

Piaget's Social Theory

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Current debate in education on the role of individual and social factors in development often presents Piaget as giving primacy to individual cognitive processes, in contrast to Vygotsky's view of the primacy of social and cultural processes (for example, Broughton, 1981; Bruner, 1985; Forman, 1992; Lightfoot, 1988; Phillips, 1995; Rogoff, 1990; Wertsch, 1985; Wertsch, Minick, & Arns, 1984; review by Lourenco & Malchado, 1996). It has even become popular to say that Piaget's child is a solitary scientist constructing knowledge apart from the social context (for example, Santrock, 1997).

This view is in error, and it is important to correct it so that the discussion of theoretical differences between Vygotsky and Piaget, and the consideration of educational implications of Piaget's work, will be based on accurate representations. My aim here is to correct the myth that Piaget did not consider social factors to be important in his developmental theory and to consider some of the practical educational implications of Piaget's social theory. To those ends, Piaget's notion of the role of social factors is reviewed, and the educational implications of the cooperative context favoring operational development are discussed with reference to five general principles of teaching.

Piaget's Notion of the Role of Social Factors in Development

This summary of Piaget's social theory focuses on the relation between the individual and the social in sociomoral, affective and personality, and intellectual development, on the identity of intellectual operations and social co-operations, and on the role of norms (rules). In addition, issues are raised regarding Piaget's social theory.

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First, it is necessary to point out that in most of his work, especially his work after 1940, Piaget focused on the problem of the development of knowledge. This is the work in which Piaget and his collaborators investigated the evolution of knowledge, especially scientific knowledge, by interviewing individual children on a wide variety of problems involving logical reasoning. When he was concerned with the details of logic in these studies, he did not always mention social factors, and he did not study these systematically. However, throughout his career, Piaget also spoke about the development of the child. When he spoke about child development, he always talked about social factors. In addition, he talked about the social process of cognitive, affective, social, and moral development.

Another introductory note relates to three parallels in Piaget's theory of sociomoral and cognitive development. The first parallel is that, according to Piaget, just as knowledge of the object world is constructed by the child, so too must psychosocial knowledge be constructed. That is, social thought and social understanding in action undergo qualitative transformations. The second parallel is that just as affect is an indissociable motivational element in intellectual development, socioaffective bonds (or their lack) motivate social and moral development. The third parallel is that an equilibration (or self-regulating) process can be described for social and moral development as for cognitive development.

The Relation between the Individual and the Social in Sociomoral Development

In Piaget's view, the child's intellectual adaptation is as much an adaptation to the social environment as to the physical. Those who mention exclusively Piaget's conceptions about the

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social in development most often mention his view of the importance of peer relations (for example, Tudge & Rogoff, 1989; Youniss & Damon, 1992). According to Piaget (1932/1965), peer interactions are crucial to the child's construction of social and moral feelings, values, and social and intellectual competence. However, I do not agree with those who interpret Piaget as saying that it is only in relations with peers that morality and intelligence develop. In fact, Piaget was quite explicit in his description of how adult-child relations influence all aspects of development.

Piaget's (1932/1965) description of sociomoral development was expressed as movement from anomy (non-regulation by others or the self) to heteronomy (regulation by others) to autonomy (self-regulation). He described two types of morality corresponding to two types of adult-child relationships, one that he believed to promote children's development in all domains and one that he believed to retard development.

The first type of morality is a morality of obedience. Piaget called this "heteronomous" morality, reflecting roots meaning regulation by others. Therefore, the individual who is heteronomously moral follows moral rules given by others out of obedience to an authority who has coercive power. Heteronomous morality means that the individual does not regulate his or her behavior by means of personal convictions. Rather, his or her activity is regulated by impulse or unthinking obedience.

The second type of morality is autonomous, reflecting roots meaning self regulation. The individual who is autonomously moral follows moral rules that are self-constructed, self-regulating principles. These rules have a feeling of personal necessity for the individual. The

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individual who is autonomously moral follows internal convictions about the necessity of respect for persons in relationships with others. On a practical level, without belief that rises from personal conviction, children will not be likely to follow moral rules given ready-made by adults.

These two types of morality correspond, in Piaget's theory, to two types of adult-child relationships. The first type is one of coercion or constraint in which the adult prescribes what the child must do by giving ready-made rules and instructions for behavior. In this relation, respect is a one-way affair. That is, the child is expected to respect the adult, and the adult uses authority to socialize and instruct the child. The adult controls the child's behavior. In this sociomoral context, the child's reason for behaving is thus outside his or her own reasoning and system of personal interests and values. Piaget calls this type of relation "heteronomous." In a heteronomous relation, the child follows rules given by others rather than by the self.

Heteronomy can range on a continuum from hostile and punitive to sugar-coated control.

According to this view, when children are governed continually by the values, beliefs, and ideas of others, they practice a submission that can lead to mindless conformity in both moral and intellectual life. Such an individual may be easily led by any authority. Or, because of failure to construct a personal feeling about the necessity of moral rules, the obedient child may eventually rebel, openly or privately. Or, the child may become "calculating," following adult rules only when under surveillance. In Piaget's view, a life dominated by the rules of others through a morality of obedience will never lead to the kind of reflection necessary for commitment to internal or autonomous principles of moral judgment. Piaget warned that coercion socializes only

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the surface of behavior and actually reinforces the child's tendency to rely on regulation by others.

Piaget contrasted the heteronomous adult-child relationship with a second type that is characterized by mutual respect and cooperation. The adult returns children's respect by giving them the possibility to regulate their behavior voluntarily. This type of relation Piaget called "cooperative." He argued that it is only by refraining from exercising unnecessary coercion that the adult opens the way for children to develop minds capable of thinking independently and creatively and to develop moral feelings and convictions that take into account the best interests of all parties. The method by which this relationship operates is co-operation. Piaget hyphenated this word when he wanted to emphasize the etymological root meaning. Co-operating means striving to attain a common goal while coordinating one's own feelings and perspective with a consciousness of another's feelings and perspective. The cooperative teacher considers the child's point of view and encourages the child to consider others' points of view. The motive for cooperation begins in feelings of mutual affection and mutual trust which become elaborated into feelings of sympathy and consciousness of the intentions of self and others.

Cooperation is a social interaction among individuals who regard themselves as equals and treat each other as such. Obviously, children and adults are not equals. However, when the adult is able to respect the child as a person with a right to exercise his or her will, one can speak about a certain psychological equality in the relationship. Piaget was not advocating that children have complete freedom because total freedom without any constraints is inconsistent with moral relations with others.

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We may extrapolate from Piaget's theory to say that it is clear that external control of children has its limits. Children may conform in behavior, but feelings and beliefs cannot be so easily controlled. As children grow larger physically, the possibility of behavioral control decreases. The only real possibility for influencing children's behavior when they are on their own is to foster their development of moral and intellectual autonomy (see also Kamii, 1982, 1984).

The child's construction of moral rules begins with learning to follow parental commands. However, these norms must be generalized because commands cannot specify all possible situations. According to Piaget, when children are encouraged to think for themselves and reflect on the moral issues in their lives, they rework commands through differentiation, reinterpretation, and elaboration in the course of lived experiences. The individual who does not do this reworking to construct new and personal norms with a feeling of personal necessity remains susceptible to the vicissitudes of others' opinions and directions. The problem for educators is how to foster a child's real feeling of respect and obligation to follow a norm or rule out of a personal feeling of necessity.

Let us return to Piaget's view of the special benefits of peer interactions for a child's development. In peer relations, it is possible for children to experience an equality that is difficult to achieve in adult-child relations, even when the adult tries to minimize coercion. Reciprocity in peer relations can provide the psychological foundation for perspective-taking (ability to consider more than one point of view) and decentering (the process by which perspective-taking operates). Children are more easily able to think and act autonomously with

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other children than with most adults. However, as Piaget (1932/1965) pointed out, inequalities also exist among children, and autonomy can be violated in child-child interactions.

The Relation between the Individual
and the Social in Affective and Personality Development

Piaget's (1928-1965/1995, 1954/1981, 1963/1976, 1976) view of affective and personality development is integrated with his theory of intellectual and moral development. He spoke about affectivity in a broad sense as the energetic source on which the functioning of intelligence depends, drawing the analogy of affectivity as the fuel that makes the motor of intelligence go. According to Piaget, affectivity is both intrapersonal (need, interest, effort, etc.) and interpersonal (attractions, etc.). In a more specific sense, Piaget took the position that every scheme (psychologically organized action) has both cognitive and affective elements, and that these are indissociable.

Piaget argued that children construct schemes of social reaction just as they construct schemes relating to the world of objects. Interest in others leads to voluntary (autonomous) social efforts. The child gradually constructs more and more consistently organized patterns of social actions. As the child acts and reacts in more or less stable ways in similar situations with a variety of people, personality becomes more consolidated and can be observed in consistent patterns. Thus, the child may be viewed as "shy," "friendly," "easily upset," "aggressive," and so forth. Behind these behavior patterns lie the child's interpretations and organizations or schemes of social orientation. Thus, peer interaction as well as adult-child interaction provides raw material out of which the child fashions his or her personality. Following Mead (1934),

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Piaget (1932/1965; 1954/1981) emphasized the developing consciousness of the self as a social object that occurs in the course of social interaction.

Piaget (1954/1981) argued that feelings are structured along with the structuring of knowledge and stated that "there is as much construction in the affective domain as there is in the cognitive" (p. 12). This is illustrated by his discussion of the development of affectivity through six cognitive stages.

For Piaget, objects are simultaneously cognitive and affective. For example, an object disappearing behind a screen is at the same time an object of knowledge and a source of interest, amusement, satisfaction, or disappointment to the infant. The ability to think about persons and objects not present makes possible conservation of feelings, the permanence of values, and the eventual elaboration of a coherent system of moral values. However, in discussing the reconstruction of feelings, Piaget (1954/1981) commented that it is not the feeling alone that is conserved, but a certain scheme of interaction with other people.

Piaget (1954/1981) referred specifically to the affect of interest as the "fuel" of the constructive process. According to Piaget, interest is central to the mental actions by which the child constructs knowledge and intelligence. Without interest, the child would never make the constructive effort to make sense out of experience. Without interest in what is new, the child would never modify the instrument of reasoning. For Piaget, interest performs a regulatory function, freeing up or stopping the investment of energy in an object, person, or event. As children pursue interests in objects and people, they differentiate these interests. Some objects or aspects are more interesting than others, some are interesting for similar reasons, and the child

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begins to coordinate interests and thus to construct a hierarchy of personal values--likes and dislikes. The values attributed to others become the point of departure for new feelings, in particular sympathies and antipathies and moral feelings and values.

A system of permanent feelings or values is regulated by what Piaget (1954/1981, 1969/1970, 1970) called "will." In the case of a conflict between values (such as feeling tempted to leave a writing task to go out on a nice day), it is by an affective decentering or will that one revives in oneself the various feelings and values attached to the work. The reconstitution of the feeling can transform the strengths of the conflicting tendencies and subordinate them to the values that are permanent and stable. By decentering, the field of comparison is enlarged, and the less stable desire or tendency becomes weaker. Piaget then defined will as the power of conservation of values, noting that an individual without will is unstable, believing in certain values at certain moments and forgetting them at other moments. Just as operations serve as regulators of the intelligence, enabling the mind to achieve logical coherence, will serves as affective regulator, enabling the individual to achieve stability and coherence in personality and in social relations. Piaget pointed out the necessity of educating the will as a regulator of feelings or values.

The core of affective and personality development, for Piaget, is social reciprocity. This reciprocity is a sort of spontaneous mutual engagement, mutual valuing, and interindividual feelings. Permanence in values and duration of feelings is made possible only when thought becomes representational. Affect then can persist in the absence, for example, of a person loved.

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Feeling is conserved in schemes of reaction which, taken all together at a later point in development, constitute the individual's character or permanent modes of reactions.

According to Piaget, the progressive differentiation of interests, feelings, and values, and the increasing stability and coherence of affectivity are bound up with intellectual development, and both depend on social relations of reciprocity. Piaget (1947/1966) pointed out that the process of coordinating different points of view and co-operating with others includes all aspects of development.

Piaget (1932/1965) emphasized that ego development necessitates liberation from the thought and will of others (that is, from heteronomy). Lack of this liberation results in inability to co-operate. How does this liberation come about? For Piaget, it is through the child's experience of being respected by the adult who co-operates with the child. Learning to understand others begins as others show that they understand the child's inner feelings and ideas. In this way, Piaget (1932/1965) noted that co-operation is a factor in the creation of personality as a stable ego. Personality is the result of continuous interaction with others--comparison, opposition, and mutual adjustment. For affective and personality development, as in the development of reasoning and moral judgment, Piaget argued that heteronomous relationships are counterproductive, and that co-operative relationships are necessary. For Piaget, therefore, co-operation is an essential characteristic of developmentally-oriented education not simply because it is a culturally valued virtue, but because of its psychodynamic developmental significance.

The Relation between the Individual and the Social in Intellectual Development

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In his early work, Piaget (1928/1995) insisted that "there are social elements in logical knowledge" (p. 196), that "social life is a necessary condition for the development of logic" (p. 210), and that "social life transforms the very nature of the individual" (p. 210). He argued that the individual's need for logic arises as a result of contact with opposing ideas of other humans, leading to doubt and a desire to verify. Here we see that Piaget conceived of social factors as having a causal relation to the development of logic. In later work of the 1940s and 1950s, even when Piaget was preoccupied with the construction of cognitive operations, he went further to state that progress in social development and the development of logic "go completely hand in hand" and "constitute two indissociable aspects of a single reality that is at once social and individual" (Piaget, 1945/1995, p. 145). Thus we see in his general statements a deep regard for social factors as equal to cognitive factors in child development.

The Identity of Intellectual Operations

and Social Co-Operations

Piaget did not stop with general statements about the relation between the individual and the social. He explicitly went on to state unequivocally that individual operations are, in fact, identical with the social operations of co-operations. This is rather an astonishing claim. Let us examine Piaget's argument first by recalling briefly an example of what Piaget meant by individual operations. We will see that Piaget discussed the development of knowledge of objects in the same terms (in italics in the following accounts) in which he discussed development of social co-operations.

Equilibrated Cognitive Operations

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In their well-known studies of the child's construction of quantities, Piaget and Inhelder (1941/1974) examined children's reasoning with regard to matter by deforming one of two equal balls of clay as children observed. They found that young children do not conserve (or maintain the invariance of) the equality relationship between the two quantities but believe in a state in inequality--that one has more or less clay when rolled into a cylinder, flattened into a disc, or divided into several smaller pieces. Nonconservation results from centering on certain perceptions. This results in the child's focusing on and simply comparing the successive states of the transformation. Children who conserve matter know that however the balls are deformed, they must by necessity remain equal in amount. Conservation reflects a decentration from perceptual states by means of mental actions that make possible consideration of the dynamic transformation. Piaget and Inhelder saw this as an extension of qualitative object permanence (knowing that a concealed object still exists) into quantitative conservation (knowing that a quantifiable aspect of an object remains the same). Piaget and his collaborators also studied children's conceptions of length, number, weight, and volume, across various transformations. Examination of children's reasoning led Piaget and Inhelder to hypothesize certain individual mental actions or groups of operations (groups of actions that make up a system of relationships) characteristic of conservation reasoning. For substance conservation, these included the two operations of identification (or identity) and reversibility in a grouping or coordination of actions. Identification refers to the child's argument that nothing has been added or taken away. Operational reversibility refers to the realization that every action can be reversed by an opposite and inverse action that cancels out the effect of the first, and thus results

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in a feeling of necessity that conservation must be so. The child's logic obliges him or her to maintain the quantitative invariance. However, neither identification nor the simple imagination of the return to the ball is sufficient for conservation. Piaget referred to the ability to imagine the inverse virtual action of transforming the deformed substance back into a ball as empirical reversibility and not operational reversibility. At a transitional level, children recognize that nothing has been added or subtracted and realize that the return to the ball will bring about a return to equality--while still maintaining that the deformed ball is more or less than the other. In later work, Piaget (1967/1971) referred to such pre-operational mental actions as regulations. Regulations may enable a child to maintain a belief in equality when deformation is slight, but in a transitional stage this is unstable and contradicted in the face of further deformation. Regulations are approximate or partial but represent progress toward operations that Piaget (1967/1971) termed "higher forms of regulations" (p. 208). Operations are characterized by stability, non-contradiction, and complete reversibility. Children who conserve are able to coordinate relationships, that is, to recognize that the clay cylinder may be longer, but it is thinner than the ball. Piaget also referred to this as the compensation of relations. That is, the child thinks of the increase in one dimension as corresponding to the decrease in another dimension. These relationships are complementary (or symmetrical) and reciprocal. Conservers are also capable of knowing that the sum of all the parts of the clay ball equals the sum of all the parts of the deformed clay. The progressive succession of regulations and operations in the child's construction of knowledge Piaget (1967/1971) called "equilibration" (p. 207), the process of organizing experience. Loosely speaking, equilibration involves establishing equalities. Piaget

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saw mental development as a dynamic process of disequilibrium and reequilibration and continuous reconstruction of knowledge. In an equilibrated or operational conservation, past and present states must be coordinated across time and organized according to a transformation viewed as irrelevant to quantity.

Equilibrated Social Co-Operations

Now let us return to Piaget's case for the identity of these cognitive operations and social co-operations. In Biology and Knowledge, Piaget (1967/1971) stated that:

In the realm of knowledge, it seems obvious that individual operations of the intelligence and operations making for exchanges in cognitive co-operation are one and the same thing, the "general coordination of actions" to which we have continually referred being an interindividual as well as an intraindividual coordination because such "actions" can be collective as well as executed by individuals. (p. 360)

Piaget (1950/1995) remarked that "each progress in logic is equivalent, in a non-dissociable way, to a progress in the socialization of thought" (p. 85). He stated that it is not possible to say which is cause and which is effect in the circular (later called "spiral") process of the development of individual logic and the development of co-operation. Further, Piaget (1950/1995) stated that "the isolated individual would never be capable of complete conservation and reversibility" (p. 94).

One way Piaget (1941/1995, 1945/1995, 1950/1995) talked about the identity of operations and co-operations was to describe the grouping of operations in social exchanges, using the language of formal logic. Unfortunately, the abstruseness of his conceptions interferes

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with his effective communication. Also, uncharacteristically, Piaget provided few examples. I

hope to make Piaget's social theory more accessible by walking the reader through my own

examples and diagrams, to show how social exchanges are characterized by the same form and

processes Piaget found in intellectual engagements. Without understanding these technicalities,

one has no basis for being persuaded of the identity Piaget claimed between logical operations and

social co-operations. Examples are taken at a very elementary level in classroom interactions of

young children because these are easier to understand and, once understood, it is possible to begin

to imagine how more sophisticated social exchanges operate. Piaget's (1950/1995)

discussion of social exchanges incorporates the three distinct but inseparable aspects that he

attributed to every behavior pattern: 1) the structure or cognitive aspect of operations or pre-

operations, 2) the affective or energetic aspect of values, and 3) the sign or language system in

which the other two aspects are expressed.

According to Piaget (1945/1995) three characteristics necessary to an equilibrated social

exchange are 1) a common frame of reference, shared language and symbols, 2) shared

conservation of propositions, and 3) reciprocity of thought among partners. Examples are

presented below of children's interactions and teacher-child interactions, to illustrate this process

in life.

Interactions between children. Over the years, Piaget (1941/1995, 1945/1995, 1950/1995)

utilized several notation systems to express his conception of the way in which social co-

operations function. I use here his last notational method but draw on his earlier discussions.

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Piaget (1950/1995) specified the terms as follows in the general form of an equilibrated social exchange. The first half of the exchange is expressed as:

$$r(x) = s(x') = t(x') = v(x). \text{ (p. 58)}$$

Let us suppose that x and x' are 5-year-old children, Latoya and Jim, and that Latoya offers something to Jim--she makes a social overture. This may be an offer of time, work, objects, or ideas. For example, as shown in Figure 1, Latoya proposes to Jim, "I'll be the Mommy." This proposal implies, "I'd like to play with you. Let's play together." It is expressed in the term $r(x)$. Jim experiences satisfaction with the offer and validates Latoya's proposition by responding, "OK." Here we have a transformation in the children's relationship. Jim gives value to Latoya's idea and feels interest. This is expressed in the term $s(x')$, and because the partners are in agreement, we thus have the equality of $r(x) = s(x')$. That is, the idea proposed by Latoya is the same idea validated by Jim, who must decenter to take Latoya's perspective in order to accept her idea. In this agreement lie certain potentials or virtual actions. That is, by accepting Latoya's proposal, Jim feels an obligation (Piaget calls it a kind of "debt") to act toward Latoya as if she is the Mommy. This is expressed in the term $t(x')$. He therefore has the possibility to conserve the agreement and establish the future potential (or virtual action) for respecting this role consistently (with non-contradiction) in subsequent play. This conservation is expressed in the equality $s(x') = t(x')$. That is, the idea validated by Jim is the same as the idea to which he feels obligated, and he therefore will not contradict himself. Because of Jim's conservation of the agreement, the virtual action implied in Jim's conservation gives Latoya a kind of "credit" which she can "cash in" by calling on Jim (in the near future at least) to act on his feeling of obligation to

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his conserved idea. The term $v(x)$ indicates the future validity of $r(x)$. This virtual action is expressed in the term $v(x)$, and we have the new equality, $t(x') = v(x)$. Jim's current feeling of obligation, $t(x')$ is projected into the future through its conservation. The equality $v(x) = r(x)$ expresses the fact that Latoya has the future possibility to expect of herself what she also expects of Jim. The idea to which the partners agreed becomes also a virtual action, the idea to which they feel obligated in the future. This implies that Latoya has the potential to conserve her own original idea to be the Mommy, expressed in the identity $r(x) = r(x)$.

Then let us say that, as shown in Figure 2, Jim proposes to Latoya, "I'll be the Daddy," $r(x')$, in correspondence with and symmetrical or complementary to Latoya's original idea but also elaborating it. Latoya agrees as seen in the term $s(x)$.² She conserves this agreement by feeling obligated to the idea, and this time the figure (Figure 2) shows not all the virtual actions but a series of real actions. Latoya picks up a doll and says, "What shall we do? She's naughty. She won't go to sleep." This implies a conservation of the original idea as well as an elaboration, expressed in $t(x)$. Then Jim calls on Latoya to act in terms of the value she has given to the play idea. He responds, "Let's give the baby something to eat," or "Let's spank the baby," expressed in $v(x')$. Thus $t(x) = v(x')$. Non-contradiction requires reversibility in thought as the children coordinate past and present ideas. The correspondences between the actions and ideas of the two children comprise together a sequence or grouping of coordinated actions in which they take the other's perspective and coordinate it with their own. Since Jim's proposition in Figure 2 reflects his conservation of Latoya's idea in Figure 1, we can superimpose the two figures and

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imagine a spiral that could continue with progression in the play theme. The whole joint

grouping of actions in Figures 1 and 2 is expressed in the series of equivalences:

$$r(x) = s(x') = t(x') = v(x) = r(x') = s(x) = t(x) = v(x').$$

(Piaget, 1950/1995, p. 58)

Imbedded in these equalities are reciprocities. We can say there is reciprocity between the children's ideas so that $r(x) = r(x')$, $s(x) = s(x')$, etc. Thus we have identities, complementarities, correspondences, coordinations, conservations, and reversibilities, all characteristics of individual operations, in a stable or equilibrated exchange of co-operations. Both partners feel obliged to refer constantly to the past in order to bring present and previous propositions into agreement, reflecting a kind of reversibility. Past and present ideas are coordinated across time according to transformations in elaborations that maintain the general agreement. The feeling of obligation to conserve an idea agreed upon does not remain static but is dynamic (in our example, the theme is elaborated). This dynamic conservation makes possible reversible coherence in the system of interactions. The equalities refer to coordinations in understanding, agreement, and valuation. Reciprocities are seen in the fact that the interaction is a series of propositions that complete foregoing propositions. Also, the rule of reciprocity is seen in the fact that both partners can call on each other to act according to the proposition agreed upon. Reciprocity in feelings of mutual valuing (mutual respect) and mutual feelings of obligation are present as long as the partners honor their mutual agreement. The agreements are in one-to-one correspondence as they match the general theme of interaction. When in an actual exchange conservation occurs so that the

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partners do not contradict themselves and continue to recognize and understand the other's point of view, the exchange is in equilibrium and can be said to be a system of co-operations.

We can say that to the extent that Jim and Latoya maintain an equilibrated exchange, their agreement has future validity and becomes a permanent value in their relationship. Implicit in this exchange is the mutual valuing of partners. When the potentialities are realized in play, the experience leads Jim and Latoya to value each other as "good pretendors" or "fun to play with," indication of successful reciprocity in the relationship from the children's viewpoints.

In the example given above, the children are bound to an equilibrated exchange only by their spontaneous feelings and converging interests and desires. The conservations are not obligatory according to moral or legal rules held by the co-exchangers. Thus the equilibrium is delicate and impermanent. Piaget pointed out that many inequalities are possible in interpersonal exchanges so that disequilibrium can occur, perhaps more often than equilibrium. In response to Latoya's overture, Jim might ignore her or assert a contradictory proposal. He might not share her language or understand her proposal. Or her action may result in a negative satisfaction (for example, if she hurts Jim in some way). In these cases, $r(x) \neq s(x')$. Jim may forget, get distracted, or change his mind so that the initial feeling of satisfaction is not conserved in the feeling of obligation, that is, $s(x') \neq t(x')$. Partial or approximate conservations are possible. A partner may abandon the agreed-upon role and propose a new theme, in which case the equilibrium vanishes and negotiation begins anew. To the extent that exchanges are based on fleeting interests with temporary "equilibria," Piaget characterized these as regulations that do not achieve co-operations. Yet regulations in Piaget's (1967/1971) theory eventually evolve into

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operations and are therefore significant reflections of progress in development. It is easy to imagine interactions devoid even of regulations (for example, parallel monologues).

While the exchanges of young children cannot be said to be fully equilibrated permanent operations, pre-operational efforts to co-operate with others foreshadow later operations, just as children's pre-operational efforts to compare number in the card game War foreshadow later operational understanding of number. Operations and co-operations occur, according to Piaget, at the stage of concrete operations at the approximate age of 7 or 8 years and progress to a wider and more coherent field of application at the stage of formal operations at the approximate age of 11 or 12 years).

Teacher-child interactions. Piaget connected his later formal theory of co-operations to points made earlier in The Moral Judgment of the Child (Piaget, 1932/1965) (summarized, in part, above), arguing that operational development depends on relations of cooperation in contrast to relations of constraint that tend to lead only to a system of regulations, not operations. The obligation in a relation of unilateral respect is one-sided (that is, non-reciprocal and disequilibrated) when the adult does not feel obligated to respect the child by accepting the child's propositions/beliefs.

Piaget pointed out three possibilities as a result of an adult exercising coercion over the child to transmit ready-made truths, and values. One possibility is that the partners may simply think in their own ways with no agreement and a disequilibrated exchange. In Piaget's terms, $r(x) \neq s(x')$. This may be due to a young child's egocentric point of view that prevents him or her from understanding the adult's meaning and from achieving shared, reciprocal propositions. Let

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us take the example of adult efforts to teach a child to take turns in a game. If the child does not understand the necessity of turntaking reciprocity for fairness, the child can only experience the rule to take turns as arbitrary. It is thus common to observe children between the ages of three and five years taking two or more turns without giving the partner a turn, or "taking turns" simultaneously.

The second possible result of coercive adult imposition is that the child may agree with the adult because of the adult's authority or prestige. A lack of reciprocity in the relationship will exist when the child does not agree with the proposition for the same reason as the adult. That is, the child does not truly validate the adult's proposition, and $r(x) \neq s(x')$. The child also may not even think whether he or she agrees with the adult's proposition, but may simply agree to be compliant, also an instance of inequality in the relationship.

Consider the example of an adult trying to teach a child to count correctly in a path game in which players take turns rolling a die and moving accordingly from start to finish. A common error among 4- and 5-year-olds is to count as "1" the space on which they landed on the previous move. The child's "logic" that it is necessary to acknowledge the starting space is at a certain moment in development very firmly held. This is what I call a "logical error of addition" due to the child's failure to see the moves along the path as a series of additions.

When the adult tries to teach the correct procedure by continually correcting the child, what inevitably happens is that the child ends up by looking at the adult's face to see if each move is approved. If x is the adult and x' is the child, as shown in Figure 3, what we have is $r(x) \neq s(x')$ because the child does not truly accept the logical necessity of the adult's proposition of

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how to move. If the teacher's idea is not understood, then the child cannot conserve this idea or feel obligated to the teacher's logic. What the child conserves in $t(x')$ is what he or she understands. Even if the child understands the rule to move forward on the count of "1," this will seem arbitrary if the child does not grasp the logic. A side effect of accepting an arbitrary adult rule may be that the child constructs and conserves the idea, "I am incompetent," or "Learning means accepting things that don't make sense." The child's feeling of obligation to the rule will therefore be unstable and based on a desire to please the adult or follow the adult's rule, and $s(x') \neq t(x')$. With this as a limited possibility, then, what the child gives the teacher's "credit" for is not the same as the teacher's idea, $v(x) \neq r(x)$. Therefore, the disequibrated exchange may be expressed as:

$$r(x) \neq s(x') \neq t(x') \neq v(x) \neq r(x).$$

Now, it may be that the child respects the adult's authority and tries to do what he thinks the adult wishes. However, the "agreement" is stable only insofar as the child is submissive to the adult, and it does not constitute a system of mutual obligations. The compliant agreement ends as soon as the child thinks autonomously. When not under surveillance, the child is likely to act according to his or her own logic. Piaget (1945/1995) talked about the equilibrium obtained in the relation of constraint as an unstable "false equilibrium" (p. 150) (as we have seen manifested, on a national scale, in Yugoslavia after the fall of communism). He pointed out that the conservations in this false equilibrium are not reversible. What is conserved may be a prohibition to do what the adult dislikes, with accompanying great uncertainty about what it is precisely that the adult dislikes and why. Similarly, young children may not understand the logic or moral value when

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the teacher says, "Count by tens to one hundred," "Make a straight line to walk through the hall," or "Don't lie."

When the content of societal values (rules) and truths is not understood, the child can only assimilate it to the schemes he or she has constructed, and can only approximate the observable form but not the substance of the adult's proposition. The result is that the child's thought may not be really transformed but changed only superficially. Even when what the adult imposes on the child is logical reasoning, adult authority does not change the thought of the child. Rather, it was Piaget's position that it is only by rediscovering ethical or rational truths "through a process of free participation" (Piaget, 1950/1995, p. 60) that these take on the character of operations. Piaget commented:

To the extent that elements of constraint such as tradition, opinion, power, social class, etc., enter into the construction of systems of collective representations, thought. . . does not, then, consist in a system of autonomous norms. (p. 61)

Constraint therefore can only result in unstable regulations, in families, in schools, and in society, rather than stable operations or co-operations.

A third possible result of the adult's effort to teach by constraint is that the child becomes personally convinced through his or her own reasoning of the validity of the adult's proposition, in spite of the adult's coercive attitude. The child manages to go around the coercion, so to speak, to construct the system of understandings, agreeing, for example, with the necessity to take turns, for reasons related to the desire for equality and the reciprocity of fair play. Egalitarian peer interactions may enable autonomous constructions in the absence of adult cooperation. As a

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result, the child feels obligated to follow this self-constructed rule, and then values the adult's commitment to the same rule. In this case, we have an equilibrated exchange.

Figure 4 shows an equilibrated exchange between teacher and child when the teacher proposes the idea, "Would you like to play Go Fish?" Latoya shows she agrees and validates the teacher's idea by beginning to deal the cards, $r(x) = s(x')$. If Latoya and the teacher share a common understanding of the rules, Latoya's agreement includes an agreement to play by the rules. Latoya has the potential to conserve her agreement by feeling obligated to observe the shared system of rules, $t(x')$. Because of Latoya's conservation, the teacher has the potential to call on her to follow the rules, and $t(x') = v(x)$. The teacher then has the potential to expect of herself what she expects of Latoya, $v(x) = r(x)$, implying that the teacher has the potential to conserve her own original idea, $r(x) = r(x)$.

We thus see how Piaget considered interpersonal exchanges as constituting a logic that is identical with individual logic in cognitive operations. Operational and co-operational development therefore occur in the same way, in this view, by a general coordination of actions as the child constructs groupings of actions. Co-operation is a system of operations carried out in common. Therefore, in Piaget's theory, **the operations of co-operation are created by the exchange and not just by individual thought**. As Stambak and Sinclair (1990/1993) quote Piaget, "To cooperate is also to coordinate operations" (p. viii).

Although I have illustrated Piaget's theory of equilibrated social cooperations with an example of interaction among young children, Piaget presented his theory as a general one. Equilibrated exchanges among adults are also those in which discussants share a common

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framework of reference (which may be political, literary, religious, etc.), conserve common definitions, symbols, etc., and coordinate reciprocal propositions. Piaget (1941/1995) spoke of "co-valorization" and "reciprocal valorization" by "co-exchangers" within a particular scale of values (pp. 108-109). Valorizations are affective as well as cognitive, and the feeling attached to valorization is respect. Disequibrated exchanges among scientists are often the case, when discussants operate out of different paradigms, give different definitions to terms, and fail to coordinate their points of view. Piaget (1941/1995) also spoke of "devalorization," signalling inequalities or disequilibria in interactions (p. 111). Political or social revolutions, as well as a marriage in which two people no longer love each other, are examples given by Piaget of collectives in which the scale of values is no longer held in common. Following Piaget, Stambak and Sinclair (1990/1993) comment that the necessity for cooperation "is the same at all levels of development, including that of scientific research. . . . Knowledge acquisition is in fact a co-construction in collaboration" (p. viii).

The Role of Norms

According to Piaget, because the qualitative equilibrium of social values is unstable, societies develop general moral and legal norms and operations to insure conservation of values. The coordination of interindividual obligations is expressed in norms or rules. The norm is a value that results from conservation and equilibrium over time. Without values (the content) made normative by a system of rules, exchanges such as those of Latoya and Jim are characterized by regulations rather than operations and are subject to disequilibrium. Piaget (1950/1995) noted that "the essential function of a rule is to conserve values, and the only social

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means of conserving them is to make them obligatory" (p. 44). The question of how children come to feel obligated to rules was the question that Piaget (1932/1965) addressed in his book The Moral Judgment of the Child, some of which was summarized in the discussion above of heteronomous and autonomous morality. Piaget (1950/1995) pointed out that legal rules and obligations are transpersonal, characterized by impersonal relationships of function and service, whereas moral rules and obligations are characterized by personal relationships. For Piaget, (1954/1981), the development of moral feelings is a particular type of the construction of affective schemas. Moral actions, according to Piaget, are disinterested. That is, these are not motivated by utilitarian personal interest or success. In a moral exchange, an individual conserves the other's scale of values and acts from the point of view of the other, to satisfy the other, and r(x) is from the beginning a decentered interaction characterized by reciprocity. Without attempting to summarize all of Piaget's lengthy consideration of the ways in which normative reciprocity operates, suffice it to say that two individuals interacting from the point of view of the other are reciprocally substituting their points of view. If each values, that is, respects, the other and feels an obligation, equilibrium in their interaction is the result.

In numerous places, Piaget (for example, 1950/1995) described social and affective actions as being, or moving toward operations only in the moral domain. He saw social operations going beyond regulations and being reversible only "in the case of values rendered normative by a system of rules. . . . It is only systems of completed rules, which are logically composable, which attain the quality of operatory groupings" (p. 59). Both the heteronomous feeling of duty and

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the autonomous feeling of moral necessity reflect normative systems, but it is only the latter that have the possibility for going beyond regulations and being reversible.

Piaget talked about semi-normative feelings that prepare the way for the establishment of moral norms in the concrete operational period (beginning at about 7 years) that are defined as 1) generalizable to all situations, 2) lasting beyond the situation from which a norm arises, and 3) linked to a feeling of autonomy and not just to obedience of an external rule. For Piaget, the role of norms is to conserve values on a collective level. He saw autonomy as the possibility "for the subject to elaborate his own norms, at least in part" (Piaget, 1954/1981, p. 66). Autonomy is manifested in feelings of justice reflecting mutual respect. Heteronomous moral norms are akin to legal norms (see Piaget, 1944/1995, for a discussion of morality and the law). These elementary moral norms reflect the pressure of an older generation with its traditions that are often communicated as transpersonal rules without consideration of personal relationships. Piaget (1944/1995) commented that "Mutual respect and autonomy for individuals are subordinated or even partly thwarted by unilateral respect and heteronomy" (p. 180). Thus, in discussing the role of norms in development, Piaget advocated educational efforts that promoted children's construction of autonomous norms in order to aid the child in overcoming heteronomy.

Issues Regarding Piaget's Social Theory

Some of the issues regarding Piaget's social theory are whether he made a clear case for the identity of cognitive operations and social co-operations, whether he has reduced the social to the cognitive, whether he intellectualized affectivity, and whether the development of operations and co-operations are synchronous. These are discussed below.

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Did Piaget make a clear case for the identity

of cognitive operations and social cooperations?

This question calls for discussion of quantitative and qualitative invariance in Piaget's theory. Piaget and Inhelder (1941/1976) made it clear that conservation of matter is quantitative in nature. Can social co-operations be characterized as reversible in a quantitative sense? Apparently not. In fact, Piaget (1941/1995) referred to the equalities in his social logic as "qualitative equivalence" (p. 102). If these are qualitative, how can they be identical to logical conservation which is quantitative? Or, if identical, identical in what sense?

In 1968, Piaget introduced the concept of qualitative identity as occurring earlier than quantitative conservation. Identity is a kind of qualitative invariance seen in the conservation of substance experiment when children understand that the clay in the cylinder is the "same clay" as it was when it was a ball. Other qualitative invariants studied by Piaget (1968) include the identity of a wire through various deformations, of the child's own body through growth over time, and of a seaweed-like growth that develops before the child's eyes (a grain of potassium ferrocyanide placed in a solution of copper sulfate and water). Another example of invariant qualitative identity is belief in the generic identity of a cat across transformations into a "dog" and "rabbit" via realistic masks (DeVries, 1969).

According to Piaget, identity is preoperational and occurs even as early as the end of the sensorimotor period (about two years). In fact, Piaget (1968) corrected his earlier reference to object permanence (understanding that a hidden object continues to exist) as "a first form of conservation" and said that this should be called "identity" because it is not quantitative (p. 20).

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While identity is prelogical, Piaget (1968) drew attention to its partial coordinations that lack reversibility but which "sketch out future operations" (p. 22). According to Piaget, conservation does not directly derive from identity, however, but identity (as it evolves) is one element of the system of operational structures that makes quantitative conservation possible.

Stambak and Sinclair (1990/1993), in their studies of pretend play among 3-year-olds, call attention to the fact that children of this age conserve personal identity when they abandon an assumed role in order to make non-pretense remarks and comments about the organization of the play. Children thus show an awareness of the duality of their pretend and real identities. Similarly, children can give symbolic meaning to an object but also return to its normal use from time to time. Stambak and Sinclair comment that "A certain kind of reversibility can thus already be observed at an early age in pretend play" (p. xvii). This ability to conserve an identity while taking on another identity reflects a mobility of thought which, if not the same as the reversible operation in quantitative conservation, may be a precursor or foreshadowing of the reversibility seen in quantitative conservations. Stambak and Sinclair (1990/1993) suggest the hypothesis of a positive influence of duality in pretend play on the elaboration of operatory thought" (p. xvii).

They also suggest that:

Social interaction and especially peer interaction thus seem, at a far earlier age than is generally supposed, to prepare the principal characteristics of the main reasoning principles brought to light by Piaget with reference to the ages of 6 or 7 The negotiations, justifications, and proposals of compromise observed show that at the age of our subjects the correspondences and reciprocities that, according to Piaget (1948/1959,

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p. 281) "constitute the most important grouping" are being constructed during the interactions. (Stambak and Sinclair, 1990/1993, pp. xvii-xviii)

Thus, in light of Piaget's theory of qualitative identity and quantitative conservation as well as the foregoing discussion, it appears that Piaget might not have meant that individual operations and interpersonal co-operations are the same in every way, but are the same in their general form or structure and function, that is, in the equilibration process by which they are formed.

Did Piaget Reduce the Social to the Cognitive?

This question raised by an anonymous reviewer also entails the issue of whether one is prior to the other. Actually, it could just as well be said that Piaget reduced the cognitive to the social. In contrast to both of these reductive ideas, he clearly stated that cognitive development is as much due to social experiences as social relations and development are due to cognition, and that "decentration of values. . . cannot be reduced to cognitive decentration" (Piaget, 1954/1981, p. 64). However, it is true, as described above, that Piaget was not interested in explaining interactional processes beyond their general structure and function. He did not study the dynamics of social interaction. Moreover, he did analyze social interactions in terms of the same processes he saw in individual cognitive development. It is true that Piaget saw parallels between his developmental levels in logical structuring and modes of social interaction, but without assigning either a causal role in relation to the other. Piaget (1950/1995) himself raised the question, "Must we conclude that it is the logical or prelogical structuration of a level which determines the corresponding mode of social collaboration, or that it is the structure of the

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interactions which determines the nature of intellectual operations?" (p. 87). He answered his question in the following way:

Here, the notion of operatory groupings helps to simplify this apparently unanswerable question: it is sufficient to specify, for a given level, the exact form of the exchanges between individuals, to see that these interactions are themselves constituted by actions, and that cooperation itself consists in a system of operations in such a way that the activities of the subject acting on objects, and the activities of subjects when they interact with each other are reducible in reality to one and the same overarching system, in which the social aspect and the logical aspect are inseparable, both in form and content. (pp. 87-88)

It is difficult, however, to accept the latter part of this statement, that the social and logical are the same in content. While it is clear from the discussion above how the logical and the social may be viewed as the same in form, it is not clear in what way they are the same in content.

Piaget defined the content of co-operations to be values. The content of the logical would be specific knowledge. These seem to be different rather than the same in content.

While Piaget emphasized the identity of individual operations and co-operations, he, like Vygotsky, seemed at times to lean in the direction of the priority of the social. He noted that the symbolism of individual images fluctuates too much to account for conservation, reversibility, and equilibrium, leading to the necessity of the social factor. He went on to declare:

What is more, the objectivity and coherence necessary for an operatory system presuppose cooperation. In short, then, in order to make the individual capable of

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constructing groupements, it is first necessary to attribute to him all of the qualities of a socialized person. (Piaget, 1945/1995, p. 154).

Piaget (1945/1995) further argued that "only the equilibrated exchange will lead to the formation of operatory thought" (p. 148) because this is already composed of groupings, as described above.

While it seems clear that Piaget did not reduce the social to the cognitive, it also has been pointed out by Chapman (1992) that Piaget underestimated the importance of the social dimension in the construction of knowledge. Chapman felt that Piaget "did not explain how . . . intersubjective equilibration was related to subject-object and intrasubjective forms of equilibration" (p. 53). Piaget could not provide this explanation because he did not study systematically relations between individual operations and social co-operations. Furthermore, Piaget did not discuss how culture influences development as he was not interested in individual differences. He (Piaget, 1966/1974) did say that it is necessary to know how differential cultural pressures influence cognitive development in order to dissociate sociocultural from individual factors in development. However, as pointed out by Downs and Liben (1993), in his cognitive studies, Piaget deliberately tried to "strip away the effects of culture" (p. 179). They go on to comment that Piaget "failed to offer us any insights about how these culturally developed and culturally provided systems have an impact on cognitive development" (p. 179). For some Vygotskians (for example, Cole and Wertsch, 1996), it is the cultural factor in Vygotsky's theory that most clearly distinguishes this theory from Piaget's. However, what Vygotskians have not explained is how cultural artifacts are constructed by individuals, although Vygotsky is said to be

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a constructivist (Bodrova, 1996, personal communication; Cole & Wertsch, 1996). Following

Piaget, Furth (1980) has shown how children construct their knowledge of cultural artifacts such as the monetary system. Thus, the source for responding to the criticism that Piaget ignored culture can be found within Piagetian theory itself.

Did Piaget Intellectualize Affectivity?

In light of the discussion above of Piaget's views on the relation between the individual and the social in affective and personality development, it seems that the criticism (for example, Brief, 1983) that Piaget's theory disregarded affectivity is an overstatement. Yet it is true that Piaget (1954/1981) may be said to have intellectualized affectivity. Even in affection, Piaget (quoted in Bringuier, 1977) found cognition: "In feelings of mutual affection there's an element of comprehension and an element of perception. That's all cognitive" (p. 80). He justified this on the basis of the presence in every affect of a discrimination which is cognitive. Thus, as pointed out by Brown (1996), for Piaget, affective structures were cognitive in nature, but certain cognitive functions such as possibility and necessity were feelings. Brown also points out that Piaget was conscious of the fact that his idea of operatory moral rules suggested that affectivity might influence structure. He escaped this apparent contradiction through his postulation of isomorphism between affective and cognitive structures, as noted above. Stating that although Piaget was close to solving the riddle of why people have feelings, Brown (1996) suggests an elaboration of Piaget's theory in terms of "affect-transforming actions" regulated by "affect-transforming schemes," in which "affectivity. . . is a form of knowledge" (pp. 162, 167). One wonders, however, whether this solution is not a reduction of the cognitive to the affective.

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Are Development of Operations and Co-Operations Synchronous?

Piaget's theory of the identity of logical operations and social co-operations suggests that one should be able to observe correspondences in logical and social abilities. Some research, in fact, provides general support for the synchronous development of operations and co-operations, but a review of this work is beyond our scope here (see Doise & Mugny, 1984; Perret-Clermont, 1980). Still, one wonders about possible decalages, a consideration not addressed by Piaget.

The Cooperative Context Favoring Operational Development:

Educational Implications

The obvious general educational implication of Piaget's social theory is to value a socially interactive classroom and foster social exchanges of a cooperative type in order to promote operational development. If Piaget was correct, then development of social co-operation is of value not just because social and moral development are important, but because cooperative relations are also necessary for optimal intellectual development and because all aspects of development are promoted by co-operation.

Inspired by Piaget's work, I have worked with teachers over more than 25 years to elaborate what I have come to call "constructivist education." In a recent book, Moral Classrooms, Moral Children, Betty Zan and I focus on what we call "the first principle of constructivist education." This is **to cultivate a sociomoral atmosphere in which mutual respect is continually practiced**. By "sociomoral atmosphere," we refer to the entire network of interpersonal relations that make up a child's experience of school. Every classroom has a sociomoral atmosphere that either fosters or impedes children's development and learning. I

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suggest five general, overlapping, principles of cooperative teaching (not to be confused with Cooperative Learning), all of which serve to promote children's autonomous activity and construction of regulations, operations, and co-operations. While some of these are not unique to constructivist education, Piaget's theory gives a new rationale, a stronger justification, for some existing practices. More than that, however, I believe that Piaget's sociocognitive theory leads teachers to think in new ways about what they do and why. Spatial constraints prevent full discussion of the following general principles that are spelled out in practical detail for early education in Moral Classrooms, Moral Children (DeVries & Zan, 1994). While these principles reflect my own experiences in preschool through grade 2, I believe they are applicable to education at all levels.

1. Relate to children in co-operative ways. What is unique in the constructivist perspective is Piaget's idea that the teacher should make a special effort to achieve equality in exchanges with children, in order to promote operational and co-operational development. A special effort is required because of children's natural heteronomous attitude toward adults. The general principle here is to minimize coercion as much as practical and possible. This attitude leads to an approach to discipline in which the teacher does not do things to children, but works with children (DeVries & Zan, 1994; Kohn, 1996).

2. Promote peer friendship and cooperation, including conflict resolution. What is most unique here is the view that conflict and its resolution are part of the curriculum. Conflict resolution is co-operative in Piaget's sense of operating in terms of another person's feelings and ideas. In conflicts, children are especially motivated by the disequilibrium in an interaction to reflect on

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ways to reestablish reciprocity. Motivation to co-operate in conflict resolution depends on whether children care about the relationship that is in jeopardy. If so, they make the effort to decenter and try to coordinate points of view. Peer friendship is therefore important to children's operational and co-operational development. The teacher's support of the value of mutual agreement is important as is mediational support in helping children develop negotiation strategies.

3. Cultivate a feeling of community and the construction of collective values. The co-operative sociomoral atmosphere is not impersonal. It is a network of deeply personal relations that come to be important to everyone. As children find satisfaction in their personal relationships, $s(x')$ or $s(x)$, they develop feelings of obligation, $t(x')$ or $t(x)$, that lead to regulations and co-operations. Central to the constructivist teacher's strategies for fostering community is consultation with children about what happens in the classroom. The co-operative teacher encourages children to make the classroom rules that, when conserved by children, become the norms or values by which they live in relation to each other. When children make the rules, they are more likely to understand and feel obligated to follow them than if the rules are given ready-made by the teacher. When rules are broken, children discover the natural consequences of non-conservation of values. Decision making and voting are regular experiences for children in constructivist classrooms. While children obviously should not make all decisions in the classroom, the decisions they do make should be about issues meaningful to them. Their decisions should be more significant than how to decorate the gym for a Sock Hop. In constructivist classrooms,

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teachers and children discuss social and moral issues and moral dilemmas in literature and in life in school.

Group games offer children an excellent opportunity to submit voluntarily to a system of rules in a limited context that nevertheless challenges children to make mutual agreements, feel obligated to the partner to abide by these, and accept the consequences of the rules. Game competition can thus be viewed within a broader framework of co-operation (DeVries & Kohlberg, 1987/1990; Kamii & DeVries, 1980). Game play may be more or less equilibrated, depending on children's intercoordinations. The teacher can encourage children to conserve their practice of rules. In games, children have the possibility to discover that when they are inconsistent in following rules, the partner may protest, and they find out the disadvantages of a breakdown in reciprocity. They may then discover the advantages of playing by the same rules when the partner accepts the consequences of playing by the rules agreed upon. While 4-year-olds are challenged by the need to construct the logic of turntaking and a specific set of rules, older children are challenged by the need to construct strategies and to coordinate with another within more complex systems of rules. In games, children have possibilities for the confrontation of different points of view that Piaget (1932/1965; 1980) considered important for the elaboration of logical thought.

4. Appeal to children's interests and engage their purposes. Providing activities that appeal to children's interests is one expression of respect for the child's point of view but also reflects respect for how children learn and develop their intelligence. General interest in an activity gives the teacher the opportunity to challenge children to pursue a specific purpose. If Piaget was

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correct, it follows that we must help children find their purposes in activities. For Piaget,

genuine experimentation and "authentic work" are salient characteristics of the active education he advocated. He noted:

When the active school requires that the student's effort should come from the student himself instead of being imposed, and that his intelligence should undertake authentic work instead of accepting pre-digested knowledge from outside, it is therefore simply asking that the laws of all intelligence should be respected. (Piaget, 1969/1970, p. 159)

Moreover, as noted above, interests are what Piaget (1954/1981) called the "fuel" of the constructive process. That is, when activities are emotionally and intellectually satisfying, they lead to prolonged effort. Appealing to interest is especially important for children whose will power is yet relatively undifferentiated. Children have to construct an evolving hierarchy of personal values in which it makes sense to them to engage in school activities. Even for adults, efforts are most productive when interests are thoroughly engaged.

One powerful way to engage children's interests and purposes is to consult with them about the content of the curriculum. When the teacher makes a list of children's ideas about what to learn, she can then conserve these ideas by organizing the curriculum around them. Children then experience the teacher's conservation of their own ideas, the feeling of obligation on the part of the teacher to these, and the resulting reciprocity. The clever teacher can integrate math and literacy and all other subject matters into what children genuinely want to know about. This does not mean that district curriculum is ignored, or that the teacher brings no suggestions, but he or

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she does so with the aim to engage children's real interests and purposes. Where content is fixed by district mandates, the teacher can consult children about how to go about their study together.

Providing for a wide range of individual and collective interests does not mean there are no "have-tos" in a constructivist classroom, but these, too, can be managed in ways that minimize coercion. For example, in one second grade, the teacher asked children to read with a friend for about 15 minutes sometime during the day. When to read and what and with whom were left to children. She thus gave children the opportunity for autonomy within an assigned task.

Similarly, because the school district mandated use of handwriting worksheets, the teacher explained where the requirement came from and that it was intended to help children write more legibly. However, children had the opportunity to decide when during the week to do the worksheets (for example, one everyday or five on Friday), and to evaluate their work with the teacher. Duties understood and accepted within a general atmosphere of mutual respect do not damage that atmosphere.

5. Adapt to children's understanding. If Piaget was correct, then one way the teacher must cooperate with children is to take account of their knowledge and ways of knowing. This can be accomplished in at least four ways. First, learn how children are already reasoning about a topic. This does not mean just finding out what children do not know. In fact, children already know a lot about most curriculum topics. Usually, however, they are incorrect in many of their spontaneous ideas about the abstract aspects of these topics.

Second, honor children's ideas, respect their reasoning, and support the search for truth. For example, in a water activity in which a child suggests that all little things float, the teacher can

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respect this idea by giving it the credence of deserving to be explored. If the teacher says, "Let's try a bunch of little things to see if that works," this creates a moment of interindividual equilibrium that permits the child to experiment and find out the truth by his or her own action.

Third, consider the kind of knowledge involved. In numerous places, Piaget (for example, 1970) distinguished between physical and logico-mathematical knowledge. Briefly, physical knowledge is based on experiences of acting on objects and observing their reactions. The source of physical knowledge is therefore partly in the object's potential for reaction in certain ways. In contrast, logico-mathematical knowledge is the result of reflective mental actions on objects that introduce characteristics that objects not have into the individual's ideas about those objects. It is a system of relationships created by the knower (for example, the "twoness" of a book and a cup does not exist in either object but in the mind of the knower who gives the objects this numerical characteristic). The source of logico-mathematical knowledge is therefore the knower's own constructive processes. Logico-mathematical knowledge is particularly important because intelligence, according to Piaget, can be described as a framework of potential logico-mathematical relationships.

A third kind of knowledge, conventional arbitrary knowledge, is arbitrary truth agreed upon by convention (such as that December 25 is Christmas Day in many countries) and rules agreed upon by coordination of points of view (such as the rule that cars should stop when a traffic light is red). The source of arbitrary conventional knowledge is other people, through various means of communication, including books and computers.

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Having made these distinctions, Piaget quickly pointed out that it is difficult to conceive of pure physical or conventional knowledge. Virtually all knowledge involves logico-mathematical construction. For example, while the fact that Houston is the name of a city in Texas is conventional knowledge, the spatial and logical inclusion of Houston in Texas is logico-mathematical. (A 5-year-old seated next to me on a airplane flying from Texas to California asked me, "Is Houston by Texas?" indicating the lack of inclusion.)

These distinctions are important to constructivist teachers because they provide a framework for planning and implementing activities. If the knowledge the teacher wants to teach is mainly physical in nature, then the teacher encourages children to act on objects to find out their properties. If the knowledge is mainly conventional in nature, the teacher simply teaches through direct instruction by telling children the arbitrary fact. In the respect that knowledge is logico-mathematical in nature, then the teacher must engage children in reflecting on situations and problems that challenge their incorrect convictions and reasoning. (For an elaboration of some of the ways in which the three kinds of knowledge pertain to curriculum, see DeVries & Kohlberg, 1987/1990; Kamii & DeVries, 1978/1993; DeVries & Zan, 1994).

Knowledge of the social world requires logico-mathematical structuring of relationships. Thus, the relationships described above of Piaget's formal logic in social interactions are logico-mathematical relations. Piaget's theory leads to the view that to foster social co-operation is also to foster the general framework of the intelligence.

Conclusion

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If we take seriously Piaget's social theory, we are challenged to reflect on the nature of adult-child relations in schools (as well as in families) and to consider what it means in practical terms to minimize unnecessary coercion of children and practice mutual respect. What coercion is necessary and what is not? How can adults co-operate with children in a relation of equality? How do we cultivate a feeling of community among children and the construction of collective values? How do we appeal to children's interests and engage their purposes while still making sure they learn what is valuable in human knowledge? How do we respect children yet avoid the chaos of permissiveness?

In answering these questions, educators must consider the long-term goal of the kind of adult we want children to become. Consideration of this issue requires honesty in evaluating whether what we do to children really is necessary, or whether it reflects personal authoritarian attitudes and acceptance of coercion as the way to easy, but temporary, results. Honesty requires that we consider Piaget's warning of the possible damaging effects of too much unnecessary coercion on children's learning and long-term development.

Piaget's social theory challenges us to reflect on how best to educate children's wills and how to foster their construction of feelings of the moral necessity to respect persons. If we take Piaget's ideas seriously, we will contemplate the sociomoral conditions necessary for children to construct personal convictions about morality and truth. If Piaget was correct, then we need to reconsider the structure and methods of our schools from the point of view of long-term effects on children's sociomoral, affective, and intellectual development.

Piaget's Social Theory

This article addresses the myth that Piaget did not consider social factors to be important in his developmental theory. It serves to correct a misunderstanding among many educators, especially those influenced by Vygotsky's theory, that the development of Piaget's child is an individual matter apart from the social context. Piaget's social theory shows him to have focused on the role of social interaction in development in terms of both general structures and their functioning. He proposed ways in which co-operative social interactions function to promote cognitive, affective, and moral development. The presentation here calls into question the conclusion of Tudge and Rogoff (1989) that "social influences on development are not central to Piaget's theory" (p. 19) and makes debatable their view that Piaget's approach was to "focus on the individual as the unit of analysis," in contrast with Vygotsky's focus on "social activity" as the unit of analysis (p. 20).

Can the views of Piaget and Vygotsky be reconciled, in light of Piaget's social theory? To what extent does Piaget's conception of co-operative activity as equilibration correspond with Vygotsky's conception of the role of social activity in individual internalization? These issues require co-operative discussion among Vygotskians and Piagetians. I hope that this presentation of Piaget's social theory will make it possible for Vygotskians and Piagetians to move on to productive discussion of the ways in which both theories may continue to develop.

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Notes

1. I would like to express my appreciation especially to Hermina Sinclair and Betty Zan, and to Rebecca Edmiaston, Linda Fitzgerald, Carolyn Hildebrandt, Christie Sales, Barry Wadsworth, and four anonymous reviewers for their comments on earlier drafts of this article.
2. Conceivably, of course, the possibility exists that Latoya would not accept Jim's proposal, countering with another proposal such as, "No, you be the baby." With each elaboration of the agreement comes also the possibility for disequilibrium or inequality in agreement to new propositions. These elaborations could also be diagrammed as a new $r(x)$ or $r(x')$, 1.