

A SCHOOL FOR THINKING: A SOLUTION TO THE PROBLEM OF LEARNING DISORDERS¹

HANS G. FURTH

It is hard to know where to start when one has a lot to say, so I'll start without beating around the bush. Would you like to see the condition of learning disorder eliminated? I will suggest to you a plan about this. There is one sure thing we know about learning disorders: it is a maladaptive response to the school system. Now it is my thesis that this maladaptive response could be changed if we changed the educational environment of the early school years. I say this without any critical spirit on my part, fully knowing that change is of course a very difficult process. But it seems that we as scientists have to be honest and straightforward and put the finger on the principal cause rather than on secondary and tertiary causes. We should state a desirable goal, even if its implementation requires all kinds of political, social, and academic changes, which are not easy to come by. I am not suggesting then that an educational change like the one I am proposing can take place overnight; but I would like to talk to you as a developmental psychologist who knows something about what intellectual development means.

The theme of my talk could be summarized in two words—intellectual health. I use the words 'intellectual health' just like other people talk about physical health. Children have a right to intellectual health in a much more fundamental sense than they have a right to read. I do not think our present school system provides an environment that is intellectually healthy. My remedy for learning disorders is then quite simple; it would be to have a school system that is intellectually healthy. If we had an intellectually healthy system we would not have learning disorders. How can I be so bold as to make this statement? Let me tell you something about my personal history as a psychologist.

I started working with children who were very severely handicapped as far as learning is concerned, namely profoundly deaf children. These children grow up during the first years of life, say, up to age five or six without hearing and knowing a language, and without being able to speak. The vast majority of deaf children do not have a language even much later—most ten-year-old profoundly deaf children in this country are woefully inadequate either in knowing English or in knowing Sign language. So here you have a population that is certainly severely deprived in terms of our traditional conception of intellectual development. Superficially, the expectation of an impoverished development is fully confirmed. These children do very poorly in school. However, what

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Dr Hans G. Furth, Deptt. of Psychology, Centre for Research in Thinking and Language, The Catholic Univ. of America, Washington D.C. 20017.

about their intelligence? Do they develop intellectual mechanisms that we find in hearing children? And if they develop these intellectual mechanisms, how can these intellectual mechanisms be explained? Is verbal language a primary factor that in hearing children contributes to the development of thinking and of general intelligence? What factor takes its place in deaf children? This is the kind of questions I asked myself.

When I started working with deaf children, some 15 to 20 years ago, I fully expected to observe severe intellectual deficiencies, not just learning deficiencies. Obviously, if a child does not know a language, it is going to be pretty hard for him to succeed in our educational system. On most achievement tests deaf children perform very poorly, just as you would perform very poorly if you took a test in a language that you do not understand. In such a situation we would not be measuring your thinking but instead determining that you do not know a certain language. Since we know already that deaf children are ignorant of language, the fact that they do poorly in school is no more enlightening than the statement that they do not know language. But, does the deaf child show severe deficiencies in general intelligence or in general learning mechanisms? In order to investigate this, one has to be inventive, precisely because the deaf child does not have language. Apart from this, language is not always the best means to find out how well a child can think. I suggest quite generally that all children, whether hearing or deaf, are more intelligent than they can show through verbal means. They can *think* more than they can either express or comprehend verbally.

In this connection I propose the following relation between thinking and language. In order to use language intelligently as a means of challenging one's thinking, one must have a developed mind. You and I can be challenged by verbal propositions that are appropriate because we have what Piaget calls formal intelligence. We should be able to make sense of these verbal propositions that I transmit to you now. But you and I know also that even for us this is quite a difficult job. Now, if it is hard for us to fully benefit from verbal language, it should make sense when I suggest that the little child—not merely the preverbal baby, but also the six, eight, and ten-year-old child—does not use language as a primary means of intellectual development. The reason is quite simple: the young child's mind is incapable of making full intellectual use of language. This statement is not merely theoretical inference but is buttressed by over 15 years of research with deaf children.

To my ever-increasing surprise, I found that deaf children were not deficient in general mechanisms of thinking. Take any five-year-old child and you will find that it is hard for him to understand that one thing *must* happen, another thing *cannot* happen, or that one thing is *more likely* to happen than another thing. The typical five-year-old child has a poor grasp of probability concepts. Obviously we are here not talking about the word 'probability', but about the understanding and mastering of probability situations. Generally, the world of five-year-old children is a world that from an adult viewpoint appears unstable, fluctuating,

HANS G. FURTH : A SOLUTION TO THE PROBLEM OF LEARNING DISORDERS

and vague. Three or four years later, however, we find that most, if not all children have a pretty good understanding of the basic concepts of probability. Where did the children get this from? We may be tempted to think that they got these concepts from language. After all, we use words like 'likely', 'more likely', 'impossible', etc. Now we observed that deaf children performed similarly to hearing children on tasks of probability understanding. When they are five years old, they fail consistently as do hearing children, but when they are seven and eight years old, they begin to understand probability situations, again like hearing children. I can assure you the language they have learned in these three years cannot possibly explain this intellectual progress because they have not learned words like 'likely' or 'more likely', and in any case, probability understanding does not reside in knowing words but in grasping logical-mathematical relations. In our research projects we studied many other concepts in deaf children, such as part-whole concepts, classification, spatial transformations, seriations, etc. (See Furth, *Deafness and Learning*, Wadsworth Pub. Co. Belmont, Calif. 1973).

Now put yourself in the researcher's position. You start off hypothesizing that language is very important in intellectual development. You fully expect that deaf children will have severe deficiencies in intellectual development in proportion to the deficiency they have in language. You don't find it, not just once, but again and again. So here is your choice. You could either interpret the results so that you can live with them, and that is what most people do. Or you change your theory, and that is what I have done. And the only theory that I have found adequate to explain the facts is the theory of Jean Piaget. If I speak now with full conviction about the adequacy of Piaget's theory, it is primarily because it is this theory that makes sense of the many findings and the many observations that we have made and I invite you to make: deaf children are around and can be observed by anyone.

If you encounter a deaf child who never mastered a systematic language and if you observe how he understands a system of symbol-picture logic that we invented in order to be able to communicate with them—the kind of symbolic logic that students learn at the college level—when you see 13-year-olds, 11-year-olds and 9-year-old deaf children succeed in this logic task and through this means of an artificial language show you that they understand the difference between a logical conjunction and a disjunction, the difference between the logical some and all, the difference between a negated conjunction and a conjunction of two negations, I cannot comprehend how one can continue calling verbal language the main, or one of the main factors, of intellectual development. And yet, this is still the common theory that prevails and in many ways, it is still the basis of our present curriculum at school.

Let me now add a few words about blind children. Severely blind children, blind from birth, have no visual experience. Therefore, they do not have visual images. They have other images but not visual images. Here again, most

theories of thinking attribute an enormous role to the visual memory image. You are supposed to recognize a person because you match the person in front of you with the image that you have within you, and you identify something because you match the thing with an image that you look at within your brain. This kind of theory is very familiar to all of us because we were all brought up on this theory. I am sure no one would object to it if I talked to you in those terms. Perception, images, memory and language—that just about explains the whole of intelligence and the whole of the thinking process for most theories. However, since blind children can develop intellectually and have very adequate spatial knowledge and certainly very adequate ability to recognize and identify things, and particularly since there exist deaf children who without languages have very adequate intellectual mechanisms, this argues very strongly that a theory of intelligence and thinking that is based primarily on memory image and linguistic rules misses the heart of the matter.

So I am proposing to you a different theory, namely Piaget's and I will say a few words about the theory, how it differs from the traditional theory, but beyond that, I want to make a few remarks about the school environment that we could have if we took Piaget's theory seriously. I do not minimize the practical difficulties. When I ask teachers, such as many of you are, should the school encourage thinking, all would say 'yes' and nobody would dare to say 'no'. But maybe those who give that answer do not mean it. Maybe we do not want children to think. These are problems to which I have no solution. However, if you sincerely want schools to be places where children are encouraged to think—which means they are encouraged to develop their thinking, because we are talking of little children at the moment—then Piaget's theory has a lot to offer. How could we be sure that we encourage thinking unless we know what thinking is? Frankly speaking, do you know what thinking means, and as you recall your training as teachers, have you ever had a course on thinking? Traditionally we have relegated thinking into the background and much prefer to talk about vocabulary and writing and language skills—things that can be easily measured and that you can put in a book form. Even philosophers prefer to talk about language rather than about thinking. Because thinking is a difficult concept, Piaget's theory is difficult to understand. A mechanistic explanation of thinking is very easy to conceptualize. Thinking would be a representation of an external situation in the form of an internal image, and then we memorize this image and then we combine the images according to linguistic rules. It is all very simple and this is why we fall for it.

Piaget's theory is different. It is to Piaget's tremendous credit that he constructed a theory of the development of thinking without basing it on images or language and without realizing how well his theory fitted the findings with blind or deaf children. I could summarize the difference as follows. The theory of thinking sketched above is really a theory of learning. And according to Piaget learning is a different psychological process than the development of thinking. For many of us learning includes almost everything that has to do with knowledge.

HANS G. FURTH : A SOLUTION TO THE PROBLEM OF LEARNING DISORDERS

1

While we would not readily say that 'a child learns his intelligence', most psychologists and most people in education when they are seriously questioned would hold that the growth of intelligence is learning. Learning theories include therefore the change of intellectual capacities that is so obvious in all growing children. In sum, learning is the main concept surrounding intelligence and it encompasses anything the child knows. For Piaget, however, there is a clear distinction between learning and development. Development is seen as nothing else but the development of intelligence and this development is a different process from the process of learning.

Now, let us look at intelligence more closely. I am here not talking about 10 tests; rather I refer to any human child that is alive. If he is three years old, he will have a certain intellectual level. Look at this child three years later, and he is going to be more intelligent. In Piaget's terminology the child is developing. He would not have developed if he had not had the motivation to develop. And, here comes at once a very important point—you do not have to give a child candy to develop his intelligence. You do not have to teach the child a certain language to give him intelligence. You do not need a specific institution, you do not need a specific culture. Intelligence is the birthright of all human beings. It is species-specific, as Piaget would say. The human intelligence is what all human beings have in common: all human beings develop their intelligence and all human beings grow in intelligence as they change in age—at least for the first twelve to sixteen years. What happens after that is a moot point. Maybe we were meant to continue in intellectual development, but apparently most people do not. The fact remains that all children do develop and in developing become more intelligent.

Now I am inclined to say that the period of primary school—age five to ten is the most important period from the intellectual viewpoint. I should not really use the superlative and compare the importance of childhood periods. It is hard to prove my point decisively. I am saying this partially because so much emphasis is put nowadays on the early period and educators say, 'You have to get these disadvantaged children earlier than primary school. You have to get them when they are three or two years old, for if you do not get them at this early age, it is too late, and we cannot provide a successful educational experience for these children'. I do not believe this is true. Sure enough, the period before age six, the preschool period, is extremely important for social development and for personality development. However, around age six there occurs an extremely important breakthrough in intellectual development: the child is beginning to have his first stable concepts. As I suggested to you earlier, before this age the child lives in a kind of dream world in which reality, dreams and self are not very well defined. The child's subjective contributions, his dreams, his images, are not clearly differentiated from what we adults would call objective reality. Around the age of six years he is beginning to have the first stable concepts. Therefore, now he is beginning to think clearly for the first time, and now he comes to school

and is spontaneously eager to make use of his newly acquired power of thinking. What does the school give him in terms of thinking?

If you are elementary school teachers, I would like to ask you this question: What did you do today in your class that challenged the child's thinking? If you cannot readily answer this question, you will at least get the point I wish to make. I believe the school should be a place where the child's intelligence is encouraged, where the child is provided with occasions to grow intellectually. We may not be able to list exactly those situations that make a child's intelligence grow, but we can have some fairly clear picture what is challenging to a child's mind. If a task is challenging to a child, then it will help the child grow. I doubt if teachers really think that a child struggling with letters or with spelling is engaged in an intellectually challenging experience. It may be challenging relative to a particular skill—it is what I would call a specific learning experience. But most teachers know very well that teaching reading does not by itself provide an intellectual challenging experience for the child. Teachers may argue that the child must learn to read before he can be intellectually challenged. Probably most teachers really think that a child can only be challenged through language, and since books present language in a convenient, stable form, a child has to learn to read before he can be challenged. However, I propose with Piaget that challenging situations for five to eight-year-old children are situations that are primarily nonverbal such as situations where a child handles things, where he is active, where he himself asks the questions, not where he learns the response to a question that is given to him from somebody else.

I have incorporated the idea for a school for thinking in the book, 'Piaget for Teachers' (Prentice-Hall). In this book I tried to clarify the possible influence of Piaget on education. Piaget does not propose a new method of teaching; he has nothing to say about the choice of a curriculum or about teaching specific tasks. Some people are going around teaching Piaget-type tasks to the teachers and to the children. This is a rather silly use of Piaget and is in direct conflict with the core of his theory. I see the main impact of Piaget in substituting a philosophy of thinking for the prevailing philosophy that focuses on specific learning skills like reading and writing, in other words, promoting a school for thinking rather than a school for learning.

Now let me hasten to add a word of caution which illustrates why a theory like Piaget's is so difficult. I have just made a distinction between development and learning and talked about challenging experiences that can contribute towards further intellectual development as against other experiences that serve at best the aim of learning. And having made the distinctions, I have to say that, of course, in concrete situations you cannot have development without having learning. These things go hand in hand. They are two aspects of the same behaviour. Take a child who is beginning to learn to ride a bicycle. As far as Piaget is concerned, this can be a developmental experience in which the child is beginning to coordinate his body position to achieve a firm balance. This is a very healthy

intellectual development. But, at the same time, he happens to learn to ride a bicycle. There is nothing wrong with that either. But what is important is whether we put the accent on learning a specific performance or encouraging the child to engage in a potentially challenging activity.

Can you guess what would happen if our curriculum demanded that a child in the first grade has to ride a bicycle according to some arbitrary performance level? Naturally, we would have all kinds of bicycle-riding disorders. This is exactly what I mean about reading. It strikes me as silly to sacrifice the intellectual health of our children on some God-given norm according to which a child has to read by his sixth or seventh birthday. A school for thinking would not neglect the teaching of reading, but it would put reading at its proper priority. It would take seriously what all of us teachers pay lip service to, namely, not to teach a skill to a person until he is developmentally ready for it. I think that the greatest percentage of learning disorders is due to the fact that we force a child to perform at a certain level when he is developmentally not ready for it. If a six-year-old child cannot ride a bicycle, this does not necessarily mean that he may not be an excellent cyclist when he is seven years old. Similarly with reading. Give us teachers time. A school for thinking can guarantee to you that a child will read when he is nine years old. But it does not want this child to be a failure when he is six, seven, or eight years old.

This is one main point which emphasizes avoidance of failure. The next point is a positive one: what do you do if you do not do reading? Dr Wachs and I have a book which is called, 'Thinking Goes to School: Piaget's Theory in Practice' (Oxford University Press, 1974). We describe there an education project in which for two years a first and second grade classroom made real our ideas of having a class for thinking. This classroom was full of activity. We called these activities 'thinking games'. The children played thinking games in small groups. Many of these thinking games you may recognize as being the kind of exercises done in remedial teaching. The difference is of course that other schools permit the children to become failures first and then they play sensible games with them, whereas we try to avoid failures. It is so much better for the child and also for the teacher. So the day is full of thinking activities: thinking with the body, thinking with the senses, eye thinking, hand thinking, logical thinking, mathematical thinking, social thinking, affect thinking, musical thinking. There are many other beautiful programmes available—such as science thinking—but none of these programmes make much difference in traditional schools because they are used in an overall atmosphere where what counts is a certain performance level rather than the thinking process.

Our aim was to provide an atmosphere that is conducive to intellectual development and that is what I meant by intellectual health. None of these children were held back in reading. In fact, the children in a school for thinking read according to their developmental level. In other words, there will be several children who come to grade one knowing how to read, and other children who

will not be ready to read. Teachers may argue that they never force children to read if they are not ready and do not consider them failure. But if reading is the main activity that takes place, and if reading is the main criterion by which the child and the teacher is judged, then the child knows that he is a failure if he does not read. Now in our school for thinking reading is merely one of many different activities. So, if he does not read, he does not experience himself as a failure. He thinks and he is clever. He can show off that he is clever and he knows it from his classroom experience. Every day the children are playing 20 to 30 games and within three weeks the teacher begins to know the child. The teacher does not need an IQ test or a diagnostic test to tell her in which particular area a child is strong or weak because she is observing the child on worthwhile thinking tasks all the time.

Here is an example. There were two children working on a problem of transposition—such as what a design would look like if it was turned around 180 degrees. Such a task can be made so that it is very hard for you and me, but it can also be made easy for any six-year-old child. All the thinking activities in a school for thinking are of this type, so that they can be made challenging to fit the individual child. One child was doing a rather complex transposition problem, a problem where an adult would be challenged, and a school inspector came along and admired this performance. Next to this first child was another child who worked on a very simple design. The inspector said to this child, pointing to the work of the first child: 'Yours is much easier, isn't it?' And this child looked up and said simply, 'No, mine is just as hard'. What the child expressed here was an important experiential insight. The simple task was just as challenging for him as was the more complex task for the other child. This child got the message that he was in school for the purpose of thinking. Once the children get the message, they do not mind individual differences. They do not need reinforcements, in terms of stars or marks or prizes. They enjoy doing the activities and they help each other and they are sensitive to each other's needs.

I want to finish this talk with the following reflections. I daresay there are some children who live in an environment that is so severely disadvantageous that perhaps no school can help these children. There may be some children who have some specific neurological deficit; but I would like to see this neurological deficit diagnosed on some independent measure and not on the fact that they are doing badly in school. And maybe this child does need some very specific treatment. But for the vast majority of children who are now diagnosed as learning disorders or behaviour disorders, I can think of nothing more important than to change the school and to provide an environment that is developmentally healthy to these children. If the environment is healthy for intellectual development, it is also going to be helpful to the children's emotional development. Children who are bored all day are faced with an impossible task. What else should they do but talk and be unruly? It is basic self-defense that forces them to do this.

HANS G. FURTH: A SOLUTION TO THE PROBLEM OF LEARNING DISORDERS

If a child comes to you who is hungry, starved, and emotionally disturbed, you do not do psychotherapy with him. You first give him something to eat. And I propose to you that many children who have behaviour problems are children who are intellectually starved. Boredom is about the worst thing that can happen to intellectual development. Fortunately, there is such a terrific biological drive in all children that boredom never dominates the entire situation. So most children develop intellectually outside of school, if not in spite of the school. This is a tragic situation, particularly for children who have some observable deficit, whether the deficit is social-cultural or whether it is neurological. Other children become learning disorders for no other reason than the normal variability in the rate at which different thinking capacities develop. Some children entering school are good in visual but not auditory tasks, others are good in auditory but not visual tasks. Remember also that we really have no meaningful norms to say that a five-year-old child should succeed in this or that performance. Our school system forces about 20 per cent of the children to become school failures because they are not ready for reading. These children are not stupid or sick, they manifest normal individual variations that a school for thinking would take care of in the normal way by what is going on during the school day.

So I am proposing that a school for thinking would be the most desirable antidote to learning disorders. And I think it is good not only for deaf children, for whom I first proposed this, but for all children, and I know it would be most welcome by many teachers who love the children and are as much frustrated by the children's failures as the children themselves.

At higher educational levels a child obviously must be expected to learn and understand a certain amount of facts, but during the developmental period when a person changes intellectually from a mind typical of a child to a mind typical of an adult, the most important thing that we can do at school is to see that the child develops his intelligence. If we put the accent on that, we will have two benefits. First of all, the child will develop as a healthy, thinking and feeling person. And at the same time, the child will learn the things that in so many cases he does not learn now. Because in the final analysis all learning is based on a proper use of intelligence and this is a distinction which Piaget stresses—not that he says that learning is unimportant or that language is unimportant, but these two things depend on a healthy intelligence and not vice versa. Fortunately a healthy intelligence is one thing that all children have, otherwise they would not be alive.

(The following remarks were made in response to specific questions).

I am not overly pessimistic about humanity, otherwise I would not be talking about a school for thinking in the first place. I think most people enjoy thinking, even adults, even teachers. I blame the structure, the system. Give the teachers a chance where they are permitted to let the child be a thinking person. A good proportion of teachers will enjoy this, because after all, teachers are not happy with failing children. Moreover we have had experience of putting the school

into practice. We worked with two or three teachers. Now these were not such outstanding persons. Sure, in order to start a change, one has to have a certain amount of courage and motivation. But, the principal point is, that a school for thinking provides a structure that by itself encourages the child's thinking. Ours was a very structured environment. We provided the teachers with a list of varied activities. Within this structure the teacher was left free and was not forced to insist on a certain arbitrary standard of performance. So that a child who classified on a preoperational level was not told by the teacher, that he should have done it a better way. The child was left alone and was presented with another classification problem next day, and next week, and next month. And the teacher was not impatient and the child was not impatient. Thus the child had an opportunity to grow.

How do we implement this concept of a school for thinking throughout the country? Of course, change will only take place if enough parents and teachers are dissatisfied with the existing state of affairs. The tremendous number of persons interested in learning disorders testifies to the fact that there are too many children who fail, and that these are not merely children who come from poor environments. It is a tragic failure that effects everybody concerned. Moreover, most novel educational ideas, such as modern science, modern mathematics, fit into the school for thinking concept but unless there is a school for thinking, none of these modern ideas are really going to be fruitful. Dr Wachs and I propose the school for thinking as a framework in which all these good ideas can come to fruition.

As to the difference between thinking and storage of learned content, Piaget considers thinking to be an internal action and intelligence the sum total of a person's available action mechanisms. You do not have to remember intelligence, but you do have to remember things that you learn. In other words, when we develop certain mechanisms of thinking, that means, we change as thinking persons. We do not have to remember that, because this change *is* part of our person like a character trait. If we are honest, we do not have to remember to be honest; we do not need an extra memory to behave in this sense. So, at the most, we can talk about biological memory, but the mechanisms of intelligence are not remembered in the strict sense, they are the framework in which we face reality. We cannot forget our intelligence unless we have some illness, whereas in learning you have to memorize and, therefore, learning needs special motivation. Intelligence does not need a special motivation. Intelligence needs a common human environment, and, therefore common human motivation and any human child who lives in an ordinary environment will become an intelligent person. Learning requires a specific motivation and things that we have specifically learned have to be stored—like a specific telephone number or a specific name. But this is a storage of a quite different character from the general knowledge that is part of our intelligence, such as understanding of classification or of probability. In short, what is learned is stored, but what develops as intelligence is an integral part of your person that is not subject to forgetting.

HANS G. FURTH : A SOLUTION TO THE PROBLEM OF LEARNING DISORDERS

As to behaviour modification, I have basically nothing against it. I see it as a limited method to reach a limited goal. Behaviour modification does not give us a goal; it makes a child behave in a certain fashion. But we need a theory like Piaget's to set psychologically healthy goals. Behaviour modification by itself would never come to the insight that reading performance is a very inadequate and sometimes quite inappropriate goal for a six-year-old child.

As for evaluation, I can only say that a school for thinking is perfectly willing to be evaluated, but give it four years. Our children would also read, but you cannot have both things: you cannot have a free atmosphere for thinking and at the same time be tested on performance every few months. It is just impossible. The teacher knows she is being tested and has to show results, and then thinking leaves the school, and performance takes its place.