BRIGHT START: Cognitive Curriculum for Young Children[1]

INTRODUCTION AND CONCEPTUAL BASE

Educators and developmental psychologists agree that the strongest and most effective educational programs are those that have clear roots in theories of child development and of developmental change. *Bright Start* is based on a theoretical system synthesized by the authors from relevant parts of several developmental theories. It derives in the most general sense from Haywood's "transactional" perspective on the nature and development of intelligence. Other theoretical bases include Jean Piaget's concepts of the cognitive development of children, and the cognitive psychology of L. S. Vygotsky, especially his notions of the social context of cognitive acquisition and his "zone of proximal development." There is a large conceptual debt to Reuven Feuerstein's theory of structural cognitive modifiability, including both his notions of the origins of ineffective thought processes and his ideas on how such processes can be changed. While our conceptual debts to these theorists are large, and gladly acknowledged, the curriculum itself is original.

Need for Bright Start

Given the many useful systematic curricula for young children that have been developed and promulgated in recent years (e.g., Bereiter & Engelmann, 1966; Blank, 1970; Hohmann, Banet, & Weikart, 1979; Klaus & Gray, 1968; Resnick, 1967; Van de Riet & Resnick, 1973; see also Costa, 1985, 1991, for descriptions of many of these), it is reasonable to ask why yet another such curriculum is needed. The answer has at least two large parts: (a) In spite of the proliferation of curricula, too many children still arrive at first grade unprepared to do first-grade work, i.e., all too often they wind up being retained or referred for special education placement; (b) The expectation of a universally-applicable curriculum for young children fails to take into account the vast individual differences that appear in children's preschool experiences.

Many of the children who do not learn well in the primary grades are not properly classifiable as intellectually disabled or learning disabled, and even if they were so classified, they might have more ability to learn than is demonstrated by their school performance (see, e.g., Burns, 1983; Feuerstein, Rand, & Hoffman, 1979). Why, then, do they not learn well? One answer is that they do not know how to think systematically or to use systematic thinking processes to direct their learning and performing in school as well as in other domains of their lives. Thus, a curriculum addressed to specific thinking (cognitive) processes is needed in order to teach children to think and learn effectively. The assumption is that children who have been taught some fundamental principles of thinking, learning, and problem solving will be more effective in academic and social learning (Arbitman- Smith, Haywood, & Bransford, 1984; Bransford, Vye, Adams, & Perfetto, 1989; Feuerstein, Rand, Hoffman, & Miller, 1980; Haywood & Wachs, 1981). Another reason for developing a specifically *cognitive* curriculum is that unpreparedness for academic learning is not uniformly distributed over social and racial groups,

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1 This is the original paper on the conceptual bases of Bright Start, written in the 1980s.
This version is a modest update and revision.

appearing to be more characteristic of poor, minority, culturally different, and handicapped children than of others in our society. Since there are no convincing reasons to assume that poor, minority, culturally different, and most handicapped children are inherently less capable of acquiring processes of systematic thinking and learning than are affluent or majority children, it is reasonable to assume that some social influences are working systematically to deny these children the opportunities to acquire basic "how-to-learn" knowledge in preparation for schoolwork (Bransford, Vye, Adams, & Perfetto, 1989; Feuerstein, et al., 1980; Haywood, 1982; Haywood & Wachs, 1981). A cognitive curriculum, applied systematically across social and subcultural groups, should be expected to reduce group differences in learning effectiveness (especially those differences associated with social-cultural differences) by bringing the learning abilities of all children up to a level appropriate to primary-grades material. In other words, a cognitive curriculum is in many respects an "equal opportunity" approach to early education, an attempt to level the educational playing field.

In developing *Bright Start*, we have not expected to solve either of these types of problems completely, but instead to take account of them and to produce a curriculum through which one can reduce the unpreparedness problem and specify the applicability of that curriculum to particular groups of children who have common cognitive needs that derive from similar preschool experiences. We have thus sought to develop a curriculum for children from 3 to 6 years of age who are either handicapped or are, on the basis primarily of factors related to socioeconomic level, at high risk of learning failure in the primary grades. We have focused *Bright Start* on the precognitive, cognitive, and metacognitive operations that appear to be prerequisite to the learning of primary-grades material rather than upon academic content alone.

THE CONCEPTUAL STRUCTURE OF THE CURRICULUM

The importance of a theoretical base for any educational plan derives in part from the need to achieve internal consistency, that is, to be sure that different parts and levels of a curriculum are not working at cross purposes (Haywood & Brooks, 1990). In addition, teachers need a clear conceptual structure because no curriculum can specify the teachers' behavior in all possible situations with all possible children. If that were possible the list would be too long to be learned. The practical function of a theoretical base is to give teachers a model from which they themselves can derive theoretically consistent classroom practices when they encounter situations that have not been anticipated in their training. Following are brief descriptions of the conceptual bases of this curriculum.

The Nature and Development of Intelligence

Our view of the nature and development of intelligence is a "transactional" one that has several components (Haywood, 2006, 2007, 2010; Haywood & Switzky, 1986a, 1986b; Haywood, Tzuriel, & Vaught, 1992). First, intelligence is both multifaceted (composed of many "kinds" or components of ability) and multi-determined (the result of complex polygenic-experiential transactional relations

rather than of either genetic or environmental influences alone). Effectiveness at thinking and learning is thought to derive from two conditions, both of which are necessary: native (gene-based) ability, termed "intelligence," and experience-based learned processes of perceiving, learning, thinking, and problem-solving, termed "cognition." Even the most intelligent persons must learn fundamental cognitive processes in order to be effective thinkers and learners, even though the higher intelligence of such persons enables them to learn the cognitive processes more quickly than do others. Failure at academic or social learning does not necessarily reflect low intelligence; instead, such failure often reflects inadequate acquisition of cognitive processes that are necessary to learn effectively. The effect of inadequate acquisition of cognitive processes is to mask native intelligence, i.e., to make it appear as if children who are deficient in cognitive development are less intelligent than they actually are. Adverse environmental circumstances do not destroy intelligence, but they often mask intelligence, that is, make intelligence less accessible. Teaching (or indeed, other experiential enrichment) does not create intelligence, but serves to unmask the intelligence that exists, i.e., to suggest the strategies by which one's intelligence may be applied in perception, thought, learning, and problem solving. (For reviews of the nature and development of intelligence, see Haywood, in press; Haywood & Wachs, 1981; Switzky & Haywood, 1984; Haywood & Switzky, 1986a; Haywood, Tzuriel, & Vaught, 1992.)

The third component in this transactional/developmental process is intrinsic motivation. Exploration, seeking of novel stimuli, reasonable risk taking, engaging in tasks for the sake of information processing itself--all are necessary for the development of specific cognitive processes and for enthusiasm for learning. On the other hand, some success at learning is necessary if one is to be enthusiastic about it, to seek opportunities to learn, to explore, seek novel stimuli, and engage in reasonable risk taking. That is to say, task-intrinsic motivation and cognitive development have a mutually dependent relationship (Haywood, 1992). Effective learning is dependent in part upon the characteristic of deriving pleasure from learning, but deriving pleasure from learning may develop out of an experiential background that includes some success at learning.

Many ineffective learners are characterized by a motivational orientation according to which they focus their attention and efforts on *avoidance of dissatisfaction* (through emphasis on task-extrinsic aspects of the environment such as ease, comfort, safety, security, practicality, and material gain). Effective learners are motivated more often to *seek satisfaction* through task-intrinsic considerations such as challenge, creativity, opportunities to take responsibility, aesthetic aspects of task involvement, and the sheer psychological joy of information processing, tension induction, and achievement. Since intrinsically-motivated persons are more effective learners than are extrinsically-motivated persons, one would hope to find strategies for enhancing the development of task- intrinsic motivation. Increasing cognitive effectiveness is one

such strategy that has been found to work. The development of intrinsic motivation and the development of cognitive structures are thus inextricably intertwined, the one feeding the other in transactional fashion. Success at learning feeds intrinsic motivation, whereas failure at learning and at exploring the world leads to avoidance of further learning challenges and thus to extrinsic motivation. Relative dominance of an intrinsic motivational system is associated with effective learning, whereas relative dominance of an extrinsic motivational system leads to ineffective learning. The roots of this motivational/ cognitive interaction (Haywood, 1992; Haywood & Burke, 1977) are found early in development, traceable to infants' earliest attempts to explore and to gain mastery over their environments. The fate of such attempts, and the reactions of others to them, may have far-reaching consequences on future motivational development, and therefore on cognitive development itself. Since increases in intrinsic motivation can lead to the seeking of more opportunities for cognitive development, and since enhanced cognitive development can lead to increased intrinsic motivation, enhanced intrinsic motivation is one of the chief goals of this curriculum.

Because of that set of considerations, the curriculum is seen as incompatible with a purely behaviorist approach. This incompatibility derives from the typical behavioral practice of using task-extrinsic rewards (which interfere with task-intrinsic motivation and related behavior), and the common behavioristic denial of the importance of process in favor of placing primary (and often exclusive) emphasis on responses. It is likely that the chief problem of purely behavioristic approaches, the problem of generalizability, can be attributed to reliance on extrinsic incentives and rewards. If the reward for task performance is intrinsic to the task, i.e., if one solves problems for the sheer joy of solving problems, that behavior is not so likely to disappear or decelerate when there is no experimenter or teacher around to give task-extrinsic rewards. Thus, in this cognitive curriculum, task-extrinsic rewards are discouraged in favor of task-intrinsic ones such as rewarding good performance with the opportunity to do other interesting cognitive tasks, puzzles, and mind-challenging games, while punishment in any form is discouraged. (For reviews of intrinsic motivation and learning, see Haywood, 1971; Haywood & Burke,1977; Haywood & Switzky, 1986c; Switzky & Haywood, 1984.)

The Cognitive Nature of Preschool Children

The ontogenesis of intelligent thought has been described extensively by Piaget and his associates (e.g., Piaget, 1952, 1960; Piaget & Inhelder, 1969). According to Piagetian theory, thought processes develop in sequential fashion with later, more mature processes dependent upon, but not foretold by, the presence of less mature processes.

The children for whom *Bright Start* was developed, i.e., 3-6 year old children, are normally approaching the age when one expects the development of concrete operational thinking. The major domains within this stage are: classification and class inclusion, relations (including seriation, transitivity, space, time, and causality),

conservation, and number. The greatest accomplishment of the period is activity that depends upon representational or symbolic thought.

In addition to a theory of cognitive content and operations, Piaget also proposed two principles of adaptation: assimilation and accommodation. Assimilation, Piaget's primary interest, refers to children's ability to understand new events according to their similarity to existing schemata, that is, to relevant previous experience and knowledge. In a sense, this concept refers to the changes that one must make to new information in order to incorporate the new information into the accumulated mass of familiar information. The other side of adaptation, accommodation, refers to changes that children make in themselves, primarily by constructing new frames of reference, in order to understand and incorporate new experience into their knowledge stores. By comparing the characteristics of a concrete operational novice (e.g., of 2-5 years) to those of a concrete operational veteran (e.g., of 9-11 years), we know what has changed or what accommodations have been made. What is missing from the theory is an account of the agents and conditions that bring about change or accommodation and how they do it. For all the richness and specificity of Piagetian theory, the roles of parents, teachers, and the social environment in cognitive development are recognized but not specified or elaborated. Furthermore, the world defined by Piaget is an object world, not a social world. Parents, teachers, and other agents of developmental change have become more and more interested in what they can do to bring about accommodation and structural change in children who do not undergo typical rates and patterns of cognitive growth. Thus, we must go beyond classical Piagetian theory in order to explore such relations.

Vygotsky: Social Context and "Zone of Proximal Development"

In contrast to Piaget, Vygotsky (e.g., Campione, Brown, & Ferrara, 1982; Karpov, 2006; Vygotsky, 1929, 1962, 1978) has emphasized and described the role of the social environment in the development of children's cognitive processes. Children initially experience cognitive challenges and problems in the presence of adults. Adults in essence "model" (or fail to model) problem solving for the children. At later stages, children attempt to solve problems themselves and adults, if present, guide, correct, and reward them in these attempts. Finally, children become capable of solving problems themselves as they require less and less help from adults. Thus, children's problem solving is, at first, "other-regulated," but becomes "self-regulated" with appropriate guidance from adults. (See also McCandless, 1970, for a discussion of another aspect of adults' roles in children's development.)

In the context of appropriate guidance, Vygotsky introduced the concept of the "zone of proximal development," defined as "the distance between the actual developmental level as determined by individual problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers" (1978, p. 86). Thus, the zone of proximal development is another name for the ability of a child to benefit from

interacting with an adult (or competent peer) in the context of solving problems. It is essentially a social concept that describes children's ability to internalize the problem-solving strategies available overtly in the social environment. For present purposes, two concepts are especially important: (a) the necessity of having an appropriate social environment that includes models for effective thinking and problem solving, and (b) the quality of the interaction between the social environment and the child. This emphasis on the quality of the social environment sets the stage for Feuerstein's description and further elaboration of the necessary characteristics of a social environment that enhances cognitive development. It is focused upon enhancing the parents' and teachers' effectiveness in reducing the discrepancy between children's typical performance and their potential performance.

Structural Cognitive Modifiability

A Theory of Structural Cognitive Modifiability has been proposed and elaborated by Feuerstein (e.g., Feuerstein, Rand, & Hoffman, 1979; Feuerstein et al., 1980) in which intelligence is seen as consisting of a finite number of basic cognitive functions. Such functions are compounds of native ability, learning history, attitudes toward learning, motives, and strategies. These basic cognitive functions have been identified primarily through clinical work with children who have learning problems in school or who are socially maladjusted. Feuerstein has proposed a list of "deficient cognitive functions" that are found often in such children and adolescents. Some examples are: blurred and sweeping perception; unsystematic exploratory behavior; lack of or impaired spatial and/or temporal orientation; lack of or impaired capacity for considering multiple sources of information; lack of spontaneous comparative behavior; lack of or impaired summative behavior; lack of or impaired planning behavior; episodic grasp of reality; deficiency of visual transport. (For complete list, see Feuerstein et al., 1979, 1980; see also Haywood, 1986). Since the basic cognitive functions are necessary to the learning of academic and social material, when there are developmental deficiencies in such functions there is inadequate learning, indeed, learning that is even below the mental age expectation for these persons (see discussion of the "MA deficit" by Haywood, 1981; Haywood, Meyers, & Switzky, 1982).

The basic cognitive functions are acquired through learning, both by the children's "direct exposure" to environmental events, including environmental feedback on their own behavior, and by a teaching process known as "mediated learning experience" (Feuerstein & Rand, 1974) that is conducted by parents, grandparents, or older siblings. In fact, this process of mediated learning is seen by Feuerstein as *essential* to the adequate cognitive development of children.

The proximal etiologic condition associated with inadequate cognitive development (and hence with ineffective learning and problem solving) is lack of sufficient mediated learning experience (MLE) rather than mental retardation (in child or parents), emotional disturbance, sensory impairment, or impoverished environment. Inadequate mediated learning

experience is more likely to occur when these conditions are present than when they are not. That is true in part because how much is enough MLE varies with the individual needs of children, and these individual levels of need for MLE are influenced by such etiologic correlates ("distal" etiologic conditions) as mental retardation, emotional disturbance, sensory impairment, or impoverished environment. It is then reasonable to assume, for example, that one must provide more MLE, perhaps of a different quality and intensity, for children who are predisposed to be mentally retarded than for children who are without obvious developmental delays or other obstacles to their "direct exposure" (i.e., without mediation or assistance) learning.

Feuerstein has specified a number of characteristics of mediated learning experiences. Whereas the list has grown over the years, the first six are the most important. Most interactions between children and adults have the potential to be mediated learning experiences, and can be to the extent that they meet these criteria (in the cases of the first three) or have these characteristics:

Intentionality. The mediating person must intend to use the interaction to produce cognitive change in the child.

Transcendence. The intended change must be a generalizable one, i.e., a cognitive structural change that transcends the immediate situation and will permit the child to apply new processes of thought in new situations.

Communication of meaning and purpose. The mediator communicates to the child the long-range, structural, or developmental meaning and purpose of a shared activity or interaction, i.e., explains why one is doing a particular activity in cognitive terms.

Mediation of a feeling of competence. The mediator gives "feedback" on the child's performance by praising what is done correctly (i.e., using correct processes), and by identifying meticulously the correct and/or incorrect aspects of the child's performance.

Regulation of behavior. Access to intelligence is enhanced when children's behavior is brought under control and when they are able to focus their attention on the problem at hand. Regulation of behavior often includes both inhibition of impulsive responding and unblocking of blocked or unforthcoming behavior.

Sharing. The child and the mediator share the quest for solutions to immediate problems and, more important, for developmental change in the child's cognitive structures. The quest is shared because each has a defined role and function, and the interaction is characterized by mutual trust and confidence.

These mediated interactions are normally carried out between children and their parents or parent surrogates. When for a variety of reasons MLE is inadequate for children's developmental needs, the necessary mediation can be accomplished later. In the case of school children, it can be done by teachers. There are important

differences between the mediation that is done in the home and mediation done at school (Arbitman-Smith, Haywood, & Bransford, 1984). For example, parents take advantage of naturally occurring situations, but teachers must construct situations that offer opportunities for mediation. Parents usually have only one child at a given developmental level, but teachers may have from 6 or 8 to 30 or even more. Parents may respond to mediational opportunities that arise because the children are at an appropriate developmental point to be interested in particular events or to acquire new understanding, but teachers often are faced with remedial tasks. To describe the role of teachers as mediators, Feuerstein and others have developed, and the present authors have elaborated (see Haywood, 1987) what is called the "mediational teaching style." Mediational teaching is characterized by awareness of the criteria of MLE and of the developmental needs of the children, by structural-cognitive goals rather than immediate-correct-answer goals, by attempts to elicit process responses from the children, by challenging of both correct and incorrect responses, and by the use of extremely varied content material as vehicles for the teaching of cognitive processes and strategies. Mediational teachers are systematic, directive, focused on cognitive goals, and optimistic about the possibility of achievement on the part of the children. Problems in learning are seen to be products of inadequate processes, which are remediable, rather than of inadequate children. The mediational teaching style is the essence of the method in a cognitive classroom, whatever content is being taught.

In addition to these theoretical bases, Bright Start was developed in part on the basis of empirical work done by Eleanor Gibson and her associates at Cornell University (see, e.g., Gibson, 1969). The focus of that work has been on the development of children's abilities to distinguish distinctive features of objects and events in the environment, to differentiate such distinctive features from "incidental" or less important features, and to behave on the basis of such a distinction.

BRIGHT START: DESCRIPTION

Bright Start is a flexible curriculum designed originally for use with children functioning at developmental levels from 3 to 6 years, including those who are typically developing, are sociologically at risk of school failure (for example, children from very poor families), and those who are mildly and moderately handicapped. Bright Start shares with all cognitive curricula the primary goal of "stretching the mind," that is, broadening of children's understanding and mastery of their own thinking processes and thus increasing their educability. It is a highly structured approach with strong emphasis on the induction of rules and explanatory concepts. Teachers emphasize the orderliness and predictability of the world, beginning with principles of organization, rule following, rule making, rule applying, and the systematic processes required for orderly perception, analysis, understanding, learning, and problem solving. Children learn to conform their behavior to internalized standards for rational reasons, to perceive the existence of problems, to identify processes for finding solutions, to apply those processes according to logical functions, to abandon unsuccessful strategies and seek new ones, to be critical

of their own solutions, and to be able to offer logical support of their thinking, learning, and problem solving processes. In other words, they do not stop with learning specific rules, but learn in addition the functions of rules and in what situations they do and do not apply, as well as acquiring the ability to construct rules (not in the sense of behavioral prescriptions but in the sense of generalizable explanations of observed events).

While there is primary emphasis on the development of cognitive processes, in reality both content and process are taught. This is done because the two are seen as interdependent: learning generalizable thinking processes in the absence of the content to which the processes may be applied is extremely inefficient if not actually impossible. Further, young children often have knowledge and information gaps that may be mistaken for lack of ability to learn. When missing information is supplied, especially through the children's own efforts, learning and problem solving may proceed with renewed effectiveness. In short, teaching content and process in combination appears to be more effective than teaching either alone.

Specific goals of Bright Start are:

1. To enhance and accelerate the development of basic cognitive functions, especially those characteristic of the cognitive developmental stage of concrete operations.
2. To identify and remediate deficient cognitive functions.
3. To develop task-intrinsic motivation.
4. To develop representational thought.
5. To enhance learning effectiveness and readiness for school learning.
6. To prevent unnecessary or inappropriate special education placement.

Throughout the curriculum, the common factor is heavy reliance on a *mediational teaching style* (see previous theory discussion; Haywood, 1985, 1987, 1988). In a mediational teaching context, the primary goal is to produce structural cognitive changes in children, i.e., to help them to construct effective thinking processes that are both durable and generalizable.

The Components

Bright Start consists of 6 major components. These are: (a) the theoretical base; (b) the mediational teaching style; (c) the cognitive small-group units; (d) the cognitive-mediational method of behavior management; (e) content-oriented large-group lessons; (f) parent participation.

The mediational teaching style is the single most important and distinguishing characteristic of teachers' behavior in a cognitive curriculum. In a cognitive classroom the teacher serves as a catalyst, bringing about a cognitively important reaction between children's thought processes and events in their experience. They help children to understand the <u>generalized</u> meaning of their experiences, of new learning, and of relationships. The goal is to extract from every encounter the children have with content materials the maximum learning of generalizable principles and strategies of perceiving the world, of thinking systematically, clearly, and effectively, of learning, and of problem

solving. Even when mediational teachers are teaching specific content, for example, counting, they teach it in such a way that the children will understand its applicability to other contexts. Thus, counting is taught as a *cognitive strategy*, a way of finding out how many of anything one has, rather than as a procedure for its own sake. (See Feuerstein et al., 1980, for general theory of mediated learning and specification of some mediational activities, and Haywood, 1987, for a discussion of the mediational teaching style.) In contrast to content-oriented teachers, cognitive/mediational teachers do more of the following things: (a) examine any interaction with children to determine to what extent it meets the criteria of mediated learning suggested by Feuerstein (see preceding section); (b) elicit evidence of thinking from the children; (c) use process-oriented questioning rather than answer-oriented questioning; (d) accept as much as possible of the children's answers while challenging process; (e) challenge answers, both correct and incorrect, requiring justification and process explanation; (f) teach inductively, asking children to form generalities from successive examples, objects, or events; (g) work to enhance the children's metacognitive functioning, i.e., make the children aware of their own thinking processes; focus on the order, structure, and predictability of the universe (Haywood, 1985).

The small-group units constitute the cognitive core of the curriculum. There are eight units, each designed to address a fundamental aspect of the cognitive functioning of preschool children. They are taught in small groups of 3-5 children with a teacher, with a small-group period lasting only about 15-20 minutes each day. Discussion of principles is encouraged, and the children work on related materials.

Behavior management is a pressing concern of all early educators. The theoretical orientation of Bright Start encourages reliance on some methods of behavior management and discourages reliance on others. Specifically, the cognitive principles of mediational teaching are used in behavior management. The goals of enhancing intrinsic motivation and of seeking maximum generalizability of thinking processes preclude use of behavioristic methods. Instead, behavior problems are seen in the same light as other problems, that is, situations to be solved by systematic cognitive processes. Teachers are taught to use a cognitive/mediational method in behavior management. To the extent that children become involved in the quest for more effective thinking processes, and their task-intrinsic motivation increases, misbehavior declines and task-oriented behavior increases. Thus, a consistent teaching approach spans the day, whether the teachers are teaching counting or dealing with a ve episode in the classroom. This approach to behavior management has been outlined in a paper that accompanies the curriculum.

Large-group lessons provide a framework for teaching specific academic content (e.g., nature studies, the calendar, seasons of the year, names of colors and shapes, different animals and plants) while simultaneously emphasizing the cognitive functions that are being taught directly in small group lessons. Part of this emphasis comes from the idea that principles and rules

of thought are learned in large part by applying them. In Bright Start, recognizing that each teacher has a specified content curriculum, the large-group lessons have not been supplied. Instead, we have provided a set of guidelines for constructing large-group lessons and a set of illustrative large-group lessons (two to accompany each of the eight small group units). Teachers construct their own large-group lessons, using these models.

The parent component is the mechanism by which teachers try to extend classroom efforts to teach more effective thinking processes beyond the classroom. Parents observe in the classroom, then participate in the classroom teaching, attend periodic parent meetings, and are given activities to do with the children at home. These home activities are carefully selected to extend the children's understanding and generalization of cognitive principles currently being explored in the classroom. The parent component has three "targets": the children in the classroom, their parents, and their siblings; and three settings: the classroom, the home, and parent group meetings.

Children have more complex needs than can be met entirely in the classroom. The most frequent "other" services are: speech and language therapy, physical and occupational therapy, psychological services, and pediatric services. These specialists are made aware of the philosophy and specific cognitive goals and methods of the classrooms and are asked not to use contradictory or incompatible methods. For example, speech therapists are specifically asked not to use contingent reinforcement techniques, and are encouraged to observe in the classrooms in order to learn cognitive/mediational methods and the cognitive goals that are being pursued.

These components of Bright Start are translated into a recommended daily classroom schedule. Parent participation and ancillary services are not included here because they do not take place predictably during a typical school day.

Classroom Schedule

The typical classroom day shown below is presented to illustrate how these components *may be* sequenced and organized into an integrated school day. Although various curriculum components are stressed at different periods of the day, there is carry-over of the specific cognitive functions that constitute the cognitive goals for the day across all content areas and every period of the day. This is a flexible schedule that can be adjusted according to the scheduling demands of individual classes. For example, many teachers use the curriculum for full-day programs, and others adjust the schedule to fit half-day programs. In making such adjustments it is essential to include the activities designated with asterisks, since these constitute the richest opportunities to mediate cognitive processes. In other words, these are defining activities of Bright Start.

9:00 AM	FREE PLAY. Children play indoors or outdoors and independently practice generalizable social and cognitive behavior. Teachers observe children's behavior.
9:15 AM	SNACK. Snack is served. Teachers talk with children about how they feel, what they did at home the night before, what they did at school yesterday (emphasizing continuity from the previous day). Teachers observe and note children's progress.
**9:30 AM	PLANNING TIME. Children and teachers talk in a group about the sequence of activities planned for the day, including special topics and events that will occur that day. Emphases are: the cognitive operation of planning, sequence, and continuity. Must be related to SUMMARY TIME at end of day.
**9:40 AM	COGNITIVE SMALL GROUP. Divided into heterogeneous groups of about four children with a teacher, the children work on the cognitive small group units (see below) for 15 minutes. The other groups work independently on conceptually related cognitive education activities with another teacher, assistant teacher, or parent volunteer.
10:10 AM	BATHROOM AND TRANSITION TO LARGE GROUP. Children are helped to regulate their own behavior in accordance with environmental changes and demands, moving in a planned and purposeful manner from one activity to another.
**10:30 AM	COGNITIVE LARGE GROUP. All children and teachers in the class are together. The emphasis in this activity is on the teaching of specific content (e.g., colors, numbers, seasons of the year, letter recognition) while exercising and reinforcing the cognitive processes being emphasized that day. Large group typically includes about 5 minutes on an active focusing activity, 5 minutes on building a context for teaching the lesson that will be familiar and interesting to the children, 10 minutes on teaching the particular lesson, and 10 minutes on "backward bridging," i.e., generalizing the content lesson to cognitive processes, concepts, strategies, and operations that have been learned before.
11:00 AM	FREE PLAY. Children play indoors or outdoors as before.
11:20 AM	BATHROOM
11:30 AM	STORY TIME. Children and

	teachers read stories together. Teachers emphasize the cognitive functions of the day and relate these to the different contexts presented in the stories.
11:45 AM	PREPARATION FOR LUNCH. Children wash hands, prepare the room, and set the table, taking turns over time. The cognitive function(s) of the day are related to these activities and bridges are elicited or suggested that relate these activities to other domains in the classroom, at home, or in their peer group activities.
12:00	LUNCH. Children eat lunch in small groups with teachers, with emphasis on communication. Discussion centers on cognitive goals for the day. Children exercise as much responsibility as possible.
12:20 PM	BATHROOM AND TRANSITION.
**12:30 PM	DIRECTED FREE CHOICE. Children choose an activity from approximately 6 learning centers selected so there is opportunity to focus on cognitive, affective, and other developmental goals. Teachers help children to choose activities in areas in which the children have specific need for help. The cognitive processes of choice-making should be emphasized, according to established rules. Teachers may also use this time to help individual children who may be falling behind in cognitive small group concepts. Over time, children move from one learning center to another and ultimately complete tasks in all centers.
1:30 PM	FREE PLAY.
**1:45 PM	SUMMARY TIME AND GOODBYE. Children and teachers review the day's activities, with emphasis on reviewing the cognitive functions learned and practiced during the day and bridging these to other domains of the children's lives. Teachers focus as well on sequence and on temporal continuity, i.e., tying the day's events to those anticipated for the next day or days.

Cognitive Small Group Units

There are eight cognitive small group units, each designed to address (and named for) a fundamental aspect of the cognitive functioning of young children. These units, with their intended functions, are given in the following list in the sequence in which we recommend they be taught.

1. *Self Regulation*. Helps children bring their body movements under the control first of external stimuli and then of internal stimuli (i.e., self control), and then to move their self control into a social context.

2. *Number Concepts*. Introduction to basic number concepts, one-to-one correspondence, ordinality, quantity, ordinal

number, counting.

3. *Comparison.* Systematic comparison across dimensions, discriminating similarities and differences, comparing on multiple dimensions.

4. *Role Taking*. The other (in addition to Self Regulation) "social" unit. Role-taking, physical and social perspective, considering other people's feelings and viewpoints, understanding that what is seen depends on one's perspective, which may be changed.

5. *Classification*. Functionality of classification; classifying across three dimensions (color, size, shape), and representational classification (i.e., without pictures).

6. *Patterns and Sequences*. Fundamental operations of identifying items within classes according to their serial position; number and pattern progression.

7. *Letter-Shape Concepts*. Identifying and classifying objects and events according to certain prominent characteristics, with emphasis on letters of the alphabet.

8. *Transformation.* Using activities focused on how things change or stay the same, children practice induction of rules of transformation and their application. This unit is a good transition to the primary grades.

Cognitive Large Group Activity

The large group component represents one of the primary tasks of Bright Start, to teach children to use cognitive processes to learn content material. Large group is a structure that provides opportunities for combining teaching of content and cognitive functions. The primary emphasis in the small group units is on development of cognitive functions, with various content as a vehicle for such cognitive learning, but the emphasis is reversed in large group, in which the primary emphasis is on the teaching of content and the application of the acquired cognitive functions to aid content learning.

Because of the developmental age of preschool children, experience and knowledge base are limited. In this curriculum, preschool content is taught in order to add to and enhance children's experience and knowledge; however, content is not taught for its own sake, in isolated bits to be committed to memory for successful performance and repetition in kindergarten. Rather, the idea is to present content in a generalizable context and to teach children to generalize principles and cognitive strategies to other familiar and frequently-encountered situations.

Large group activities have not been specified and prescribed in this curriculum. They must be planned and devised by the teachers, but there are some guidelines (see paper on large group lessons, section VI: Parts of the Day). First, the activities should be chosen and constructed so as to call upon the cognitive principles and strategies that are emphasized for that day. Second, the content chosen for the large group activities should be consistent with the cognitive goals of the small group unit activities for the same day. Third, the activities should be ones in which all the children can participate actively, either collectively or in turn. Fourth, the activities should have generalizable aspects, i.e., should not be so foreign to the children's past and future experience that the children would have difficulty relating these activities to their own lives. Suppose, for example, that the

class is working on quantitative relations. The small group unit for a particular day might be concerned with the need to establish a strategy for finding out how many of something one has or will need. Counting is suggested as a good strategy. A large group activity might be constructed in which the children play a game that requires each child in one group to have one kind of item while those in the other group have a different item. Boxes are presented containing the two kinds of items. The problem is: how many of item A do we need, and how many of item B (need for a strategy)? Do we have enough (application of the strategy)? If the children turn their backs to the boxes, how can they tell other children what to take from the boxes (i.e., labeling)? Name three other times when we have to use a strategy to find out how many of something we need (generalizing the strategy to other domains). What alternative strategies might work (testing strategies such as guessing, asking the teacher, handing out items until there are no more)? In order to use the counting strategy, what do we have to do (create need for content learning)?

In this curriculum, teachers try not only to teach content in cognitive contexts but also to teach children to generalize cognitive functions to the solution of new problems when such problems arise in different settings. In doing so, the teachers try to get the children to give examples of other times when a certain kind of thinking might be required or would result in better solutions, to discriminate appropriate and inappropriate applications of particular modes of thought, and to be critical of their own solutions, requiring logical evidence for their acceptance.

Teachers mediate the children's thinking by using opportunities throughout the day that stimulate children to think beyond immediate situations. One might hear such questions in the classroom as: "How could you prevent that from happening next time?" "What would be a good way to do that so that you won't miss any, or won't make mistakes?" or "How can we fix that?" Such questions are intended to instigate verbal exchanges that will engage children as active participants in problem-solving by looking for effective processes and not just for answers.

One of the principal mechanisms of mediation is "bridging," the activity by which cognitive concepts, principles, and strategies are applied to familiar contexts (Haywood, 1988). It is in these applications, rather than in the memorizing of verbal statements of principles, that the concepts are learned and made secure. Bridging should be done carefully and often, and according to the following principles. First, the bridges should be elicited from the children whenever possible rather than always being supplied by the teacher. Second, teachers should try to elicit bridges (or should suggest them) to experience that is familiar to the children. Third, bridges suggested by teachers must be simple, clear, and direct rather than complicated and logically tortuous. Fourth, bridging should be done to different and varied domains of the children's experience. In fact, it is a good idea to try, in the course of teaching a particular concept or generalizable idea, to elicit bridges to at least the three domains of school learning, home activities, and peer interactions such as playground activities. In all of these curriculum activities, teachers initially direct children's behavior so that the children learn to use appropriate strategies

when conceptualizing their world and solving problems. Teachers help children to focus attention, inhibit impulsive behavior, minimize irrelevant behavior, discriminate relevant from irrelevant aspects of tasks and stimulus arrays, induce rules from examples, apply rules, compare their work with models and rules, use multiple sources of information, be self-evaluative, and develop needs for precision and accuracy and for logical evidence. Ultimately teachers help children to regulate their own behavior and to generate their own cognitive strategies. The overall goal, then, is to teach children not only to approach particular problems effectively but to be able to approach new problems as effective, independent learners. Through activities with mediational teaching, young children are taught to be active and competent participants in the events of their lives, rather than merely accepting whatever life happens to hand them.

EVALUATION OF BRIGHT START

Up to this time there have been more than a dozen principal studies of the effectiveness of Bright Start, in the United States, Canada, Israel, Belgium, France, as well as smaller studies in Finland, The Netherlands, Spain, and South Africa. See Brooks and Haywood (2003) for a summary of the evaluation research.

In the first evaluation study (Haywood, Brooks, & Burns, 1986), there were three groups of children: mildly and moderately mentally retarded who got Bright Start, children at "high risk" of school failure (mostly from poor families) who also got Bright Start, and high risk children who got a good but noncognitive project Head Start program.

The high risk children who got Bright Start gained almost 9 IQ points on the McCarthy Scales of Children's Abilities, while the Head Start children gained about 1 point. Bright Start children also gained significantly more than did comparison children in all subscales of the McCarthy except the verbal score, in which the difference was not statistically significant.

The retarded children (for whom there was no comparison group) showed significant gains on all parts of the McCarthy, with a mean IQ gain of 12 points in just 7 months of the program. There were also reductions in their "confirmation seeking," that is, in the frequency with which the children asked teachers and examiners whether their answers were right or wrong.

In general, these IQ results were replicated by Samuels & Killip, unpublished). Their small group of handicapped children included those who were diagnosed as learning disabled, mildly retarded, and emotionally disturbed. One-half of the group received Bright Start, the others a good non-cognitive preschool program at a children's hospital. The interval between pretest and posttest was only 6 to 7 months. The Bright Start group gained an average of 8.1 IQ points on the McCarthy, while the comparison group actually lost 1.8 points. The Bright Start group also made significantly greater gains on language expression and the Peabody Developmental Motor Scales.

In this study, the children whose parents participated "often" in the program showed greater gains than did those whose

parents participated "rarely" or "not at all."

After one school year, both groups were placed by the school system either in regular classes or in special education, without any participation in those decisions by members of the research staff. Of 12 Bright Start children, 9 were placed in regular classes and only 3 in special education, in spite of the fact that these children had started the year with lower test scores than had the children in the comparison group. Of 12 comparison children, 9 were placed in special education and only 3 in regular classes.

In Seattle, Bright Start was compared (Dale & Cole, 1988) to a content-oriented curriculum, DISTAR, whose method is essentially behavioral. The investigators observed in both kinds of classrooms, and recorded their observations in 14 categories of teacher and child behavior that had been developed on the basis of theoretical expectations from both curricula. The first thing they found was that the programs were indeed observably different. Significant differences were recorded in 9 of their 14 categories. In the DISTAR classes, there were significantly more instances of verbal imitation, unison responding, questions requiring limited responses, "labelling" (what is it?) questions, and immediate correction (reinforcement). In Bright Start classes there were significantly more instances of process teaching, generalization of processes, process oriented questions, and questions that permitted free or unlimited answers.

With respect to child outcomes, each curriculum produced some superior results. Once again, Bright Start children made greater IQ gains, which included greater gains in mental age, the verbal scale, and the memory scale. In addition, Bright Start children gained more in the complexity of their verbal communication. The DISTAR children made larger gains in a Test of Early Language and made fewer errors on a Test of Basic Language Concepts. In general, these differential results of the two programs were very much in line with what one would expect from their different philosophies.

These three preliminary evaluative studies suggest that a program of cognitive early education based on a transactional interpretation of the nature and development of intelligence, focusing on the development of intrinsic motivation, and applied to classes of low-functioning children, can produce beneficial changes in the children's intellectual and cognitive functioning.

Studies in Belgium have shown that children with speech, language, and hearing impairments benefit significantly from the Bright Start experience, especially with respect to their cognitive development and their ability to use abstract thinking (see Vanden Wijngaert, 1991; Warnez, 1991).

The Israeli studies have been focused primarily on "socially disadvantaged" children, including some very interesting groups of children from recent immigrant families who came from very different cultures. These carefully designed studies, including random assignment to experimental and control conditions, show significant benefits of Bright Start, compared to children in the control conditions, in cognitive development, problem solving, performance on some dynamic assessment tasks, including

organization and perceptual memory, as well as some areas of subsequent school achievement (e.g., Tzuriel, Kaniel, Zeliger, Friedman, & Haywood, 1998; Turiel, Haywood, & Mandel, 2005).

The series of French studies, carried out primarily with immigrant children from North Africa and the Indian Ocean, show that Bright Start at kindergarten can substantially overcome the learning and performance deficits associated with minority ethnic and socio-economically disadvantaged status. Further, these studies revealed long-term positive—and sometimes dramatic—effects on subsequent school achievement, especially in reading and reading comprehension, math, and language achievement, at least through third grade (as far as the studies have yet gone). (See, e.g., Cebe & Paour, 2001; Paour, Cebe, & Haywood, 2000).

A recent study in Spain (Molina & Vived, 2004) demonstrated the utility of Bright Start with pupils who have Down syndrome. Although there was no control group in this study, it provided convincing evidence that two academic years of Bright Start can lead to significant advances in cognitive and intellective development with these children.

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