Vygotsky, Piaget, and Education:

A Reciprocal Assimilation of Theories and Educational Practices

Rheta DeVries

Regents' Center for Early Developmental Education

University of Northern Iowa

Cedar Falls, IA 50614-0616

Phone: (319) 273-2101

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Abstract

Seeking a rapprochement between Vygotskians and Piagetians, the theories of Piaget and

Vygotsky are compared, and educational extensions by their followers are examined. A paradox

in Vygotsky's theory is highlighted, where evidence is found both for claiming that Vygotsky

was a behaviorist and that he was a constructivist. Similarities in the two theories are presented:

social factors as having a central role in child development, the transformative nature of

internalization, and the individual as what develops. Differences in the theories pertain to the

nature of the stimulus, nature, and origin of psychological instruments, nature of self-regulation

and novelty in development, direction of development, the concept of social development, and

the role of language in development. Because practical applications of theories often clarify the

theories, some educational extensions of Vygotsky's theory are critiqued from a Piagetian

constructivist perspective, and, in contrast, constructivist educational interpretations of

Vygotsky's work are noted. Aspects of Piaget's theory emphasized by educators are presented,

and educational practices inspired by this theory are outlined. A rapprochement is sought, with

consideration of convergences in educational practices of followers of Piaget and Vygotsky,

sources of difficulty for rapprochement, and changes necessary in educational theories of

followers of both Piaget and Vygotsky.

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It has been with some surprise that I have taken note of Vygotskians' criticisms of Piaget for not emphasizing social processes in development. I have been surprised because Piaget's theory led me to a definition of education emphasizing the social (DeVries & Zan, 1994; Kamii & DeVries, 1978/1993, 1980). I have found myself wondering whether I had unwittingly become a Vygotskian. As a Piagetian seeking in Vygotsky what might enrich my constructivist educational ideas, I have sought to understand the similarities and differences between Vygotsky and Piaget, both in theory and in the extensions of theory to educational practice.

The current state of my search is one of some confusion. It has been difficult to resolve a paradox in Vygotsky's work. On the one hand, Vygotsky often sounded like a behaviorist. On the other hand, Vygotsky often sounded like a constructivist. Sometimes I have felt like a member of the panel in the old TV show, "What's My Line?" in which I am asked to guess which is the real Vygotsky among a group of impostors. I have frequently wished I could hear a moderator put an end to my misery by saying, "Will the real Lev Vygotsky please stand up?"

Vygotsky As a Behaviorist

In 1926, Vygotsky wrote a short course on Pedagogical Psychology in which he presented the idea, quoting Munsterberg, that "the pupil is a reacting apparatus." According to Van der Veer and Valsiner (1991), "he seemed convinced that all human behavior consists of (chains of) reflexes and that ultimately it would be possible to translate psychology's old concepts into reflex terminology" (p.49). By 1930, just four years prior to his death, Vygotsky still presented the conditioned reflex as a prime example of a psychological tool or instrument.

He stated, "the whole composition of the instrumental act can, without exception, be reduced to a system of stimulus-response connections" (Vygotsky, 1930b/1981, p. 140). He defended the idea that "All human behavior finds its origin in reactions to stimuli coming from the external world," relying "heavily on Pavlov's theory of the conditional reflexes" (Van der Veer and Valsiner, p. 50). Vygotsky (1930a/1981) aligned himself with the American psychologist Thorndike:

> It would seem to us to be correct, given our present stage of knowledge, to take the point of view defended by the American psychologist Thorndike (p. 173). . .(where) the intellectual response, as it turns out, is essentially reduced to nothing except a system of habits. . . Since the laws of stimulus-response connections are the basis of natural behavioral laws, it is impossible to control a response before controlling the stimulus. Consequently, the key to the child's control of his/her behavior lies in mastering the system of stimuli. . . But a system of stimuli is a social force provided externally to the child. (pp. 175-176)

As for the individual, Vygotsky (1930a/1981) defined stages in terms of conditioned reflexes that are peculiar to particular individuals: "the conditioned reflex is peculiar to only a particular individual not in accordance with nature or heredity, but as the acquired conditions of experience" (pp. 173- 174).

Evidence certainly therefore exists that calls for placing Vygotsky in the behaviorist camp. This however, is not the whole story.

Vygotsky As a Constructivist

For a long time, I was unable to see Vygotsky as a constructivist. However, challenged by those who read Vygotsky in Russian and who say he is a constructivist (for example, Bedrova, Valsiner, and Wertsch), I reread Vygotsky and concluded that Vygotsky's behaviorist statements should be interpreted in the context of his advocacy of more constructivist ideas. Evidence for Vygotsky as a constructivist comes principally from his theory of the dialectic. He sounded like Piaget, for example, when in one of the same 1930 articles quoted above (Vygotsky 1930a/1981) he said

> that any new form of cultural experience does not simply come from outside,
>
> independently of the state of the organism at a given point of development. The fact is
>
> that the organism that is mastering external influences masters a number of forms of
>
> behavior or assimilates these forms depending on its level of mental development. . . .
>
> these external materials are reprocessed and assimilated in the organism. (p. 169)

In that same year, Vygotsky (1930b/1981) also said that "the psychological tool alters the entire flow and structure of mental functions" (p. 137). Moreover, he called the psychological tool a "construction" (p. 137). Most importantly, Vygotsky (1930b/1981) talked a great deal about how development is a transformation through action: "By acting on external nature and changing it, they also change their own nature and act on it at the same time" (p. 140).

It is easier to see constructivism reflected in the work of others in the Soviet activity theory tradition and some contemporary followers of Vygotsky. For example, Van der Veer and Valsiner (1991) note that Molozhavyj's developmental emphasis in the later 1920s was close to what Vygotsky would later express. They say that "Molozhavyj argued for the processes of equilibration and disequilibration (terms our contemporary readers are familiar with, after Piaget)

in conjunction with the notion of structural holism in development" (p. 322). They quote

Molozhavyj (1928):

> Every process becomes resolved in a way that brings [the organism] either to the
>
> restoration of balance in its previous structural form, or to the destruction, structural
>
> change, reorganization, regrouping--to a new type of connections, to a new coordination
>
> that enters the system of elementary moments. (Van der Veer and Valsiner, 1991, p. 322)

The description of Molozhavyj's ideas could come straight out of one of Piaget's books. For

example:

> The emergence of qualitatively novel psychological mechanisms regulates the organism's
>
> relationships with its environment. According to Molozhavyj, child development is
>
> characterized by the emergence of novel adaptive mechanisms as a result of
>
> disequilibration, rather than by equilibrative return to the previous state of the organism.
>
> (Van der Veer and Valsiner, 1991, pp. 322-323)

Evidence certainly therefore exists that calls for placing Vygotsky in the constructivist camp.

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Theoretical Similarities

between Vygotsky and Piaget

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Let us consider in more detail some of the important similarities between the theories of

Vygotsky and Piaget. These pertain to social factors, transformative internalization, and the

individual as what develops.

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<u>Social Factors Play a Central Role in Child Development</u>

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Vygotsky's position that social factors are central in development is well known. Piaget,

however, is often misunderstood as viewing the child as a lonely scientist apart from the social

context (e.g., Damon, 1981; Haste, 1987; Goffin, 1994; Lubeck, 1996; New, 1994; Santrock, 1997). It is true that his research focused mostly on individuals in a laboratory setting (the study of children's marble play being an exception). However, it is important to distinguish between Piaget's statements as an epistemologist and his statements as a psychologist. His main goal was epistemological--to explain how knowledge develops, not how the child develops. It is certainly incorrect to state, as did Bedrova and Leong (1996) that "Piaget placed thinking at the center of child development" (p. 27). It seems that by criticizing Piaget for not explaining in full detail the specific role of social factors in the child's development, we ask more of Piaget than he asked of himself. When he spoke as an epistemologist, Piaget focused on the development of ideas. When he spoke (less frequently) as a child psychologist, Piaget emphasized the central role of social factors in the construction of knowledge. For example, even in his early work (Piaget, 1928/1995), he sounded like Vygotsky when he said that "social life is a necessary condition for the development of logic" (p. 120), "social life transforms the very nature of the individual" (p. 210), and "that (the progress of) reason is due to social mechanisms" (p. 199). In later work, Piaget (1950/1995) stated that "relations among individuals. . . modify the mental structures of individuals" (p. 40). Further, he unequivocally equated intellectual and social operations as identical, stating that:

> In the realm of knowledge, it seems obvious that individual operations of the intelligence and operations making for exchanges in cognitive cooperation 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. (Piaget, 1967/1971, p. 360)

A more detailed presentation of how Piaget saw intellectual and social operations as identical is found elsewhere (Piaget, 1928/1995, 1950/1995; DeVries, 1995, 1997).

It is therefore clear that Piaget and Vygotsky were in agreement that when one speaks of child development, one must give great attention to social factors.

Internalization Is Not a Process of Copying Material
from the Environment but Is a Transformative Process

Piaget's stage theory describing qualitatively different structures of knowledge and his constructivist theory of the transformative interiorizing mechanisms of intellectual development are well known (see, for example, Piaget, 1970). Vygotsky emphasized internalization in development, but it is not easy from reading Vygotsky's works available in English to determine exactly what he meant by his famous statement:

> We could formulate the general genetic law of cultural development as follows: Any
> function in the child's cultural development appears twice, or on two planes. First it
> appears on the social plane, and then on the psychological plane. First it appears
> between people as an interpsychological category, and then within the child as an
> intrapsychological category. (Vygotsky, 1930a/1981, p. 163)

The key to understanding this passage is to emphasize that it is cultural development that first appears on the social plane. I see no problem for a Piagetian in agreeing with this statement. Cultural development involves learning the characteristics of the particular culture. Vygotsky did not define this term, but to the extent that he meant that these are characteristics that the individual could not learn without communication from others, then it is akin to Piaget's conventional knowledge (explained below). Even scientific concepts that involve logico-

mathematical structuring in the Piagetian view could be seen as having a conventional content aspect in the sense that people have agreed on particular terms expressing truths.

Perhaps Vygotsky is misunderstood to mean that what is experienced interpsychologically is simply internalized in unchanged form to become intrapsychological. The following statement may be interpreted to contradict this idea: "what was an outward sign operation. . . is now transformed into a new intrapsychological layer (emphasis in original) and gives birth to a new psychological system, incomparably superior in content, and cultural-psychological in genesis" (Vygotsky and Luria, 1930, pp. 109-110; quoted in Lawrence and Valsiner, 1993, p. 163). This similarity on the matter of psychological transformation has been noted by Glassman (1994) who interprets the transformation as one of structure. However, if Vygotsky refers to a transformation in content, the similarity dissolves. To the extent that Vygotsky may have referred to structure, this similarity in views may reflect the influence of Claparede and Baldwin on both Vygotsky and Piaget.

In their review of internalization in Vygotsky's theory in the context of influence by Janet and Baldwin, Lawrence and Valsiner (1993) conclude:

> Once the transformation concept is accepted as the cornerstone of sociogenetic theory, the individual mind is readily seen as the initiating agent of constructive and reconstructive change. . . .Similar concepts appear within and across generations of psychologists and paradigms, including the idea that external-to-internal movement of material involves adaptive reorganization rather than automatic transmission. (p. 165)

Does Vygotsky mean the same thing as Piaget when he wrote about adaptive reorganization? It is difficult to know. Wertsch and Bivens (1992) state that we know very little about exactly how

or why the transition occurs from the intermental to the intramental plane in Vygotsky's theory. In any case, Vygotskians have not addressed the research by Piaget and others showing that children do "know" a great deal that is erroneous and could not have been the result of social transmission.

<div align="center">What Develops Is the Individual</div>

While Vygotskians criticize Piaget for having a theory of individual development, Vygotsky certainly saw the higher mental functions of the individual as the goal of development. The discussion of internalization above presents the individual child as the site of intrapsychological activity. Matusov (1996) also discussed the privileged role given to mastery of solo activity in Vygotsky's model and notes its dualistic conception of the social and the individual.

<div align="center">Differences between Vygotsky and Piaget</div>

Differences between the theories of Vygotsky and Piaget can be discussed in terms of the nature of the stimulus, the nature of knowledge and psychological instruments, the origin of the nature of self-regulation, the nature of novelty in intellectual development, the direction of development, the concept of social development and the role of language in development.

<div align="center">Nature of the Stimulus</div>

Piaget certainly saw the nature of the stimulus differently than Vygotsky. For Piaget, the stimulus is not a stimulus until acted upon by the subject, in contrast to Vygotsky's empiricist views presented above on conditioned and unconditioned responses that depend on the action of the environment.

Another difference with regard to this point is that, as noted by Hermina Sinclair (personal communication, 1995), Vygotsky focused on the content of the stimulus while Piaget focused on the structure of the knowing individual. Fosnot (1996) neatly summarizes the essence of this difference by likening it to a visual figure-ground illusion involving the individual and the social and comments: "If we ask a question about the effect of culture on cognition, we get a cultural answer; if we ask about the individual's cognizing, we get an answer that reflects that component" (p. 29). As we will see, this difference leads some Vygotskians to didactic teaching in education and leads Piagetians to more open-ended teaching.

<div align="center">Nature of Knowledge and Psychological Instruments</div>

As pointed out by Sinclair (1996), Vygotsky emphasized the content of development while Piaget emphasized the structure of development. She wrote:

> In contrast with other researchers in this field, Piaget emphasizes the underlying forms of cooperative interaction among persons, just as he does for interaction of the individual with objects: he is interested in the logical or proto-logical structuration of turn-taking, the pertinence of responses (whether in action or verbally expressed), and agreements and disagreements. The content of interaction may vary considerably depending on the shared activity and the developmental level of the participants. The role of a participant who is considered to be more competent and is expected to act as a tutor (emphased by Vygotsky) relates to the content rather than the structure of interaction. (p. 187).

Sinclair and her colleagues documented the emergence of proto-structures during social interactions of children from one to three years of age (Stamback, Barriere, Bonica, Maisonnet,

Musati, Rayna, & Verba, 1983; Stambak & Sinclair, 1990/1993; Sinclair, Stambak, Lezine, Rayna, & Verba, 1989).

While Piaget (1928/1955, 1950, 1995) went further than Vygotsky in specifying how social and intellectual functions have the same structure and develop in corresponding ways, he did not see psychological instruments as social in origin but as originating in the action of the individual. Vygotsky (1930a/1981) himself noted his disagreement with Piaget on this point: "In contrast to Piaget, we hypothesize that development does not proceed toward socialization, but toward the conversion of social relations into mental functions" (p. 165). Perhaps this difference in views stems in part from the fact that Vygotsky did not study infant development while Piaget (1936/1952, 1937/1954) microanalytically considered the origins of intelligence and knowledge in infancy. Vygotsky (1935) saw the years up to age 3 as characterized by lower mental functions, developed around perception.

Vygotsky also saw psychological instruments as the content of cultural representations whereas Piaget saw psychological instruments as structural adaptations to experience. Yet in this difference lies also the seeds for rapprochement inasmuch as cultural representations are experienced, and adaptations to these are constructed.

<div align="center">Nature of Self-Regulation</div>

Self-regulation is an important notion for both Piaget and Vygotsky. However, for Vygotsky, self-regulation is behavioral. For Piaget, it is psychological. For Vygotsky, self-regulation appears after and as a result of regulation by others in a specific task. For Piaget, self-regulation is present from early infancy in the child's equilibration of actions, and regulation by others does not have to come before self-regulation in a specific task. For Vygotskians, self-

regulation is promoted by external regulators such as timers, schedules, etc. For Piagetians, self-regulation is promoted, for example, by giving children extensive opportunities to make choices and decisions, to make rules by which they will regulate themselves, and to regulate group games according to the rules that are mutually agreed upon (Kamii & DeVries, 1980; DeVries & Zan, 1994). For Piaget (1932/1965) regulation by others hinders the development of self-regulation or autonomy.

Nature of Novelty in Intellectual Development

While both Piaget and Vygotsky emphasized the importance of novelty in children's development, they differed in what they identified as novel. Vygotsky saw novelty in the content of conditioned responses arising out of unconditioned responses; for him, novelty is thus some form of mediation. Piaget saw novelty in both content and structure of mental adaptations.

Direction of Development

Viewing the child's cultural experience as constituting development from the outside in, Vygotsky (1930a/1981) criticized the idea of development as "what proceeds from the inside out" (p. 169). Instead, he stipulated that

> What goes from outside in is schooling because we never find a child who would naturally develop arithmetic functions in nature. . . .These are external changes coming from the environment and are not in any way a process of internal development. (p. 169)

In contrast, Piaget's picture of development is more a matter of proceeding from the inside out. Viewing the child's adaptation as constituting development, Piaget saw the developmental process as one in which the child is in control. His research revealed children's ideas that were not the result of schooling (for example, nonconservation of number). He would therefore argue

that arithmetic knowledge is indeed a process of internal development, although here, too, we find

conventional aspects that must be communicated socially (e.g., names of numerals and other

arithmetic symbols).

The Concept of Social Development

While Vygotsky emphasized the role of the social in determining development, he did not

write about social development itself. In contrast, Piaget wrote extensively on social

development, as discussed above. He saw social understanding, including the idea of the self,

progressing from a lack of awareness to consciousness of others' perspectives and to situating

the self in a system of social relations. As Sinclair (personal communication, 1996) commented,

what Vygotsky meant by "social" was "society." Piaget also acknowledged the role of society in

many publications.

The Role of Language in Development

This difference is perhaps the most well known between the two theories. While

Vygotsky saw words as giving children scientific concepts, Piaget emphasized that children often

use the same words as adults but mean something quite different. For Piaget, understanding

scientific concepts is a matter of progressive construction through stages where reasoning

becomes increasingly more adequate and corresponds to what society considers correct. In this

conception lies the possibility for going beyond society and constructing something new to

society.

Education Based on Vygotsky's Theory

In view of the presence in Vygotsky's writing of both behaviorist and constructivist

conceptions, it is not surprising that some educators draw from Vygotsky's work educational

implications that are behavioristic, and others draw implications that are constructivist. It is important to look at specific educational practices drawn by theorists and their followers because these applications of theory give us insights into the theory itself, at least as it is interpreted by followers.

As far as I know, Vygotsky himself hardly described any educational practices that he saw as consistent with his theory. In one lecture given in 1933 or 1934, and published in French, Vygotsky (1935) specified the necessity to take into account the fact that the child up to the age of three years "learns while following his own program" (p. 35) and that by school age (7 years in Russia) he is able to learn according to the teacher's wishes. The preschool age, according to Vygotsky, occupies an intermediate position in which the child "does what he wishes but that he wishes what the guide wishes" (p. 36). From the age of three years, "the child of preschool age is capable of learning to the degree that the program of the teacher becomes his own program" (p. 36) [translations from this source the responsibility of the author]. Followers of Vygotsky draw key practical implications from Vygotsky's well-known notion of the zone of proximal development (ZPD), expressed as follows:

> What we call the zone of proximal development. . . is the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers. (Vygotsky, 1935/1978, p. 86)

The problem with trying to draw educational implications from this rather romantic idea is that Vygotsky never specified clearly the forms of social assistance that constitute guidance to learners in the zone of proximal development. The idea of providing assistance to a child is an

idea that is in itself neither behaviorist nor constructivist and is certainly not new. Therefore, one

can conceive of providing directive, authoritarian assistance as well as non-directive, cooperative

assistance. As Hatano (1993) notes, "Assistance may be just awful" (p. 160). The ZPD can be

used to describe or justify any type of educational approach (for example, Montessori,

constructivist, or DISTAR). However, Vygotsky (1934/1987) did write about assisting children

"through demonstration, leading questions, and by introducing the initial elements of a task's

solution" (p. 209). In this same source, he stated that "the teacher, working with the school child

on a given question, explains, informs, inquires, corrects, and forces the child himself to explain"

(p. 209). One could argue that this sounds rather like the emphasis on direct teaching that one

finds in behaviorist classrooms. While these types of interventions do not predominate in

constructivist education, there are times when constructivist teachers also intervene in these

ways. The differences between behaviorist and constructivist interventions lie in how the teacher

intervenes in these ways, under what circumstances, and how often. A discussion of these

differences is beyond the scope of this paper.

<u>A Piagetian Critique of Some Examples of Vygotskian Education</u>

Vygotskian educators draw particularly on the idea of the ZPD, seeking to identify

teaching that uses the competence of the adult or more capable peer as the guide for participation

in an activity.   As noted above, this idea does not specify <u>how</u> to intervene in the ZPD, and

Vygotskian educators differ widely in the teaching they present as models.

This section is not a comprehensive review of Vygotskian education, but it may be useful

to take some examples of models offered by Vygotskian educators and comment on them from a

Piagetian constructivist perspective.

Kamehameha Elementary Education Program (KEEP)

In their book Rousing Minds to Life: Teaching, Learning, and Schooling in Social Context, Tharpe and Gallimore (1988) describe their development from 1970 to 1983 in Hawaii of an elementary school program based on Vygotsky's theory. They specify that Vygotsky's theory leads to education in which "the child is not merely a passive recipient of adult guidance and assistance; in instructional programs, the active involvement of the child is crucial" (p. 29). They describe internalization as a process of reorganization and reconstruction. However, some discontinuity seems to exist between these "Piagetian" ideas and the description of specific practices in this program. In writing about teaching in the ZPD, Tharpe and Gallimore (1988) list six means of assisting children's performance, some of which seem to fall into a behaviorist paradigm:

1.   Modeling

2.   Contingency management of rewards and punishments

3.   Feeding back information about accuracy of performance

4.   Instructing on matters of deportment and assigning tasks

5.   Questioning that requires a reply in language

6.   Cognitive structuring that organizes, evaluates, and groups and sequences perceptions, memory, and actions. (p. 177)

With these principles, Tharpe and Gallimore state that "One of our goals is the integration of neo-Vygotskianism with those considerations central to behaviorist and cognitive studies of learning and self-control" (p. 45). Like many other Vygotskians, Tharpe and Gallimore refer to the assistance of performance through scaffolding which they liken to "behavior shaping" in

which the child's role is simplified by means of "graduated assistance from the adult/expert" (p. 33). Their behaviorist orientation is further reflected in their specification of the social learning theory use of "rewards and punishment. . .arranged to follow on behavior, depending on whether or not the behavior is desired" (p. 51). They further elaborate: "The rewards, praises, and encouragements that follow a behavior are like props or buttresses that strengthen each point of advance through the ZPD, preventing loss of ground" (p. 53). Tharpe and Gallimore further specify their use of reinforcement:

> Although some stars, tokens, and privileges are dispensed contingently, the KEEP management system relies in the earlier grades on the reinforcing effects of hugs, smiles, and praises, and, as the children grow older, on public, verbal recognition of progress and diligence. (p. 172)

In addition to praise for good deportment and academic behavior, the Vygotskian KEEP teachers used "verbal negatives (scolds or desists) for unacceptable behaviors" (p. 172). The importance of reinforcement to this Vygotskian approach is reflected in the fact that newly hired teachers "spent 16 weeks learning to use praise effectively" (p. 193). This is in contrast to a constructivist view that frequent praise for the sake of praise can make a child dependent on teacher approval and therefore can undermine the development of intellectual autonomy.

As an example of giving feedback, Tharpe and Gallimore cite a guided reading lesson in which the teacher operates in the ZPD to get children to answer accurately questions about the text:

> Teacher: Okay, go ahead and finish the rest of the story
>
>   and see what happens.

Children: [Mumbling aloud as they read, only half-silently]

Cindy: Or. . .bit?

Teacher: Yeah, orbit.

Emma & Jimmie: [Turn pages and look at each other]

Jimmie: First! I finished first.

Emma: Me.

Jimmie: I finished first.

Teacher: [Reaching over to hold Jimmie's shoulder] Could you answer a question about

 that? Who are the two men that went to the moon?

Emma: Ummmmm. . .

Jimmie: John Glenn and. . .

Teacher: To the moon?

Jimmie: Yes.

Teacher: Read again. Who went to the moon?

Emma & Jimmie: [Open their books again and read]

Emma: [Turns her book around and shoves it in front of teacher; points at a word]

Teacher: Astronaut.

Emma: Astronaut. [Points again]

Teacher: [Again providing a correct pronunciation] Armstrong.

Cindy: The first man on the moon was. . .

Jimmie: Armstrong

Teacher: Aldrin. Aldrin. (Tharpe and Gallimore, 1988, pp. 55-56)

My reaction to this example is that it is no different from lots of behaviorist direct teaching in which children are not really interested, but are half-heartedly obeying the teacher and trying to respond to questions having specific correct answers. This exclusive focus on correct answers removed from children's interests is in contrast to constructivist teaching that appeals to children's interests and development of reasoning.

In their discussion of how the Vygotskian teacher orchestrates the whole group, Tharpe and Gallimore (1988) note that in the kindergarten year children are socialized into the habits and understandings required for participating in a center-based classroom. One of the teacher's responsibilities in the first few days of school is to teach children "the rules and the rest of the social system that make up the classroom and school" (p. 167). This contrasts sharply with the constructivist approach to establishing a cooperative sociomoral atmosphere, in part by having children construct the classroom rules on the basis of the needs they experience (see DeVries & Zan, 1994).

Reciprocal Teaching

Palincsar, Brown, and Campione (1993) emphasize the importance of structured dialogues that provide guided practice toward the goal of understanding written texts. They give four concrete strategies for getting children to understand text:

1.   Asking questions about text;

2.   Summarizing to get consensus;

3.   Clarifying to restore meaning upon misunderstanding;

4.   Predicting about upcoming event.

They describe the teacher's scaffolding role in terms of cued elicitations, paraphrasing children's contributions, choral responses, framing children's responses, selective use of praise, and silence (p. 54).

Review of transcripts of classroom teaching leads me to conclude that this approach to teaching is nothing new, but is highly similar to teachers' guides that have existed for a long time.

Classifying Grocery Items

Rogoff and Gardner (1984) give an example of adult guidance of cognitive development in the ZPD with an activity involving classification of grocery items on shelves in a mock kitchen. A mother instructs her 7-year-old daughter in the organization of grocery items on shelves. Then she tries to get the child to take greater responsibility in remembering where the items go. The mother tells the child to put the margarine with the bread, gives hints by looking toward or pushing items in the direction of their correct placement, corrects the child's errors by giving the correct answer, and tells the child to think.

Mother (picking out margarine and handing it to child): This goes on bread.

(Child studies item.)

Mother: Where do you put that? (Touches margarine, practically pushing it in correct direction as a hint.)

Child: Ah. (Makes unintelligible comment, then places margarine appropriately and returns to mother.)

(Mother picks out can of pineapple, hands it to child, and smiles expectantly at child, hinting with her eyes moving pointedly toward the correct shelf.)

Child: Mm. The fruit goes here. (Places item on appropriate shelf, perhaps without

   seeing mother's eye cues.)

Mother (picking out rice and handing it to child): This is another starch. (Pauses, turning

   and edging slightly toward the appropriate cabinet, then looks toward the cabinet,

   which contains two shelves.)

Child: It goes over here. (Stands poised by wrong shelf in correct cabinet, not placing

   item, apparently waiting for a more specific cue.)

Mother: No. (Points at correct shelf.) It goes right down here.

(Child places item on correct shelf.)

Mother (picking out wheat thins and handing them to child): This is a snack.

(Child looks in carton, looks at mother, and grins without moving toward placement of

   item, apparently requesting more information.)

(Child places wheat thins correctly.)

Mother (picking out ketchup and holding it toward child): What is this?

Child: Ketchup. (Moves to place it on incorrect shelf.)

Mother: No.

(Child pauses in mid-step, waiting for more information.)

Mother (providing no cue): Where does it go? Think.

(Child backs up to center of room and appears to "think.")

Mother: Okay. (Looks at appropriate shelf, capitulating in giving a cue.)

(Child makes no move.)

Mother (pointing at correct shelf): It goes over here with the pickles and the olives.

   (Points at pickles and at olives, making her cue quite explicit.) Okay?

(Child nods and places item on correct shelf.)

For Rogoff and Gardner, this interaction illustrates how the mother tries to get the child to be more independently active and how the child seeks information needed for correct placement.

Viewing this interaction from the perspective of constructivist principles, we see a child doing an arbitrary task in order to accommodate the adult's interest. The child is simply expected to comply with the adult demand. Furthermore, the organization on the shelves contradicts in some ways the child's experience at home (for example, at home the margarine goes in the refrigerator, not by the bread on a shelf). In our view, the child's dependence on the adult regulation is heteronomous, as described in the discussion below of education based on Piaget's theory.

This example is in contrast to a similar situation in constructivist preschool classrooms when the teacher asks children to put away toys at cleanup time. The particular placement of groups of toys is arbitrary, as is placement of items in the kitchen, described above. However, the constructivist teacher emphasizes the sociomoral reason for correct cleanup organization. That is, if things are not put away in an organized fashion, people will not be able to find what they need. In the 3-year-old classroom in the Human Development Laboratory School at the University of Houston, the teacher let children experience the logical consequences of children's unwillingness to clean up. When they failed one day to make the classroom tidy, she left the mess and instructed the custodians not to clean it up. When children came into the classroom the next morning, they were surprised to see what a mess it was in. They found it difficult to engage

in activities in such a mess, expressed a shared feeling of dislike for the mess, and became a great deal more willing to clean up thereafter.

Our general constructivist approach to classification is to engage children in activities in which children are motivated to classify, such as games (Guess Who, card games involving sets of suites or families, etc.) and organizing the results of experimentation (for example, creating lists of objects that sink and float).

Taxonomic Hierarchical Classification

In their work to apply Vygotsky's theory to education, Panofsky, John-Steiner, and Blackwell (1990) tell about a fifth-grade teacher who gave explicit instruction in scientific hierarchical classification of animals as vertebrates and invertebrates and mammal, reptile, amphibian, bird, or fish. Children played the game Animal-Vegetable-Mineral, and the teacher was puzzled that children had difficulty with classifications in the game despite having demonstrated on a test that they had learned the categories. For example, one child asked if the animal was a bird after having learned that it did not have wings. Learning the hierarchical taxonomic categories did not transfer to using logic to deduce the identity of the animal. Further, despite having worked on taxonomic classification all year, 81% of the children did not use these categories when asked to sort 30 animal pictures and label their groupings. Instead, children mixed taxonomic and non-taxonomic categories and used non-mutually exclusive categories such as "live in water" and "have backbones."

Panofsky, et al, appreciate the fact that children make their own constructions and realize that observers may ignore children's constructions. Nevertheless, they view children's non-taxonomic groupings as inappropriate and recommend additional instruction in classification

systems. This view is consonant with that of Griffin and Cole (1984) who recommend that adult directiveness become more intense when children perform at low levels. They quote Wood (1980): "Adult tutorial interventions should be inversely related to the child's level of task competence--so, for example, the more difficulty the child had in achieving a goal, the more directive the intervention of the mother should be" (p. 284). Betty Zan and I (DeVries & Zan, 1992) commented on this as follows:

> From our perspective, more instruction on what children cannot do is the worst thing a teacher can do. When children cannot organize hierarchical categories, we would place the emphasis on helping children pursue interests in the characteristics of individual animals. By encouraging children's reasoning about similarities and differences, we would promote the construction of the foundation of hierarchical inclusion without killing interest in taxonomy. This difference in approaches to teaching classification reflects the difference between Vygotsky's emphasis on the instruction of scientific concepts and Piaget's emphasis on the child's construction. (p. 22)

A Story on Killing

Moll (1990) gives an example of a conversation between fifth graders and their teacher about a story of a panther that kills a boy's dog. The teacher focused on prediction of what might happen next in the story.

1. Mary: I think Lonny is going to kill the cat.

2. John: I think Lonny is not going to kill the cat.

3. Barb: The reason why he is not going to kill the cat is because she has babies.

4. Juan: I think that he is going to kill the panther and his dad is going to help him.

(Other children give their opinion of whether Lonny is going to kill the panther.)

5. Teacher (interrupting): I just want to explain what we just did in this group.

The teacher points out that Mary (the first student to respond) offered the prediction

that the panther will be killed, and others shared their ideas on what might happen to the

panther. She then emphasized to the students that, as readers, we are always predicting.

(pp. 13-14)

Zan and I (1992) point out that this teacher's goals are too narrowly literary. She missed an

excellent opportunity to foster children's sociomoral reasoning with questions such as: Why did

the panther kill the dog? Was this a good reason? Does this justify killing the panther? Are

there ever justifications for killing?

Constructivist education places emphasis on the discussion of social and moral issues that

arise in the life of the classroom and that are found in children's literature (See DeVries and Zan,

1994, for principles of teaching and examples).

Constructivist Educational Interpretations of Vygotsky's Theory

In contrast to behaviorist educational expressions of Vygotsky's theory, a number of

educators interpret this theory in ways compatible or identical to our constructivist approach

based on Piaget's theory. For example, Goodman and Goodman (1990), writing about how

teachers teach in the ZPD, offer five guidelines. They say that teachers should:

1. Interfere as little as possible.

2. Ask a question.

3. Offer a useful hint.

4. Direct attention at an anomaly.

5. Direct attention at an overlooked bit of information. (p. 236)

Whitmore and Goodman (1995) describe in detail a whole language approach to literacy that illustrates our constructivist ideal. Moll and Whitmore (1993) provide a description of Vygotskian theory in classroom practice that appears strikingly similar to our own experience of Piagetian constructivist classrooms. Cobb, Wood, and Yackel (1993) describe integration of Piagetian and Vygotskian theories in their approach to mathematics education. Chang-Wells and Wells (1993) describe some aspects of their Vygotskian interpretation of good educational practices that dovetail with our Piagetian approach to physical-knowledge activities. We describe our Piagetian approach below.

Education Based on Piaget's Theory

Education based on Piaget's theory has been more fully detailed than education based on Vygotsky's theory. More consensus perhaps exists among Piagetian constructivist educators than among Vygotskian educators. This has changed since the later 1960s and early 1970s when some Piagetians proposed and implemented education having behaviorist characteristics (see DeVries & Kohlberg, 1987/1990, Chapter 3, for examples). While some education flying the Piaget banner may still be found with behaviorist coloring, this is not generally the case. While it is beyond the scope of this paper to provide a full account of education based on Piaget's theory, critical theoretical distinctions are summarized, and an overview of practices is sketched.

Theoretical Distinctions

The most central theoretical distinctions with regard to education pertain to the bases for Piagetian constructivists' recommendation of a cooperative teacher-child relationship and to the bases for recommendation of teaching content depending on the kind of knowledge involved.

Two Types of Morality and Adult-Child Relationships

Piaget (1932/1965) distinguished between heteronomous morality that is based on

obedience to authority and autonomous morality that is based on self-constructed, personal

convictions about what is right and good. These two types of morality correspond to two types

of adult-child relationships.

A heteronomous relationship is coercive and supports a morality based on obedience to

authority. When governed continually by the values, beliefs, and ideas of others, the child

practices a submission that can lead to mindless conformity in both moral and intellectual

spheres. Piaget warned that coercion socializes only the surface of behavior and actually

reinforces the child's tendency to rely on purely external regulation.

Piaget contrasts the heteronomous adult-child relationship with a second type that is

characterized by mutual respect and cooperation. The adult returns the child's respect by giving

her the possibility to regulate her behavior voluntarily. In so doing, the adult helps to open the

way for the child to develop a mind capable of thinking independently and creatively and to

develop moral feelings of reciprocity in all kinds of social relations. 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 (1932/1965) commented on the value of attempting to establish

psychologically equal relations with children:

In so far as the adult can cooperate with the child, that is to say, can discuss things on an

equal footing and collaborate with him in finding things out, it goes without saying that

his influence will lead to analysis. But in so far as his words are spoken with authority,

in so far, especially, as verbal instruction outweighs experiment in common, it is obvious

that the adult will consolidate childish verbalism. (p. 194)

These ideas lead Piagetian constructivist educators to the view that teachers should minimize the

exercise of unnecessary authority to the extent practical. This philosophy is in contrast with the

view of Vygotskians that ideal adult-child partners are unequal. (For further discussion of this

aspect of Piaget's theory, see DeVries and Zan, 1994).

Three Kinds of Knowledge

Piaget distinguished among three kinds of knowledge: physical knowledge, logico-

mathematical knowledge, and conventional arbitrary knowledge.

Physical knowledge is based on experiences of acting on objects and observing their

reactions. This may be action to find out what will happen, with no preconceived ideas, or

action to find out if the object will react as one predicts. The child cannot construct physical

knowledge without getting information from the object's reactions to actions on it. However,

physical knowledge cannot be elaborated without logical reasoning. Knowledge about physical

events requires inferences drawn from observations. The source of physical knowledge is partly

in the object whose reaction depends on its properties.

Logico-mathematical knowledge is constructed as the result of reflective mental actions on

objects that introduce characteristics that objects do not have into the individual's ideas about

those objects. For example, number is not a property of any group of objects but is a system of

relationships created by the knower. One would not have to group together two objects as

"two" but one might simply see them as individual objects. Logico-mathematical knowledge is

particularly important because intelligence can be described as a framework of potential logico-

mathematical relationships. The source of logico-mathematical knowledge is the knower's

constructive processes.

Conventional, arbitrary knowledge is truth that results from social agreement (such as

dates of holidays and names of objects). The source of arbitrary conventional knowledge is other

people, through various means of communication.

These distinctions are useful to Piagetian constructivist teachers in their planning of

activities and in their intervention in children's activity. Teachers thus plan activities in which

children can act on objects and reason about the relationships involved in physical phenomena

(such as a catapult or parachute). Teachers think about the kind of knowledge involved in an

aspect of curriculum. If it is arbitrary, the teacher does not hesitate to tell children. If it is

physical, the teacher encourages children to act on objects and reason about reactions. If it is

logico-mathematical, the teacher plans occasions for children to continue reasoning about the

issue. (For more details and examples of the three kinds of knowledge, see DeVries and

Kohlberg, 1987/1990, DeVries and Zan, 1994, and Kamii and DeVries, 1978/1993.)

Educational Practices

The first principle of constructivist education inspired by Piaget's theory is to cultivate a

sociomoral atmosphere in which mutual respect is continually practiced. This translates into

practices that promote child autonomy and reasoning. The Piagetian constructivist teacher

promotes a feeling of community in the classroom, makes it possible for children to make

classroom rules and many decisions about life in the classroom, conducts discussions about social

and moral issues, promotes conflict resolution, and consults children about what they want to

learn. Activity time allows children to pursue chosen projects, including physical-knowledge

activities and group games. Subject matter is taught through projects where curriculum is integrated. Educational practices based on Piaget's theory are detailed elsewhere (for example, DeVries and Kohlberg, 1987/1990; DeVries and Zan, 1944; Kamii and DeVries, 1975/1977, 1978/1993, 1980; Kamii, 1982, 1985, 1989, 1993; Fosnot, 1989; Forman, 1980).

A Rapprochement Through Reciprocal Assimilation

Here I draw on Piaget's (1936/1952) conceptualization of the coordination of reflexes in early infancy when the baby, for example, intentionally looks at something she is grasping or intentionally grasps something at which she is looking. Piaget termed this reciprocal or mutual assimilation. I am optimistic about the possibilities for reciprocal assimilation of the theories of Piaget and Vygotsky and for reciprocal assimilation of educational practices based on these theories. Let us consider convergences and sources of difficulty.

Convergences in Educational Practices of

Followers of Piaget and Vygotsky

To begin discussion of reciprocal assimilation of educational practices of followers of Piaget and Vygotsky, we might first point to a number of convergences that already exist between some Vygotskian and Piagetian educators. (Note: Citations that follow are meant to be illustrative, not exhaustive.)

1. Children are viewed as active. A number of Vygotskian educators do not take up the behaviorist aspects of Vygotsky's theory, but agree with Piagetians that the child is active in the construction of knowledge (Bedrova & Leong, 1996; Berk & Winsler, 1995).

2. Rote learning should be avoided. Agreement also exists among Piagetians and some

Vygotskians that rote learning is not consistent with their theories of learning (Berk & Winsler,

1995, p. 116; DeVries, Haney, & Zan, 1991).

3. The Whole Language approach to literacy is advocated. Followers of both Piaget and

Vygotsky claim that the Whole Language approach to teaching literacy reflects their theories of

educational practice (Bedrova & Leong, 1996; Berk & Winsler, 1995; DeVries & Zan, 1994; Moll

& Whitmore, 1993; Whitmore and Goodman, 1995).

4. Collaboration of children in classroom activities is advocated. Followers of both Piaget and

Vygotsky also agree on the importance of children's collaboration (Berk & Winsler, 1995;

DeVries & Kohlberg, 1987/1990; DeVries & Zan, 1994; Moll & Whitmore, 1993; Whitmore &

Goodman, 1995).

5. Establishing community in the classroom is important. Vygotskians such as Moll and

Whitmore (1993) talk about the connection of individual ZPDs in collective, interrelated zones.

Piagetians such as DeVries and Zan (1994) talk about the importance of a "feeling of community"

in a classroom. While these conceptions may not be precisely the same, they provide a basis for

children's co-constructions.

6. Curriculum should be based on children's interests. Both Piagetians and Vygotskians consider

the element of interest essential to activities in a model program (Bedrova & Leong, 1996; Berk &

Winsler, 1995; DeVries & Zan, 1994; Moll & Whitmore, 1993). These pairs of curriculum

developers recommend that teachers consult children about what they want to study and both

view children's interests as crucial to successful individual construction of knowledge. They

concur in viewing the curriculum as an emergent process.

7. <u>External rewards should not be used with children</u>. DeVries and Zan (1994) and Berk and Winsler (1995) agree on this point.

8. <u>Pretend play is an important part of the curriculum</u>. Followers of both Vygotsky and Piaget advocate organizing a center in the classroom to promote pretend play (Bedrova & Leong, 1996; Berk & Winsler, 1995; Kamii & DeVries, 1975/1977).

<u>Sources of Difficulty for Reciprocal Assimilation of the theories of Piaget and Vygotsky</u>

Sources of difficulty for reciprocal assimilation of Piaget's and Vygotsky's theories and their educational extensions include two points already discussed: lack of consensus about educational practices among practitioners following both Piaget and Vygotsky, and the role of language in development. In addition, distortions of positions, and external mediation versus internal action are briefly discussed below.

<u>Distortions of Theoretical and Practical Positions</u>

The first source of difficulty is the unproductive attacks on "straw men" that are presented to represent the two theories. The current adversarial relations between Vygotskians and Piagetians derive principally from myths each group believes about the other group. The principal myths are that:

1. Piaget focused solely on individual development and did not recognize the important role of social factors in development.

2. Vygotsky focused solely on the role of society in development and did not recognize the individual constructivist process.

The foregoing discussion debunks these myths.

In addition to the earlier discussion on this point, it may be useful to note that some Vygotskian educators erroneously say that Piaget saw development as a result primarily of the child's interaction with objects. For example, Bedrova and Leong (1996) say: "for Piaget, cognitive construction occurs primarily in interaction with physical objects. People play an indirect role, for example, in planning the environment or creating cognitive dissonance" (p. 8). Berk and Winsler (1995) similarly attribute to Piaget the belief that children learn only through discovery. As pointed out elsewhere (DeVries & Edmiaston, 1999), this idea constitutes a generally held misconception about education based on Piaget's theory. Another misconception on the part of some Vygotskians is that Piaget's theory leads teachers only to present what a child already knows. In fact, Piaget made a distinction between discovery and invention and pointed out that while the child can discover certain things in the world, development consists in inventing logico-mathematical knowledge that is new to the child. Furthermore, constructivist teachers do present some kinds of information to children. This includes arbitrary, conventional knowledge that can only be known through some form of social transmission (such as names of things and conventional facts). It also includes information about the natural world (such as the habits of animals). The society also presents to the child information about the world (such as the existence of wheeled vehicles).

Similarly, a myth exists that teachers inspired by Piaget's theory do not intervene in children's activities. For example, Berk and Winsler (1995) state that "the Piagetian approach to education is one of an active organism taking responsibility for change in a social environment that refrains from interfering with natural development" (p. 103). Readers of the books on constructivist education referenced here, however, recognize that this conception is erroneous.

Intervention by constructivist teachers is described in many books (DeVries & Kohlberg, 1987/1990; DeVries & Zan, 1994; Kamii & DeVries, 1978/1993; Kamii & DeVries, 1980; Kamii, 1985, 1989, 1993).

External Mediation Vs. Internal Action

The Vygotskian idea of external mediators necessary for the development of thought is a real "sticking point" for Piagetians. Bedrova and Leong (1996) give an example of using fingers as a mediator when a child uses them to calculate. However, from a Piagetian perspective the child's mind directs the fingers. In this view, it is internal mental action that is the mechanism of thought.

Words as mediators are of primary importance in Vygotsky's theory. Bedrova and Leong (1996) give an example of the words "small," "medium," and "large" as mediators in a sorting activity. However, from a Piagetian perspective, the way the child uses these words to organize thought depends on how the child understand the words--in other words, the logical structure underlying the words. If the child does not understand transitivity (the idea that if A>B and B>C, then A>C), then the words "small," "medium," and "large" are merely descriptors no different from "red," "yellow," or "blue." Transitive reasoning is a characteristic of the individual, in the Piagetian view. Again, we come back to mental action.

Both Piagetians and Vygotskians are guilty of a certain "balkanization" that is generally characteristic of paradigmatic groups (as noted by Donmoyer, 1996) and tend to talk only to each other. A number of Piagetians (for example, Cobb, Wood, and Yackel, 1993, and Fosnot, 1996) seem more aware of Vygotskian work than Vygotskians of Piagetians' work.

Changes Necessary in Educational Theories

of Followers of Both Piaget and Vygotsky

What is required for Piagetians and Vygotskians to be able to join forces and pursue co-constructed goals in education? I suggest several movements in both theory and practice that are necessary for each of these paradigms, in order to complete the process of reciprocal assimilation of the two theories and their educational extensions. The fact that I require more movement by Vygotskians than Piagetians reflects my Piagetian bias. However, it also reflects the greater lack of unity among Vygotskian educators.

Vygotskian Views

As I see it, the reciprocal assimilation of Vygotsky to Piaget's theory requires that Vygotskians move:

1. Toward fuller integration of the notion of the individual with the social. In his emphasis on the importance of the social in child development, Vygotsky did not neglect the individual. The notion of the zone of proximal development is an individual one. Also, it is clearly the individual who is conscious and internalizes socially offered information, and thinking is done by the individual even when mightily influenced by the social context. Cobb, Wood, and Yackel (1993) solve this problem by taking the position that individuals and social practices do not exist apart from each other. They argue against the view that individuals are subordinated to the social as expressed, for example, in the metaphor that individuals are "embedded" in social practices. Instead, they recommend that social practices not be reified. The non-dualist solution they propose is to see social practices as being "interactively constituted by the actions of actively interpreting individuals" (p. 96). If Vygotskians could unite in this view, Piagetians would not feel so obliged to oppose the Vygotskian paradigm.

2. <u>Away from empiricist notions of learning.</u> Hatano (1993), in his excellent piece on merging

Vygotskian and constructivist conceptions of knowledge acquisition, notes:

> The Vygotskian conception has not been as fertile in educational reform as it could be,
>
> partly because it has been interpreted in terms of the empiricism that has dominated
>
> American education and educational research. According to the empiricist's view, the
>
> core of educational process is the transmission of ready-made knowledge from outside to
>
> the individual mind, which is like a blank slate. The Vygotskian conception interpreted
>
> within this framework is compatible with conventional didactic teaching, including "rote,
>
> drill and practice instruction". . . . (p. 155)

Further, Hatano feels that Vygotskians have been so busy criticizing Piagetians that they have

not yet differentiated their conception of education from traditional transmissionism. Especially

unfortunate has been the resulting tendency to see the child as passive recipient of knowledge.

Wertsch (1993) admits that his early Vygotskian work reflected this view, and he now sees "a

fundamental strength" in the Piagetian view of the "active role that children take in social

processes" (Wertsch & Bivens, 1992, p. 36).

A basis for this shift exists in Vygotsky's theorizing, although its acceptance would for

some Vygotskians mean a significant reinterpretation.

3. <u>Toward a conceptualization of the constructive process that takes advantage of Piaget's</u>

<u>contribution.</u> This is a corollary to the second shift, suggesting that the void in Vygotsky's

theory as to how internalization occurs can be filled by Piaget's careful work on this point.

<u>Piagetian Views</u>

Piagetians need to shift their theoretical emphases in the following ways:

1. <u>Toward fuller integration of the notion of the social in individual processes</u>. As noted by

Moll and Whitmore (1993), Vygotsky "viewed thinking not as a characteristic of the child only,

but of the child-in-social-activities with others" (p. 19). The basis for the greater integration of

the social in Piaget-based education can be found in Piaget's theory of the role of the social in

child development, as discussed above, and should not present any difficulty for Piagetian

educators.

The work of DeVries and Zan (1994) places the social at the center of constructivist

education. Piaget and Garcia (1983/1989) concur in the view that the adult social environment

provides stimulation for children's development:

> There is, however, something mysterious about the sequence of stages in the development
>
> of impetus, which occurs much more rapidly in child development than in historical
>
> development. The reason is undoubtedly related to the influence of the adult social
>
> environment manifesting itself in countless stimulations and ever new problem situations.
>
> But this does not mean that that children's responses had been dictated by simple
>
> learning. The fact that the surrounding intellectual climate should stimulate children in the
>
> direction of quantification only raises new questions; it is up to the subjects to build their
>
> own cognitive tools in each new problem situation. (pp. 77-78)

2. <u>Toward greater appreciation of the co-construction of meaning in social interaction</u>. With the

child's constructions seen as "interactively constituted," it is a short step to conceptualizing the

constructions of interacting individuals as providing aliment for one another. In an interaction,

each is constructing the meaning of the other's actions, sometimes misinterpreting and

reinterpreting. What is individually constructed thus incorporates constructions of the other's

constructions.

A basis for this shift can be found in Piaget's (1928-1977/1995) account of the identity of

intellectual and social operations.

3. Toward appreciation of the culture as aliment for the development of mental structures.

Piaget's emphasis on structural development has sometimes led Piagetians to think in terms of

abstractions apart from content. Vygotsky's emphasis on content is therefore a useful balance,

especially in education where content is a necessary concern. While structures do not exist

without being manifested in some content, it will be a challenge for Piagetians to link the theory

of cognitive structures clearly with content provided by the culture, especially in schools.

Changes Necessary in Educational Practices

by Followers of Piaget and Vygotsky

The following shifts in educational practices are seen as necessary for a rapprochement

between Piagetian and Vygotskian educators.

Vygotskian Education

Vygotskians will need to move:

1. Away from authoritarian conceptions of the teacher's role in scaffolding children's learning.

Moll (1990) notes that Vygotsky never specified the forms of social assistance to learners that

constitute guidance in the ZPD. As noted above, behaviorist conceptions of teaching have been

offered as Vygotskian. Hatano (1993) rightly points out that Vygotskian educational practice

"relies heavily on direct teaching of solution routines for testlike problems" (p. 154). Because it

has often taken up only Vygotsky's behaviorist ideas, Vygotskian education has often looked no

different than traditional behaviorist teaching. Vygotskians will have to consciously wrestle with this problem of the basic nature of the teacher-child relationship. This shift requires that Vygotskians give up the idea of the teacher as the sole source of knowledge, and this will be difficult for those wedded to Vygotsky's behaviorist conceptions. However, a basis for the shift exists in Vygotsky's constructivist conceptions and especially in his conception of the cooperative role of adults in the child's ZPD.

2. <u>Toward a cooperative conception of the classroom atmosphere</u>. This is outlined by DeVries and Zan (1994) based on Piaget's conceptualization of the value of a cooperative teacher-child relation for the child's construction of knowledge, intelligence, morality, and personality. Constructivist aspects of Vygotsky's theory provide a basis for this choice, and some Vygotskian educators already recommend practices consistent with this view (for example, Berk & Winsler, Moll & Whitmore, 1993).

3. <u>Toward a more comprehensive conception of the aim of education</u>. While both Vygotskian and Piagetian theories can be said to take development as the aim of education, Vygotskian educators have specialized in intellectual aspects of this aim. Piagetian educators offer a broader view that can be seen as consistent with Vygotsky's theory, incorporating affective and moral goals in their conception of developmental aims.

4. <u>Toward increased recognition of the role of the individual in constructing meaning and cognitive tools</u>. Certainly a basis in Vygotsky's theory exists for the rehabilitation of the role of the individual in development. As indicated above, the individual is present as the internalizer of social transmissions.

<u>Piagetian Education</u>

A reciprocal assimilation of Piagetian and Vygotskian educational practices requires that Piagetians move:

1. <u>Toward greater specificity in ideas about how subject-matter content is acquired by children in school</u>. Some Piagetian educators are making progress on this shift. Kamii's (1982, 1985, 1989, 1993) work on the teaching of arithmetic based on Piaget's theory is one example of what needs to be done in all curriculum areas. The physical-knowledge approach to science (Kamii & DeVries, 1978/1993) is another example. Piagetians can make a more conscious integration of cultural artifacts in their approach.

2. <u>Toward more consensus on the necessity of a constructivist sociomoral atmosphere</u>. Not all Piagetian educators emphasize the importance of the sociomoral atmosphere in classrooms. The work of DeVries and Zan (1994) provides a conceptualization that might unify Piagetians.

3. <u>Toward increased recognition of the role of the culture in the child's construction of meaning and cognitive tools</u>. It is clear that children do not have to invent all ideas anew. The culture contains important objects and ideas to which children can adapt in their constructive process.

Conclusion

I would like to conclude by referring to Hatano's (1993) apt remark that one can become a Vygotskian without giving up being a constructivist, and one can become a Piagetian without giving up the role of the individual in the constructive process.

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