events that adults ignore. In one experiment, adults and children watched a videotaped basketball game, paying special attention to the play. Later, 22 percent of the fourth-graders and 75 percent of the first-graders remembered seeing a woman carrying an umbrella who had walked through the game, while virtually none of the adults did (Neisser, 1982). Since this kind of apparently irrelevant detail is often crucial in criminal testimony, children occasionally make better witnesses than adults.

**Elaboration** Through the strategy of *elaboration* we link together items we want to remember by creating a story about them or a visual image of them.

*Elaboration* A mnemonic strategy for remembering a group of items by imagining a scene or story that links the items together.



Thus, to help ourselves remember to buy lemons, ketchup, and napkins, for example, we might imagine a ketchup bottle balanced on a lemon, with a pile of napkins handy to wipe up the spilled ketchup. Older children are more likely than younger ones to do this spontaneously, and they remember better when they make up the elaborations themselves, while younger children remember better when someone else makes up the elaboration for them (Paris & Lindauer, 1976; Reese, 1977).

**External Aids** Probably the mnemonic strategies used most commonly by both children and adults involve something outside the person's own brain. You write down a telephone number, you make a list, you tie a string around your finger, you ask someone to remind you, you set a timer, or you put a library book by the front door, where you can't miss it when you go out. Even kindergartners recognize the value of such *external aids*, and as children mature, they make increasing use of them (Kreutzer, Leonard, & Flavell, 1975).

### Metamemory

Children are familiar enough with memory to discuss it intelligently. We call this general knowledge of the processes of memory *metamemory*. Contemporary research has focused much attention on the topic and has shown that children's understanding of memory does develop during middle childhood. Interestingly, the link between metamemory and actual ability to remember is not particularly strong.

In one important study of metamemory, researchers interviewed children from kindergarten through the fifth grade and found a steady progress in understanding memory (Kreutzer et al., 1975): at the beginning of middle childhood (kindergarten and the first grade), children already understand what it means to learn, remember, and forget, and they have a few ideas about each process. They understand that a longer study time enhances learning and that the passage of time leads to forgetting. They also know that external aids like writing down a phone number and asking another person to remind them of something can help them remember. Perhaps the most sophisticated thing they know about memory, because it combines a knowledge of learning with a knowledge of forgetting, is that relearning something is easier than learning it for the first time.

The older children in the study (third- and fifth-graders) had a better understanding of memory than the younger ones. They were generally aware that some people remember more than others and that some things are easier to remember than other things. They could also plan better to remember something. For example, they were more likely than the younger children to think of putting their skates by their schoolbooks if they wanted to be sure to remember to take their skates to school the next day.

Although fifth-graders have improved, their metamemory has not yet fully developed. Most notably, they do not yet spontaneously invent images and phrases to help their memory. If required to remember meaningless pairs of words, such as *cow* and *ball*, some adolescents will imagine a scene such as a cow balancing a ball on the end of its nose. When a teacher tells them about this trick, fifth-graders can understand the value of such images, but they do not typically think of the trick by themselves.



(Elizabeth Crews)

Children seeing pictures of themselves at an earlier age simultaneously experience memory ("Oh, I remember that") and metamemory, as they see how pictures can remind them of events they have forgotten.



PSYCHOMETRIC APPROACH:  
MEASURING INTELLIGENCE IN SCHOOLCHILDREN

In Jason's school all the children are given group intelligence tests every few years, partly to assess individual ability and partly to judge how well the school prepares its students. After the fourth grade, Jason changed schools and took a test individually—to help the school decide whether to admit him and to see whether it should address any special problems or strengths.

There are both pros and cons to using the familiar IQ tests. On the positive side, these tests have been standardized, and we have extensive information about them concerning norms, validity, and reliability. IQ scores are good predictors of achievement in school, especially for highly verbal children, and they help identify youngsters who are especially bright or who need special help.

On the other hand, there are problems with the use of intelligence tests. We've already pointed out the poor predictive abilities of tests for infants and the way motor-oriented tests can underestimate the abilities of handicapped children. In this chapter we'll examine the ways in which intelligence tests used today may underestimate the intellectual abilities of minority-group test takers.

### Tests for Schoolchildren

Schoolchildren can be tested either individually or in a group. The most widely used individual test is the *Wechsler Intelligence Scale for Children (WISC-R)*. This measures verbal and performance abilities, yielding separate scores for each, as well as a total score. Separating the subtest scores makes the diagnosis of specific deficits easier. For example, if a child does significantly better on the verbal tests (such as understanding a written passage and knowing vocabulary words) than on the performance tests (such as figuring out mazes and copying a block design), this may signal problems with perceptual or motor development. If the child does much better on the performance tests than on the verbal tests, there may be a problem with language development.

A popular group test is the *Otis-Lennon Mental Ability Test*, which has several levels covering children from kindergarten up to the twelfth grade. Children are usually tested in small groups of 10 to 15 and are asked to classify items, to show an understanding of verbal and numerical concepts, to display general information, and to follow directions.

### Implications of Intelligence Tests

**Cross-Cultural Testing** As far back as 1910, researchers recognized the difficulty of devising tests to measure the intelligence of people in diverse cultural groups. Since then, they have tried in vain to devise tests that can measure innate intelligence without introducing cultural bias. It has been possible to design tests that do not require language: testers use gestures, pantomime, and demonstrations for tasks such as tracing mazes, finding absurdities in pictures, putting the right shapes in the right holes, and completing pictures. But it has not been possible to eliminate all cultural content. If a test taker finds absurdities in a picture, the picture has to be something with which he



© Judith D. Sedwick/Picture Cube

This girl is taking the WISC-R, which yields separate scores for verbal and performance abilities.

*Wechsler Intelligence Scale for Children (WISC-R)* An individual test for children that includes verbal and performance subtests.

*Otis-Lennon Mental Ability Test* A group intelligence test for use with children.



or she is familiar. The conventionalities of art affect the way the test taker views the picture: a group of Asian immigrant children in Israel, asked to provide the missing detail in a picture of a face with no mouth, said that the *body* was missing. They were not used to considering a drawing of a head as a complete picture and "regarded the absence of a body as more important than the omission of a mere detail like the mouth" (Anastasi, 1968, p. 252).

Recognizing the impossibility of designing a *culture-free* test, test makers have tried to produce *culture-fair* tests that deal with experiences common to people in various cultures. But it is almost impossible to screen for culturally determined values and attitudes. Some of the conditions that differ among cultures are "the intrinsic interest of the test content, rapport with the examiner, drive to do well on a test, desire to excel over others, and past habits of solving problems individually or cooperatively" (Anastasi, 1968, p. 251). There are other cultural attitudes, too. A child from a society that stresses slow, deliberate, painstaking work is handicapped in a test that stresses finishing a task within a set time. One from a culture that stresses sociability and cooperation will be handicapped taking a test alone.

The difficulty of devising culture-fair tests appears in the discrepancies between the scores of black children and white children on the so-called *performance tests*, or *nonverbal tests*. Many studies "have found larger group differences in performance and other nonverbal tests than in verbal tests" (Anastasi, 1968, p. 252). These nonlanguage tests must be heavily loaded with cultural baggage, which, being largely invisible, is hard to allow for. Even if we could devise a test that had no relevance to culture, what would we be measuring? Doesn't intelligence have something to do with how well a person perceives and adapts to the culture? Isn't culture so pervasive that it is bound to affect every aspect of a person's intellectual functioning?

Such questions have more to do with social issues than with science. One person will ask why schools should use tests that ignore cultural bias, when, to succeed, the children will have to function in a particular culture. Another person will respond that not only should the tests take a minority culture into account, but society as a whole also must make room for that culture. These issues and their resolution profoundly affect the application of our knowledge of child development. Perhaps nowhere is the issue joined more forcefully than in the testing of black children.

**Intelligence Testing of Black Children** Black Americans tend to score about 15 points lower on IQ tests than white Americans do (E. B. Brody & Brody, 1976). While there is considerable overlap in scores, with some blacks scoring higher than most whites, most educators are concerned with the difference in the average scores of members of the two groups, and the meaning of this difference is highly controversial.

These racial differences can be interpreted in two basic ways. One is that they reflect differences in the environments of the two groups—differences in education, in cultural traditions, and in other circumstances that affect self-esteem and motivation, as well as academic performance itself (Kamin, 1974). Another viewpoint is that such disparities reflect genetically caused differences and that blacks are innately inferior in intellectual capability (Jensen, 1969).



While further research can continue to test these rival hypotheses, we need to find ways now to help more black children do well in school and grow up to do well in life. Those who argue that the difference in IQ scores reflects a genetic handicap tend to add that any special help is a waste of resources, but this conclusion misses the point of education. Schools try to help people achieve their fullest potential, whatever that potential might be.

Besides, the argument concerning a genetic handicap overlooks plenty of evidence that the environment is also important. We believe that environmental differences are largely responsible for group differences. Let's see why we hold this position.

For one thing, differences between black children and white children do not appear in infancy. They emerge when children are about age 2 or 3, when blacks lag behind whites in intelligence test scores (M. Golden, Birns, & Bridges, 1973). Some research suggests, in fact, that black babies are precocious on tests of infant intelligence (Bayley, 1965; Geber, 1962; Geber & Dean, 1957). Although the difference that shows up later may reflect the switch from predominantly motor to predominantly verbal tests, verbal ability is highly influenced by environmental factors. Environmental factors seem to make more of a difference after the first couple of years of life.

We can also see the important influence of the environment when we compare people from different socioeconomic levels. The same pattern that holds for American white test takers and black test takers (an average difference of 15 points) also holds for American middle-class and deprived rural and mountain children and for English middle-class and canal-boat and gypsy children (Pettigrew, 1964). Furthermore, black children who live in northern cities score higher than those in the rural south (Baughman, 1971), and middle-class blacks score better than poor blacks (Loehlin, Lindzey, & Spuhler, 1975).

Considering the major effect of the environment, then, the psychological and educational communities need to develop tests that take environmental factors into account. The *System of Multicultural Pluralistic Assessment (SOMPA)* is now used in some states. This battery of measures for 5- to 11-year-olds includes a medical exam, a Wechsler IQ test, and an interview with the parents. The interview yields information about the environment (how many people live in the home, their levels of education, and so forth) and the child's level of social competence (how many classmates the child knows by name, whether the child prepares his or her own lunch, and so forth).

Thus, a 9-year-old girl (for instance) who scored only 68 on the Wechsler IQ test might be eligible for placement in a class for the mentally retarded. But when we take into account the fact that she is living in a poor urban ghetto and compare her with other children from similar backgrounds, we realize that her IQ score of 68 is only 9 points below the mean for that group. Her adaptive-behavior scores show that she is unusually capable of taking care of herself and getting along in her community. Her estimated learning potential, or "adjusted IQ," of 89 means that she belongs in a regular class that takes her background into account (Rice, 1979).

**High Scorers and Their Futures** How well do those with the highest IQs actually fare in life? Lewis Terman, the professor who brought the Binet test to the United States, designed a classic study that asked just such a question.

*- no difference in parents*

*System of Multicultural Pluralistic Assessment (SOMPA) A battery of assessment measures designed to take environmental factors into account.*





Lewis Terman was a pioneer of psychometrics in the United States. His longitudinal study of gifted children exploded the popular belief that the very bright child soon burns out or is a social failure. Most of his subjects had a lifetime of achievement. However, relatively few were outstandingly creative.

Terman identified a gifted child as one with an IQ of 140. Then, in 1922 he located more than 1300 such children. Through a series of 11 questionnaires spanning more than six decades, investigators at Stanford have followed the progress of these subjects up to the present time, providing a large body of information on the school, vocational, and social careers of people of high intelligence.

The children were tested for intelligence, achievement in school, character, personality, and interests. They were examined medically, their physical measurements were taken, and their parents and teachers were interviewed for case-history material and ratings of the children's personalities. The data that emerged demolished the popular stereotype of the bright child as a puny, pasty-faced bookworm. On the contrary, these gifted children were superior in all areas. They tended to be taller, healthier, and better coordinated than the average child. They were also better adjusted and more popular with other children (Wallach & Kogan, 1965).

This study inspired the movement to enrich the education of gifted children and demonstrated that being "skipped" in school is not harmful for bright children (Rafferty, 1984).

Over the years the intellectual, scholastic, and vocational superiority of the subjects has held up. They were 10 times more likely than an unselected group to have graduated from college and 3 times more likely than other students to have been elected to honorary societies like Phi Beta Kappa. By midlife, they were highly represented in listings such as *American Men of Science* (which, despite its title, includes women) and *Who's Who*. Almost 90 percent of the men\* were in the two highest occupational categories: the professions and the semiprofessions and higher echelons of business (Terman & Oden, 1959).

This study has provided great comfort to the defenders of IQ tests, since it illustrates that even in the early days of intelligence testing, the tests could correctly spot some children as having unusual promise. But the group that Terman studied has not been especially creative. It never, to take just three examples, produced a great musician, an exceptional painter, or a winner of a Nobel prize.

These findings have surprised many people, but perhaps they will seem less surprising after we have discussed creativity. As we will see, the hallmark of creative activity is divergent thinking, a tendency to move away from the cultural norms. Intelligence tests, however, are actively biased in favor of people who think in the terms of the dominant culture. In short, they measure convergent thinking. It hardly seems reasonable to expect that a culture's strongest convergent thinkers will grow up to be its most important divergent thinkers as well. IQ tests do tell us something about a person's potential, but they don't tell us everything, perhaps not even most things.

\*Because of different societal attitudes toward careers for men and women, the sexes were evaluated separately. Both sexes made a good showing.



## Development of Language

Popular wisdom commonly holds that by the time they enter the first grade, all normal children have learned a language. In one sense this is true: first-grader Vicky can talk your ear full, she pronounces her words clearly, and she can converse easily about many things. But there is still plenty she does not understand, and there are many words she does not know and many subtleties of social language she does not appreciate. During middle childhood her language development continues apace. One new area of development is **metacommunication**, the understanding of the processes of communication.

**Metacommunication**  
Knowledge of the processes  
of communication.

### GRAMMAR: THE STRUCTURE OF LANGUAGE

Let us imagine that you are looking at a snow-covered driveway and you ask someone else how you are going to get the family car out of the garage. If you don't receive a not-too-gentle suggestion that an able-bodied adult should be able to figure that one out without any help, you might get an answer like one of the following: "John promised Mary to shovel the driveway" or "John told Mary to shovel the driveway." Depending on which answer you received, you know whether the figure coming into view, shovel in hand, is John or Mary. But many children under 5 or 6 years of age do not understand the syntactic differences between these two sentences and think that they *both* mean that Mary is to do the shoveling (C. S. Chomsky, 1969). Their confusion is understandable, since almost all English verbs that might replace *told* in the second sentence (such as *ordered*, *wanted*, *persuaded*, *advised*, *allowed*, and *expected*) would put the shovel in Mary's hand.

Most 6-year-olds have not yet learned how to deal with grammatical constructions in which a word is used as *promise* is used in the first sentence, even though they know what a promise is and are able to use and understand the word correctly in other sentences. By the age of 8, most children can interpret the first sentence correctly. They know the concept attached to the word *promise*, and they know how the word can be used.

The above example shows us that even though 6-year-olds speak on a rather sophisticated level, using complex grammar and a vocabulary of several thousand words, they still have a way to go before they master syntactic niceties. During the early school years, they rarely use the passive voice, verbs that include the form *have*, and conditional ("if . . . then") sentences.

Children develop an increasingly complex understanding of syntax up to and possibly after the age of 9 (C. S. Chomsky, 1969). When testing forty 5- to 10-year-old children's understanding of various syntactic structures, Chomsky found considerable variation in the ages of children who understood them and those who did not (see Table 12-3, on page 398).

**Syntax** The way in which words are organized into phrases and sentences.

### COMMUNICATION ABILITY

When 6-year-old Vicky was given a fluoride treatment by her dentist, she was told not to eat for half an hour. She interpreted this to mean that she was not to *swallow* for half an hour. Soon after leaving the examining room, she started to drool and to look very upset, and she was greatly relieved when the dentist noticed this and told her that, yes, she could swallow her saliva.



Table 12-3 Acquisition of Complex Syntactic Structures

STRUCTURE	DIFFICULT CONCEPTS	AGE OF ACQUISITION
John is easy to see.	Who's doing the seeing?	5.6 to 9 years.*
John promised Bill to go.	Who's going?	5.6 to 9 years.*
John asked Bill what to do.	Who's doing it?	Some 10-year-olds still haven't learned this.
He knew that John was going to win the race.	Does <i>he</i> refer to John?	5.6 years.

\*All children aged 9 and over know this.  
Source: C. S. Chomsky, 1969.

Despite the fact that Vicky had arrived at a rather sophisticated level of linguistic ability, she was still having some problems with communication—as many children her age do. (Of course, adults, too, often misinterpret what other people say—often resulting in major misunderstandings, both cognitive and emotional—but their failures to get or receive messages seem to stem from causes other than understanding the basic concepts of communication, which is often the cause of children's misinterpretations.) To look closely at children's ability to transmit and to understand spoken information, researchers have designed a number of ingenious experiments.

In one, kindergartners and second-graders were asked to construct block buildings exactly like those built by another child and to do this on the basis of the first child's audiotaped instructions—without seeing the buildings themselves. The instructions were often incomplete, ambiguous, or contradictory. The "builders" were then asked whether they thought that their buildings looked like the ones they were supposed to be copies of and whether they thought that the instructions were good or bad.

The older children monitored their comprehension better. That is, they were more likely to notice when instructions were inadequate and to show this by pausing or looking puzzled. They were more apt to know when they didn't understand something and to see the implications of unclear communication—that is, that their buildings might not look exactly like the ones they were copying because they hadn't received good enough instructions. The younger children sometimes knew that the instructions hadn't been clear, but they didn't seem to realize that this would mean that they couldn't do their job well. Even the older children (who, after all, were only 8 years old or so) didn't show a complete awareness of knowledge about communication (Flavell, Speer, Green, & August, 1981).

Findings like these have important implications for parents, teachers, and others who work with children. Young children don't understand much of what they see, hear, or read, but they're often not aware of not understanding. They may be so used to not understanding so much in the world around them that this doesn't seem unusual to them. Much of the time, then, they just go along, nodding, trying to follow unclear directions, and not asking questions. Adults need to be sensitive to the fact that they can't take children's understanding for granted. For the sake of children's safety, well-being, and academic advancement, we have to figure out ways to tell whether children do, in fact, know what we want them to know.



## Development of Creativity

So much of what grade school children learn consists of rules and facts, and, of course, there are many rules and facts to learn—for example, 8 times 6 is 48, and George Washington was the first president of the United States. To participate fully in society, children must know such things, but they also need to retain and develop their creative abilities.

What is creativity? There are many rival definitions of that simple word, but whatever it is and however it works, creativity begins with a surprise, a break with the established rules and facts. The creative surprise may then develop in accordance with established procedures—great mathematicians, composers, and chess players, for example, often begin with a surprising leap of the imagination, which they then develop according to the traditional rules of their field of endeavor. Or the creative surprise may lie in the violation of traditional rules and assumptions. Einstein's theory of relativity began with well-known physical observations which he interpreted in a startling and unexpected way.

The hallmark of creativity is **divergent thinking** rather than **convergent thinking** (Guilford, 1959). Convergent thinking relies on established wisdom and seeks the one "right" answer to solve many ordinary problems of the day. Divergent thinking breaks with tradition and tries to find new solutions. Often enough, it fails, but its successes are a society's chief source of solutions to its most vexing problems. Without divergent ideas, any society, no matter how diverse its initial culture, seems doomed to see its traditions converge into banality. Since so much is at stake, society should do what it can to nurture and encourage creativity in children.

**Divergent thinking**  
Creative thinking.

**Convergent thinking**  
Thinking aimed at finding the one "right" answer to a problem; traditional thinking.

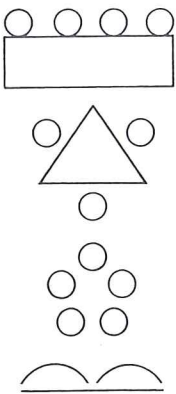
### MEASURING CREATIVITY

If we could identify the most creative children, perhaps we could nurture their creativity. IQ tests don't help in the search, and so researchers have developed other tests (see Figure 12-1, page 400, for an example). As of now, the special tests of creative aptitudes that have been developed are more important for research than for educational or vocational counseling. One problem with them is that scoring depends heavily on speed—and creative people are not always lightninglike in their responses. Another problem is that while the tests are *reliable*—that is, consistent in their results even when administered by different testers—so far there is little or no evidence of their *validity*. That is, we don't know whether they really measure creativity in nontest situations (Anastasi, 1976).

One important battery, the **Torrance Tests of Creative Thinking**, was developed for use in schools and has been administered to schoolchildren. This test is made up of three groups of exercises. In Thinking Creatively with Words, test takers think of ways of improving a given toy to make it more fun to play with, list unusual uses for common objects, and ask unusual questions about the same common objects. In Thinking Creatively with Pictures, test takers draw pictures that take off from a colored curved shape, a few lines, or pairs of short parallel lines. Thinking Creatively with Sounds and Words uses recordings of onomatopoeic words (like *crunch* and *pop*)—words whose

**Torrance Tests of Creative Thinking** A test battery developed for use with schoolchildren; it measures creativity with words, pictures, and sounds and words.



QUESTIONS	COMMON ANSWER	CREATIVE ANSWER
<p>How many things could these drawings be?</p> 	<p>Table with things on top.</p> <p>Three people sitting around a table.</p> <p>Flower.</p> <p>Two igloos.</p>	<p>Foot and toes.</p> <p>Three mice eating a piece of cheese.</p> <p>Lollipop bursting into pieces.</p> <p>Two haystacks on a flying carpet.</p>
<p>What do meat and milk have in common?</p>	<p>Both come from animals.</p>	<p>Both are government-inspected.</p>
<p>How many ways could you use a newspaper?</p>	<p>Make paper hats.</p>	<p>Rip it up if you're angry.</p>

**Figure 12-1** Tests of creativity. (Source: Adapted from Wallach & Kogan, 1967.)

sounds suggest their meaning—to which test takers respond by writing down what the sounds suggest.

#### FAMILY INFLUENCES ON CREATIVITY

Many researchers have studied the ways in which the family influences children's creativity. A review of 61 reports on such studies yielded a set of conclusions that could be translated into the following guidelines for parents who want to have highly creative children (B. Miller & Gerard, 1979):

- X ■ *Have as many or as few children as you like. Family size appears to be unrelated to creativity.* So does birth order: some studies show that first-borns are more creative, some show that they are less creative, and some show no difference. A few find that the youngest sibling, when there is no other sibling close in age, is relatively uncreative.
- X ■ *Have another child soon after the one whom you want to be the creative light of the family.* Highly creative children often have a younger sibling close in age.
- X ■ *Don't worry about what other people think.* Highly creative children tend to have parents who feel secure and unconcerned about their social station, are uninhibited and unconventional, and are indifferent to social pressures.
- X ■ *Be capable yourself and develop your own interests.* This may include gainful employment, or it may involve the pursuit of an intellectual or artistic hobby.

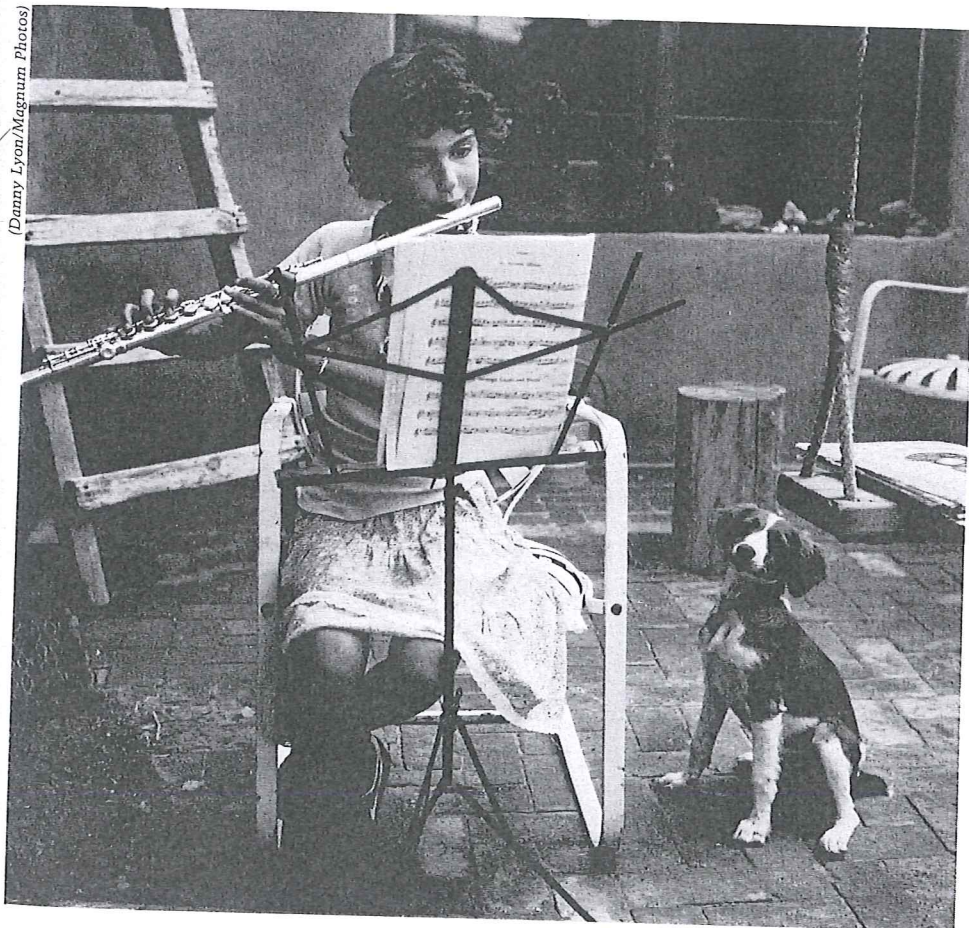


- X ■ *Treat your children with respect and confidence. Expect them to do well, while granting them both freedom and responsibilities.*
- X ■ *Most important of all, do not aim for rigid control of your children. The most consistent and the best-supported finding to emerge from this review of the literature is that parental vigilance, authoritarianism, dominance, and restrictiveness inhibit the development of creativity. Children who are constantly directed and molded apparently lose the confidence and the spontaneity essential for the creative spirit.*

## DEVELOPING CHILDREN'S TALENT

The name of one study of creativity, Project Zero, was chosen to reflect what the project's founders considered to be the level of understanding of creativity when the project began. It concluded that the elements of artistic success are inborn talent, encouragement of that talent, and the artist's own drive to excel (H. Gardner, 1979). A further study at the University of Chicago confirmed and amplified these findings. It investigated 120 high achievers who, before the age of 35, had become internationally known pianists, sculptors, athletes, mathematicians, and neurologists (Bloom, 1985).

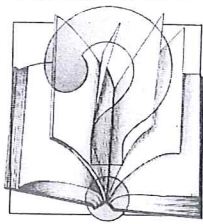
(Danny Lyon/Magnum Photos)



*No matter how much talent a child has, it has to be nurtured to achieve full expression. This girl is likely to become much more proficient on the flute if her talent is recognized and encouraged at an early age, if she receives good teaching, and if she wants to excel. The appreciation she gets from the attentive friend shown here is a good motivator!*



A CHILD'S WORLD . . .  
**AND YOU**



- Which sort of thinking do you believe benefits society more, convergent or divergent thinking? Is your answer an example of divergent thinking?
- Do you believe that creativity and intelligence are closely linked, loosely linked, or not linked at all?
- Should schools actively seek out their most creative students and give these students special training?
- Creative children often devote many hours a week to learning the techniques of their field. Do you think that it would be better for them to lead more normal lives?

Inborn ability has to be recognized before it can be well nurtured. Recognition tends to come early for those who achieve success. Most of the people in the Chicago study became intensely involved in their field before the age of 12, and many before the age of 10. Commonly, a parent or other relative who was talented in the same area recognized and encouraged the child's talent at an early age. The mother of one of this country's leading ballerinas has reported that she herself always wanted to be a dancer and that, in the delivery room, when she first saw her newborn daughter's long feet, "I knew what I had" (Franceschi, 1985).

Once recognized, the talent must be nurtured. The teachers who developed the talent of the high achievers in the Chicago study were found to have several important qualities. A child's first teacher should foster the joy and playfulness of the talent. Why do artists and athletes devote so much energy and passion to their work? Because they love it. Talented children should first fall in love with the field where their ability lies. Then when they discover how demanding it is, they will want to master its discipline.

Teachers who do give rigorous training should take a "longitudinal" approach. The Chicago study found that the teachers knew the children well, expected to remain with them over several years, and emphasized long-term goals and each child's individual progress over a period of time. The typical classroom teacher, on the other hand, takes a "cross-sectional" approach, being responsible for children for only 1 year and judging them by comparing them with their classmates.

In addition, the talented young people in this study received periodic emotional "highs" from regular participation in public events, such as recitals and contests that provided a series of short-term goals to work toward and gave them benchmarks of progress. When they performed well, the praise and rewards inspired them to continued effort, and when they did poorly, they were motivated to try to do better the next time. In contrast to the schooling of earlier days, which was full of events like spelling bees, debates, and competitions in writing, scientific, and mathematical projects, schooling today includes few such events.

Talent and training are never enough. The growing child must want to excel. The joys and rewards of the labor must seem like full payment for its rigors. As the children in the Chicago study grew up, their talent continued to assume the most important role in their lives. Adolescents often devoted 15 to 25 hours a week to their particular activity, and they chose their friends from among other participants.



## The Child in School

Vicky is now in the second grade. She goes with the rest of her class to the auditorium, where they are to hear a guest speaker, the author of a book about the brain. After her talk, the speaker asks the 200 or so assembled children whether they have any questions. Shyly, Vicky raises her hand and asks, "Do headaches come from the brain?"

Ten years later, Vicky remembers that day with pain. "That woman laughed at me. The way she smiled and the tone of voice she used made me feel that I had asked the dumbest question in the world. I was really embarrassed. And I think that's one of the things that happened to me when I was little that made me the way I am today. I hate to ask questions in class!"

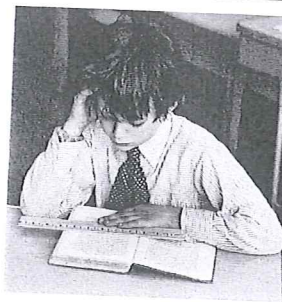
School takes up so many hours and assumes such a central place in Vicky's life that it affects and is affected by every aspect of her development—intellectual, physical, social, and emotional. While virtually all child-care professionals and educators recognize the importance of school, they often disagree on the ways in which school can best enhance children's development. Nowhere can this be seen more clearly than in the great swings in educational theory that have occurred over the past several decades.

### CHANGES IN EDUCATION

The three R's are back in style. Basic academic subjects like reading, writing and arithmetic were the backbone of American schools during the 1920s and 1930s, until reform movements of the 1940s and 1950s reacted against heavy regimentation to bring about methods that focused on taking advantage of students' interests. In 1957, when the Soviet Union launched Sputnik, the first satellite, Americans began to fear that our students were not as well prepared scientifically as Soviet children were, and so there was a wave of encouragement for science and math in our schools. During the politically turbulent late 1960s, such curricula seemed less relevant than children's ability to think for themselves and direct the course of their own education. Experiments such as "open classrooms" came into being, with children in the same room doing a variety of different activities and with teachers being seen more as "facilitators" and overseers than as transmitters of knowledge. High school students made more of their own decisions about which courses to take, and as a result fewer studied foreign languages and signed up for difficult science courses (Ravitch, 1983).

When the mid-1970s brought drops in high school students' scores on the Scholastic Aptitude Test (SAT), American educators became concerned that our schools were not giving students enough grounding in basic academic skills and became convinced that students could best think for themselves if they had better basic skills. As a result, the byword is "back to basics," as schools emphasize these skills as part of their standard curricula. One result of the change is that high school and college students have shown a renewed interest in foreign language, with the biggest jumps in enrollment in courses in Japanese, Chinese, and Russian (Maeroff, 1984).

What do all these changes mean for American children? They illustrate, for one thing, the underlying faith of Americans that our future rests on the

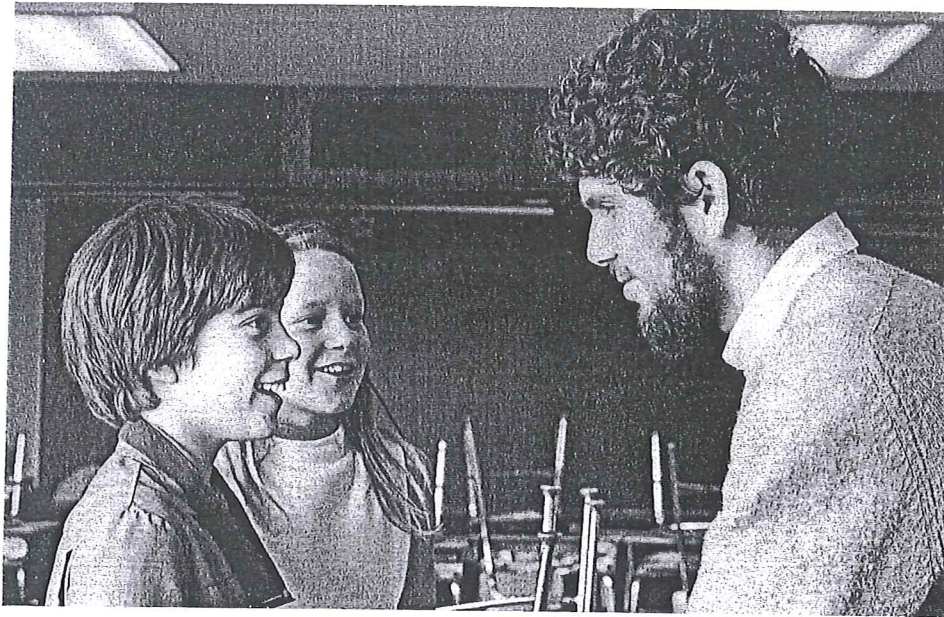


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Photo Researchers, Inc.)

*School is one of the dominant experiences of childhood, and the experience can take many forms. The degree of formality—as expressed by dress codes and academic structure—can vary enormously, depending on what a particular set of administrators consider important.*



*Teachers are the single most important influence in a school. Exceptional teachers who inspire and excite children are often remembered and admired by their students years later.*



way our children turn out and that a basic way to affect children's development is through their education. While professionals are divided on the extent of this influence, it is undeniably present, as we'll see.

## TEACHERS

### The Teacher's Influence

A teacher's influence is especially powerful during the early years, when he or she becomes a parent substitute, an imparter of values, and a contributor to the child's self-esteem. This was dramatically brought out by one study that linked a number of people's successes in adulthood to their having been in the first-grade classroom of a very special teacher. Originally launched to track changes in IQ over the years among a group of disadvantaged children from a poor inner-city neighborhood, the study discovered by chance an amazingly enduring relationship between having been in "Miss A's" first-grade classroom and a number of happy events. Many more of Miss A's former students showed impressive increases in IQ over the years than children who had been in other first-grade classrooms. Even more remarkable, however, was the relationship between having been a student of Miss A and such measures of success in adulthood as occupational status, type of housing, and personal appearance (posture, dress, and grooming). When a number of graduates of this same school were interviewed by researchers who did not know who their first-grade teachers had been, the ones who had been in Miss A's class scored better on all these measures (Pederson, Faucher, & Eaton, 1978).

What did Miss A do that was so special? Apparently, she showed her confidence in the children's ability and encouraged them to work hard to justify that confidence. She gave extra time to those who needed it, staying



after school when necessary. And she cared about them. She was affectionate, she shared her own lunch with children who had forgotten theirs, and she remembered former students by name, even 20 years later. What miracles schools could accomplish with more Miss A's!

### Computers as Teachers

At present, schools seem drawn more toward the programmed logic of computers than toward the spontaneous passions of the Miss A's. Some people have even predicted that by the end of this century, the computer will provide most of a child's education (Kleiman, 1984). Can that be a healthy development? Maybe, but computers in classrooms are so new that we still have more questions than answers.

One recent survey of the role of microcomputers in education focused on several particularly important questions (Lepper, 1985).

*Will technology increase the gap between advantaged and disadvantaged students?* Probably, especially if the pressures of the marketplace control matters. In the days when a blackboard and chalk marked the upper limit of technology in the classroom, the Miss A's of the world could give a powerful boost to the most promising disadvantaged students. When equipment becomes as expensive as a computer, poor schools simply cannot afford to provide the "hands-on" experience that a richer school can give. Those who have more learn more.

*Will computers help the best or the weakest students?* Students of low

(© Elaine Rebban/Photo Researchers Inc.)



*At this point, we have more questions than answers about the ultimate impact on education of the "computer revolution."*



and average ability may benefit the most from computer-assisted instruction. This optimistic assessment rests on the hope that "the use of motivationally enriched instructional materials may prove a particularly effective approach for precisely those children who are not now being effectively motivated by traditional classroom instruction" (Lepper, 1985, p. 14).

*Are boys and girls likely to be affected differently?* Contemporary studies repeatedly show that boys use computers more than girls do and that the difference increases with age. We don't understand the reasons for the difference, although some speculation focuses on the tendency to base computer games and rewards on war and sports, which appeal more to boys than to girls.

*How will the computer affect social development?* The answer to this question is straightforward: We have no idea. Two rival hypotheses are (1) that computers will harm social development because they replace subtle human interaction with mechanical control and (2) that computers will nurture social development by promoting a degree of cooperation previously unknown in classrooms. Only longitudinal studies seem likely to answer the question.

*What kind of activities will the computer replace?* Will students have less personal contact with their teachers? Will they read less? Write less? Answer fewer questions aloud? We don't know, but the inclusion of time spent with a computer into a class schedule seems certain to reduce the time devoted to other elements of the schedule.

Apparently, we are on the verge of a great change in the classroom experience. High school graduates in the year 2000 (first-grade entrants of 1988) will think of computers as classroom tools that they have known all their lives. Today we can only guess at what such an education will do.

### Self-Fulfilling Prophecies

Perhaps computers in the classroom will affect students in whatever way teachers expect them to affect students. According to the principle of the self-fulfilling prophecy, students live up to or down to the expectations that other people have for them.

In the famous "Oak School" experiment some teachers were told at the beginning of the term that some of their students had shown unusual potential for intellectual growth. Actually, the children identified as potential "bloomers" had been chosen at random. Yet several months later, many of them—especially first- and second-graders—showed unusual gains in IQ. And the teachers seemed to like the bloomers better. They do not appear to have spent more time with them than with the other children or to have treated them differently in any obvious ways. Subtler influences may have been at work, possibly the teachers' tone of voice, facial expressions, touch, and posture (R. Rosenthal & Jacobson, 1968).

While this research has been criticized for methodological shortcomings, work by many other researchers using a variety of methods has established the basic principle—that teachers' expectations "can and do function as self-fulfilling prophecies, although not always or automatically" (Brophy & Good, 1974, p. 32).

This principle of the self-fulfilling prophecy has important implications for minority-group and poor children. Since many middle-class teachers are



convinced (often subconsciously) that such students have intellectual limitations, they may somehow convey their limited expectations to the children, thus getting the little that they expect.

It's often difficult for a teacher who either has been born into the middle class or has adopted its standards to understand or get through to children of lower socioeconomic status. Goals that the teacher takes for granted—neatness, punctuality, and competitiveness, for example—may not be the goals of the child's associates. When a child's family and friends have values that are markedly different from the teacher's, the child will be loyal to familiar values and unimpressed with the teacher's. This may upset the teacher and cause problems in the teacher-student relationship. The closer students come to having their teachers' value systems, the higher their grades are likely to be (Battle, 1957). The advantage conferred on like-thinking students may be the result of more favorable interaction between teacher and student, which encourages the student to learn better, or it may be the product of bias in the grading process.

Looking back on his youth as a poor child in Chicago, the comedian and civil rights worker Dick Gregory has written of the gulf between him and his unsympathetic, uncomprehending teacher:

The teacher thought I was stupid. Couldn't spell, couldn't read, couldn't do arithmetic. Just stupid. Teachers were never interested in finding out that you couldn't concentrate because you were so hungry, because you hadn't had any breakfast. All you could think about was noontime, would it ever come? Maybe you could sneak into the cloakroom and steal a bite of some kid's lunch out of a coat pocket. A bit of something. . . .

The teacher thought I was a troublemaker. All she saw from the front of the room was a little black boy who squirmed in his idiot's seat and made noises and poked the kids around him. I guess she couldn't see a kid who made noises because he wanted someone to know he was there. (1964, p. 44)

### Do Teachers Like Girls Better?

Dick Gregory's account of his teacher's distaste for his fidgety behavior raises an interesting point. In folklore, the ideal child is a girl. Little girls are made of "sugar and spice, and everything nice," while little boys are composites of "snips and snails, and puppy-dogs' tails." Likewise, the ideally behaved student is passive, docile, and quiet—the way many people expect girls to be. The stereotypical American boy, however, is active, independent, and aggressive. This role conflict seems likely to confuse boys, and, sure enough, the elementary school in the United States is a girl's world, especially during the early grades.

Girls read and write better than boys, are less likely to repeat grades or get into trouble, and are liked better by teachers (Baughman, 1971; Brophy & Good, 1973; Maccoby, 1966). In some other societies boys come out ahead (Brophy & Good, 1974). One explanation is that female teachers understand and like girls better and are less able to put up with the dirt and noise and aggression that swirl around little boys. But male teachers tend to show the same attitudes, generally scolding *and* praising boys more (Brophy & Good, 1973; Etaugh & Harlow, 1973). The result: boys taught by males don't do any better than boys taught by females (Brophy & Good, 1973).





Mainstreaming gives handicapped children the opportunity to participate with others.

## SOME SCHOOL-RELATED ISSUES

### Educating Handicapped Children

Education for handicapped children has come a long way since the family of Helen Keller had to travel to distant cities to find help for their daughter who was deaf and blind. In 1975, Congress passed the Education for All Handicapped Children Act, which assures an appropriate public education for all handicapped children. This law provides for an evaluation of each child's needs and the design of an appropriate program, for the involvement of parents in the decision about their children's education, and for the allocation of necessary funds. Eight out of ten children in the program are mentally retarded, learning-disabled, or speech-impaired.

The law also requires **mainstreaming**, or the integration of handicapped with nonhandicapped youngsters, as much as possible. Under the principle of mainstreaming, handicapped children are in regular classes with nonhandicapped youngsters for all or part of the day, instead of being segregated into special classes. Proponents of this approach emphasize the need for handicapped people to learn to get along in a society where most people do not share their impediments, and they also point to the need for nonhandicapped people to get to know and understand those who are handicapped. Mainstreaming requires innovative teaching techniques that meet the needs of all students. Its critics maintain that handicapped children can be taught better and more humanely in small classes by specially trained teachers. Retarded children have been found to do as well academically in mainstreamed classes as in special classes, but not better (Gruen, Korte, & Baum, 1974). Unfortunately, mainstreaming does not seem to diminish the stigma experienced by these children.

The best solution is probably a combination of mainstreaming and special classes. A retarded child, for example, might be able to take physical education or shop in a regular class, while receiving academic instruction in a class with slow learners. Or a child with cerebral palsy might be in regular academic classes but receive special physical training while his or her classmates go to gym.

### Learning Disabilities

Many children whose intelligence is normal still have great difficulty learning how to read, write, or work with numbers. They see and hear perfectly well, but they have trouble processing what comes through the senses. As one child said, "I know it in my head, but I can't get it into my hand." Often thought of as "underachievers," such children are said to have a **learning disability**, a disorder that interferes in some way with achievement in school. The problem is common, affecting as many as 30 percent of all schoolchildren, or an estimated 1.8 million students (Feagans, 1983; Fiske, 1984). Since success in school is important for self-esteem, learning disabilities can have devastating effects on the psyche as well as on the report card.

Dozens of different disorders affect one or more aspects of the learning process. Adam, for example, has problems with visual perception: he confuses up and down and left and right, and so he has great difficulty learning how to

**Learning disability** A disorder that impedes performance in school.

**Mainstreaming** The integration of handicapped and nonhandicapped children in the same classroom.

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read and do arithmetic. Barbara has problems with auditory perception: she cannot grasp what the teacher is saying when he stands up in front of the room. Charles has difficulties with small-motor coordination: he cannot color inside the lines or draw and write clearly. Derek is clumsy in his large-motor movements, a deficit that is painfully apparent in the school yard when he tries to run, climb, or play ball. Ellen has speech problems: she began to speak quite late and still articulates so unclearly that she is embarrassed to speak out in class and to read aloud.

The cause of these disabilities is not known. It's not mental retardation: learning-disabled (LD) children tend to score only 5 to 10 points below average on IQ tests, putting them in the normal range. Some researchers point to behavioral explanations, since LD children show up as less task-oriented, more easily distracted, and less able to concentrate than other children. Others look at failures in cognitive processing, since these children are less organized as learners and are unlikely to use cognitive strategies such as the strategies for remembering discussed earlier in this chapter (Feagans, 1983). Still others believe that abnormal brain structures are at the root of their difficulties; this explanation is based on studies that have uncovered differences between the brains of people with learning disabilities and those of people without such disabilities (Blakeslee, 1984).

If LD children are given special attention at an early age, they can sometimes overcome their difficulties well enough to lead satisfying, productive lives as adults. Some go on to college and professional careers, and while they're never cured of their disabilities, they can often learn how to get around them. Nelson Rockefeller, the former governor of New York, for example, had so much trouble reading that he ad-libbed his speeches rather than risk garbling written ones (Fiske, 1984).

It's essential that LD children receive individualized instruction designed for their own needs. Among the most successful aids are behavioral modification techniques which help them concentrate and which improve their handwriting, spelling, and reading; methods for teaching them how to use cognitive strategies; help in organizing their daily lives outside school as well as in it; and encouragement of their progress in the areas that give them difficulty, as well as in nonacademic areas where they do well.

The social problems that all too often accompany the academic problems of LD children—the aggressiveness that makes them unpopular with teachers and other children, the truancy that sometimes gets them into trouble with the law, and the poor self-esteem that interferes with healthy personality development—are a reminder of the importance of school in the lives of children, an importance that goes far beyond the academic skills and facts learned there.

### School Phobia

Many professionals who have studied *school phobia* claim that it is misnamed—that the unrealistic fear which keeps children from attending school has less to do with a fear of school itself than with a fear of leaving their mothers. So many researchers are convinced of the basic "separation anxiety" underlying this problem that virtually no research has been done on the school situation of school-phobic youngsters. We know very little about their per-

*School phobia* Fear of school.



ceptions of school, how they get along with their teachers and the other children, and whether there is a basic problem in the school itself, such as a sarcastic teacher, a bully in the school yard, or overly difficult work. (In some schools the levels of tension and violence are, of course, high enough to cause *realistic* fears. In situations like this, it is the environment that needs to be changed, not the child.)

What do we know about school-phobic children? First, they are not truants. They are often good students whose parents know when they are absent. These absences extend for long stretches at a time. The children's ages are evenly distributed between 5 and 15, and boys and girls are equally likely to be affected. They tend to be of average intelligence or higher and to perform at least at average levels in school. While they come from a variety of social-class backgrounds, they seem to be overrepresented in the professional classes.

Typically, school-phobic children wake up on a school morning complaining of some physical ailment, such as nausea, stomachache, vomiting, or headache. Soon after they have received permission to stay at home, the symptom clears up. This may go on day after day, and the longer they are out of school, the harder it is to get them back. These children are often timid and inhibited away from home, but willful, stubborn, and demanding with their parents.

Not all school phobias are the same. In the "neurotic" type, which affects mainly children from kindergarten through the fourth grade, the avoidance of school comes on suddenly, and the child continues to function well in other areas of his or her life. In the "characterological" type, seen in early adolescence, the phobia has come on more gradually, the child is more deeply disturbed, and the outlook for the child's future is less hopeful.

The most important element in the treatment of a school-phobic child is an early return to school. Most experts advise getting the child back to school first and then going on with whatever other steps may be called for, such as therapy for the child, for one or both parents, and possibly for the entire family. Getting children back into school breaks up the extreme interdependence between them and their mother, emphasizes the children's basic health, keeps them from falling behind in their work (which would aggravate their problems), restores them to a more normal environment, and breaks the phobic cycle.

The return to school is sometimes accomplished gradually, beginning with the parent's driving the child to school and just sitting in the car, then getting out and walking around the outside of the school with the child, next going with the child into the principal's office, and finally having the child go to school alone—first, possibly, for an hour a day, then for several hours, and eventually for an entire day. An approach like this requires working closely with school officials.

Usually children can be returned to school without too much difficulty once treatment is begun. The few studies that have followed up school-phobic children in later years are unclear, though, in determining how well treatment helped their adjustment in general (D. Gordon & Young, 1976).



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## Summary

### KEY CONCEPTS

- X ■ Piaget says that children aged from about 6 to 11 are in the stage of concrete operations. They can think logically about the here and now, but they cannot yet think abstractly.
- X ■ Moral judgment requires the ability to understand other points of view and to consider many factors; thus, the development of moral judgment depends on cognitive development.
- X ■ Piaget sees moral development as occurring in two stages: first there is a morality of constraint, in which children handle moral concepts in a rigid way, and later comes a morality of cooperation, which is characterized by moral flexibility.
- X ■ Kohlberg has devised a set of moral dilemmas to assess moral judgments. The reasoning used to resolve a moral dilemma (not the specific resolution of the dilemma) indicates the stage of moral development that the person is in. Each dilemma rests on a concept of justice. Kohlberg sees moral development as progressing through six stages, which he divides into three levels: preconventional morality, morality of conventional role conformity, and morality of autonomous moral principles.
- X ■ The information-processing approach divides memory into four basic steps: perception, encoding, storage, and retrieval.
- X ■ There are several different forms of memory, such as sensory memory, short-term memory, and long-term memory.
  - Creative thinking is divergent rather than convergent.
  - Tests designed to measure an intellectual ability like creativity may be reliable (able to yield consistent results) without being valid (able to measure something outside the test situation).
- X ■ Because it has proved impossible to design a culture-free IQ test, test makers now hope to develop culture-fair tests that rely on experiences that are common to people in many cultures.
  - Although every generation wants the "best" education for its children, opinions about what constitutes the "best" change according to new experiences and new needs.

### KEY FINDINGS

- Mental operations performed by children in this stage include the ability to decenter (to consider several aspects of a situation at once) and reversibility (the awareness that an object can be returned to its original state).
- Conservation, the ability to understand that a change in form does not involve a change in amount, develops throughout this period. Children can conserve substance at age 6 or 7, conserve weight at age 9 or 10, and conserve volume at age 11 or 12.
- Selman found five stages in the development of role-taking: in stage 0, children recognize only their own point of view; in stage 1, they realize that others can see matters differently; in stage 2, they realize that others know that they have a particular point of view; in stage 3, they can imagine a third point of view; and in stage 4, they realize that mutual role-taking cannot resolve everything.



- The stages in Kohlberg's theory correlate positively with the age, education, IQ, and socioeconomic status of American males. The theory's value in assessing the judgments of females and of people in other cultures is less certain.
- Memory improves greatly during middle childhood.
- Short-term memory appears to be able to hold seven "chunks" of information, plus or minus two. Depending on the task and the person, the contents of short-term memory generally can range from five to nine items.
- During middle childhood, children's understanding of their own intellectual abilities increases. Thus, we see a rise in metamemory (the understanding of memory) and metacommunication (the understanding of communication).
- Grammatical ability continues to improve as children realize that identical sentence structures do not always imply identical relationships.
- Children become increasingly skilled at monitoring their own linguistic comprehension.
- IQ scores are good predictors of achievement in school, especially for highly verbal children.
- Culture can affect a person's behavior while taking an intelligence test as well as the person's ability to answer the questions.
- Differences in average IQ scores commonly appear when a group that is more closely associated with the dominant middle-class urban culture is compared with a group that is poor, a minority, or from a rural culture. Thus, differences in average scores are more likely to reflect environmental than genetic differences.
- Differences between blacks' and whites' average IQ scores do not appear in infancy.
- Long-term observation of children with high IQs (140 and above) shows that they are likely to be high achievers as adults, but not necessarily creative.
- Teachers in the early grades tend to be particularly influential in shaping a child's future performance in school.
- The influence that computers will have on education is still uncertain and may depend as much on a teacher's expectations as on anything inherent in the computer.
- Girls typically do better in school than boys, especially during the early grades.
- Retarded children do as well in mainstreamed classes as in special classes, but not better.

#### KEY APPLICATIONS

- Effective strategies for remembering include rehearsal, organizing, elaboration, and using external aids. The link between metamemory and actual memory is not particularly strong.
- In order to nurture creativity, a child's first teacher should foster the joy and playfulness that come from the child's talent. Later, teachers who stress the discipline and rigor associated with the talent should teach the child for a number of years. Teaching should include competition and emotional "highs."
- The Wechsler Intelligence Scale for Children (WISC-R) is the most popular individual measure of a schoolchild's ability. The Otis-Lennon Mental Ability Test is a popular group test. The System of Multicultural Pluralistic Assessment gives a richer understanding of a person's development but is much more difficult to administer.
- The most helpful teachers bring a positive, affectionate approach to the classroom.



- A combination of mainstreamed and special classes enables handicapped children to participate more fully in society, while still receiving special attention to the areas in which they need it.
- Most experts advise that school-phobic children should first be returned to school and then be given any needed special aid or therapy.

## Suggested Readings

- Bloom, B. S. (1985). *Developing talent in young people*. New York: Ballantine Books. An absorbing report of a project in which researchers interviewed 120 accomplished young pianists, sculptors, swimmers, tennis champions, mathematicians, and research neurologists and their parents, teachers, and coaches. The book emphasizes the importance of the parents' and teachers' active development of the young people's abilities.
- Coles, R. (1986). *The moral life of children*. Boston: Atlantic Monthly. A prominent child psychiatrist offers his rebuttal to the Kohlbergian theory that moral development rests on cognitive development and that schoolchildren are too young to live profoundly moral lives. The special strength of the book is the many moving quotations it includes by children discussing morality in their own experience.
- Eysenck, H. J., & Kamin, L. (1981). *The intelligence controversy*. New York: Wiley. A lively debate on whether intelligence is the result of heredity or environment by two prominent advocates of each point of view, complete with attacks, counterattacks, and rebuttals.
- Goertzel, V., & Goertzel, M. G. (1978). *Cradles of eminence*. Boston: Little, Brown. An absorbing study of the childhoods of some 400 prominent persons that seeks to relate factors of early life to eventual success in life. It brings together biography, autobiography, and professional literature about gifted children and adults.
- Simon, S. B., & Olds, S. W. (1977). *Helping your child learn right from wrong*. New York: McGraw-Hill. A self-help manual for parents to aid them in establishing moral values and emotional self-awareness in their children. The authors explain why values themselves cannot be taught but how parents can teach children a process for arriving at their own values.