

The development of academic concepts in school aged children

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The topic of the development of academic¹ concepts in school aged children is first and foremost a practical problem of enormous, even primary, importance from the point of view of the difficulties which schools face in connection with providing children with an academic education. At the same time, we are shocked by the scarcity of any available information on this subject. The theoretical side of this question is no less significant, because a study of the development of academic, i.e. authentic, reliable and true concepts, cannot fail to reveal the most profound, essential and fundamental laws which govern any type of process of concept formation. It is quite astonishing, in view of this fact, that this problem, which holds the key to the whole history of the child's intellectual development and which, one would think, should provide the starting point for any investigation of the thinking process in children, appears to have been neglected until very recently, to such an extent that the present experimental study, to which these pages are to serve as an introduction, is almost the very first attempt at a systematic investigation of this problem.

How do academic concepts develop in the mind of the child who undergoes school instruction? What are the relationships between the child's proper learning² and the acquisition of knowledge and the processes governing the internal development of an academic concept in the child's mind? Do they actually coincide and are they really only two sides of essentially one and the same process? Does the process of internal development of concepts follow the teaching/learning [*obuchenie*] process, like a shadow follows the object which casts it, never coinciding, but reproducing and repeating its movements exactly, or is it rather an immeasurably more complicated and subtle relationship which can only be explored by special investigations?

Contemporary child psychology offers only two answers to all these questions. The first says that, generally speaking, academic concepts do not have their own internal history and that they do not go through a process of development in the strict sense of that word, but that they are simply acquired, are taken in a ready-made state via processes of understanding, and are adopted by the child from the adult sphere of

thinking and that, in essence, it should be possible to solve the whole problem of development of academic concepts by teaching the child academic facts and for the child to be able to assimilate the concepts. This is the most widespread and practical generally accepted view which, until very recently, has formed the basis of the educational and methodological theories of the various academic disciplines. /

The inadequacy of this view is revealed as soon as it is brought face to face with any scientific criticism, and this becomes clear simultaneously both from the theoretical and the practical points of view. From investigations into the process of the formation of concepts, it is known that concepts do not simply represent a concatenation of associative connections assimilated by the memory of an automatic mental skill, but a complicated and real act of thinking which cannot be mastered by simple memorization, and which inevitably requires that the child's thinking itself rise to a higher level in its internal development, to make the appearance of a concept possible within the consciousness. Research shows that, at any stage of its development, the concept represents an act of generalization when looked at from the psychological point of view. The most important result obtained from all the research in this field is the well established theory that concepts which are psychologically represented as word meanings, undergo development. The essence of this development is contained, first of all, in the transition from one generalization structure to another. Any word meaning at any age represents a generalization. However, the meanings of words develop. At the time when a child first acquires a new word connected with a definite meaning, the development of this word does not stop, but is only beginning. At first, it represents a generalization of the most elementary type and the child is only able to progress from the starting point to this generalization on this elementary level to ever higher types of generalization, depending on the level of his development, and this process is accomplished when real and proper concepts make an appearance.

This process of development of concepts or the meanings of words requires the development of a number of functions, such as voluntary attention, logical memory, abstraction, comparison and differentiation, and all these very complicated psychological processes cannot simply be taken on by the memory or just be learned and appropriated. Thus, from the theoretical point of view, one can hardly doubt the total inadequacy of the view which claims that a child acquires concepts in their finished state during the course of his schooling, and that they are mastered in the same way as any other intellectual skill.

However, from the practical point of view, the erroneousness of this view becomes revealed at every stage of the way. Educational experience, no less than theoretical research, teaches us that, in practice, a straightforward learning of concepts always proves impossible and educationally fruitless. Usually, any teacher setting out on this road achieves nothing except a meaningless acquisition of words, mere verbalization in children, which is nothing more than simulation and imitation of corresponding concepts which, in reality, are concealing a vacuum. In such cases, the child assimilates not concepts but words, and he fills his memory more than his thinking. As a result, he ends up helpless in the face of any sensible attempt to apply any of this

acquired knowledge. Essentially, this method of teaching/learning [*obuchenie*] concepts, a purely scholastic and verbal method of teaching, which is condemned by everybody and which advocates the replacement of acquisition of living knowledge by the assimilation of dead and empty verbal schemes, represents the most basic failing in the field of education.

It was Leo Tolstoy, the great connoisseur of words and their meaning, who better than anyone recognized that a direct and simple communication of concepts from teacher to pupils, and a mechanical transference of the meanings of words from one head to another by using other words, was impossible – this impasse he had encountered in his own teaching experience.

Recounting these experiences whilst attempting to teach literary language to children by using translations of children's words into the language of fairy tales, and then from the language of fairy tales to a higher level, he came to the conclusion that pupils cannot be taught the literary language against their will, in the same way as they are taught French, by forcible explanations, memorizing and repetition. 'We must admit' he writes,

that we have tried this more than once in the past two months and have always met with an insuperable distaste on the part of the pupils which has proved the wrongness of the path we took. In these experiments I merely convinced myself that to explain the meanings of words and of speech is quite impossible, even for gifted teachers, not to speak of those explanations so beloved of ungifted teachers, that 'an assembly is a small Sanhedrin' and so on. In explaining any word, the word 'impression' for example, you either replace the word you explain by another word which is just as incomprehensible, or by a whole series of words, the connection between which is just as incomprehensible as the word itself.³

Truth and falsehood are mixed in equal measure in Tolstoy's categorical statement. The true part of this statement is the conclusion which stems directly from experience and is known by every teacher who, like Tolstoy, is vainly struggling to explain the meaning of words. The truth of this theory, according to Tolstoy's own words, lies in the fact that almost always it is not the word itself which is unintelligible, but that the pupil lacks the concept which would be capable of expressing this word. The word is almost always available when the concept is ready.

The erroneous part of his statement is directly connected with Tolstoy's general views on the subject of teaching/learning [*obuchenie*] and it consists of the fact that it excludes any probability of this mysterious process being crudely interfered with, and strives to allocate the process of the development of concepts to the laws of its own internal strategy, and by doing so, he separates the whole process of concept development from the process of teaching and thus condemns teachers to an extreme state of passivity, as far as the problem of the development of concepts is concerned. This mistake is particularly conspicuous in his categorical formulation where he proclaims that 'any interference becomes a crude, clumsy force which retards the process of development'.⁴

However, even Tolstoy understood that not every interference holds up the process of concept development, but only the crude, instant, direct sort which follows a straight line, the shortest distance between two points, interference with the process of concept formation in the child's mind, which can produce nothing but harm. But more subtle, complex and more indirect teaching methods may interfere in the process of children's concept formation in such a way that they can lead this process forward and on to a higher plane. 'We must', says Tolstoy,

give the pupil opportunities to acquire new concepts and words from the general sense of what is said. He will hear or read an incomprehensible word in an incomprehensible sentence once, then again in another sentence, and a new concept will begin dimly to present itself to him, and at length he will, by chance, feel the necessity of using that word, he will use it once, and word and concept become his property. And there are thousands of other paths. But deliberately to present a pupil with new concepts and forms of language is, according to my conviction, as unnecessary and pointless as to teach a child to walk by means of the laws of equilibrium. Any such attempt carries a pupil not nearer to the appointed goal, but further away from it, as if a man should wish to help a flower to open out with his crude hand, should begin to unfold the petals, and crush everything around it.⁵

Thus Tolstoy knows that there are thousands of other ways besides the scholastic ones to teach children new concepts. He rejects only one of these, that of the direct, crude, mechanical unfolding of a new concept 'by its petals'. This is perfectly true and indisputable. It is confirmed by all theoretical and practical experience. But Tolstoy ascribes too much significance to the spontaneity, randomness and the actions of vague ideas and feelings, and the inner aspect of concept formation, which is enclosed within itself, and he underestimates the role of possible direct influences on this process, exaggerating the gap which exists between education and development.

In this instance what we are interested in is not this erroneous side of Tolstoyan thought and trying to debunk it, but rather the real heart of his theory, which is the conclusion that one should not unfold new concepts 'by their petals'. We are intrigued by the thought which seems true enough, that the road leading from the initial familiarization with a new concept to the moment when the word and the concept become the child's property, is a complex internal psychological process, which involves a gradually developing meaning emerging from a vague conception of the word, and is then followed by the child's personal use of it, and which, only in the last instance, forms the last link in the chain, a proper assimilation of it. We basically tried to express the same idea, when we said that at the moment when the child first recognizes the meaning of a new word, the process of concept development does not stop, but is only beginning.

This practical experimental investigation aimed to verify the probability and fruitfulness of the working hypothesis which is being developed in this paper. It aims to show not just the thousands of alternative roads which Tolstoy mentions, but also that a conscious attempt to teach pupils new concepts and forms of words is not only

possible, but that it can be the source of higher levels of development of the child's personal, already-existing concepts and that, furthermore, direct work in the realm of concepts within the programme of a school education is perfectly achievable. But this work, as research has shown, is the beginning and not the end of development of an academic concept, and not only does it not exclude personal processes of development, but it gives them a new direction and creates new and extremely favourable relationships between the educational and developmental processes from the point of view of educational end goals.

But in order to be able to deal with this subject, one circumstance must first be explained. Tolstoy constantly talks about concepts in connection with teaching children the literary language. Consequently, what he has in mind is a concept which has not been acquired by the child in the process of assimilation of the system of academic knowledge, but words and concepts of everyday speech, new and unfamiliar from the child's point of view, which are woven into the fabric of the child's previously formed concepts. This becomes obvious from the examples which Tolstoy gives. He discusses the explanation and interpretation of such words as 'impression' or 'tool' – words and concepts which do not presuppose a mandatory assimilation in a strictly defined system. Meanwhile, the subject of our research is the problem of the development of academic concepts, which happen to form during the process when the child is acquiring a specific system of academic knowledge. So it is natural for the question to arise, to what extent the theory examined above can also be extended to the process of the formation of academic concepts. For this purpose it is necessary to explain the general relationship between the process of formation of academic concepts and those concepts which Tolstoy had in mind, which on the strength of their having originated in the child's own life's experience, could be tentatively called everyday concepts.

So, by making a distinction between everyday and academic concepts, we are in no way prejudging the question to what extent such discrimination can be considered objectively valid. On the contrary, one of the fundamental aims of this investigation is just the problem of clarifying whether or not there exists an objective difference between the course that the development of both these types of concepts follows, and if so, what its nature consists of and if it really does exist, what objective factual differences between the developmental processes of the academic and the everyday concepts could be said to justify a comparative study.

The task of this essay, which is an attempt to construct a working hypothesis, is to provide evidence that such segregation can be empirically justified and is theoretically well grounded, and that for this reason, it ought to form the basis of our working hypothesis. We require proof that academic concepts develop in a somewhat different way from the everyday variety and that the course of their development is not just a repetition of the development of everyday concepts. The task of the study which attempts to verify our working hypothesis, is the factual confirmation of this theory and the clarification of what the differences which exist between these two processes consist of.

It should be said right at the start, that the distinction drawn between everyday and academic concepts, which we have chosen as our starting point, and which we have developed in our working hypothesis, and in the entire formulation of this problem, which was dealt with in our research, is not only not generally accepted by contemporary psychology, but is seen as contradicting the widely held views on this subject. This is why it is in such dire need of elucidation and proof to uphold it.

We have already said above that at the present time there exist two answers to the question as to how academic concepts develop in the minds of school age children. The first of these answers, as has been said, fully denies the very presence of any process of an inner development of academic concepts which are acquired in school and we have already attempted to point out the unfoundedness of such a view. There still remains the other answer. This is the one that seems to be the most widely accepted at the present time. It says that the development of academic concepts in the minds of children in school, does not substantially differ from the development of all the remaining concepts which are being formed in the process of the child's personal experiences, and that, consequently, the very attempt to separate these two processes is a meaningless exercise. From this point of view, the process of development of academic concepts simply repeats the course of the development of everyday concepts in all its basic and essential features. But we must immediately ask ourselves what such a conviction can be based on.

If we look at the whole scientific literature on this subject, we will see that the subject of nearly all the research devoted to the problem of concept formation during childhood, invariably deals only with everyday concepts. All of the basic laws guiding the development of concepts in children are based on material about children's own everyday concepts. Later, without a thought, these laws are extended to the realm of the child's academic thinking,⁶ and thus they are transferred directly to another sphere of concepts, ones which have formed in entirely different internal circumstances; and this happens simply as a result of the fact that the question of whether such an extended interpretation of experimental results limited to one single defined sphere of children's concepts, is right and valid, does not even enter the minds of these researchers.

We recognize that the most astute researchers, like Piaget, felt they had to deal with this question. As soon as they were faced with this problem, they felt obliged to draw a sharp line of demarcation between those conceptions of reality in children, where a decisive role is played by the workings of the child's own thinking, and those which have come into being as a result of the specific and determinant actions of facts which the child had acquired from his environment. Piaget designates the first type as spontaneous conceptions and the others as reactive ones.

Piaget⁷ establishes that both these groups of children's conceptions or concepts have a lot in common: (1) they both reveal a tendency to resist suggestion; (2) they both are deeply rooted in the child's thinking; (3) they both disclose a definite common character among children of the same age; (4) they both remain in the child's consciousness for a long time, over a period of several years, and they gradually give

way to new concepts instead of disappearing instantly, as suggested conceptions tend to do; and (5) they both become apparent in the child's very first correct replies.

All these signs which are common to both groups of children's concepts differentiate them from suggested conceptions and answers which a child is likely to produce under the influence of the suggestive force of the question.

In these basically correct ideas one can already find a full affirmation of the fact that academic concepts in children, which undoubtedly belong to the second group of children's concepts and which do not arise spontaneously, undergo a fundamental process of development. This is obvious from the five illustrations listed above.

Piaget concedes that research into this group of concepts may even become a legitimate and independent subject for a special study. In this respect he goes further and delves deeper than any other researchers. But at the same time, he follows false leads which tend to depreciate the correct parts of his arguments. Three such internally connected erroneous ideas in Piaget's thinking are of particular interest to us.

The first of these is that, whilst admitting the possibility of an independent investigation of non-spontaneous concepts in children, and at the same time as he points out that these concepts are deeply rooted in children's thinking, Piaget is still inclined towards the contrary assertion, according to which only the child's spontaneous concepts and his spontaneous ideas can serve as a source of direct knowledge about the qualitative uniqueness of children's thinking. According to Piaget, children's non-spontaneous concepts, which have been formed under the influence of adults who surround them, reflect not so much the characteristics of their own thinking, as the degree and type of assimilation on their part of adult thinking. At the same time, Piaget begins to contradict his own sound idea that, when a child assimilates a concept, he reworks it and in the course of this reworking, he imprints it with certain specific features of his own thoughts. However, he is inclined to apply this idea only to spontaneous concepts and he denies that it could equally be applied to non-spontaneous ones. It is in this completely unfounded conclusion where the first incorrect aspect of Piaget's theory lies concealed.

The second false premise flows directly from the first. Once it has been acknowledged that children's non-spontaneous concepts do not reflect any of the aspects of children's thinking as such, and that these aspects are only to be found in children's spontaneous concepts, by the same token we have to accept – as Piaget does – that there exists an impassable, solid and permanently fixed barrier which excludes any possibility of mutual influence among these two groups of concepts. Piaget is only able to differentiate between the spontaneous and the non-spontaneous concepts, but he is unable to see the facts which unite them into a single system of concepts formed during the course of a child's mental development. He only sees the gap, not the connection. It is for this reason that he represents concept development as the mechanical coming together of two separate processes which have nothing to do with one another and which, as it were, flow along two completely isolated and divided channels.

These mistakes cause the theory to become entangled in another internal contradiction and this leads to the third one. On the one hand, Piaget admits that children's non-spontaneous concepts do not reflect any characteristics of children's thinking, and that this privilege belongs exclusively to spontaneous concepts. In that case he should agree that, in general, the understanding of the characteristics of children's thinking has no practical significance, as the non-spontaneous concepts are acquired completely independently of these characteristics. On the other hand, one of the basic points of his theory is the admission that the essence of a child's mental development consists of the progressive socialization of his thinking; one of the basic and most concentrated aspects of the formation process of non-spontaneous concepts is schooling, so the most important process of thought socialization for the development of a child as it makes its appearance during schooling turns out, as it were, not to have any connection with the child's own internal process of intellectual development. On the one hand, understanding of the process of the internal development of children's thinking has no significance for the clarification of the socialization process during the course of school education, and on the other, the socialization of the child's thinking, which takes the foreground during the process of schooling, is in no way connected with the internal development of children's conceptions and concepts.

This contradiction, which is the weakest point of Piaget's whole theory and, at the same time, serves as the starting point for a critical review of it in the present study, deserves a more detailed analysis.

The theoretical aspect of this contradiction has its source in Piaget's ideas about the problem of teaching/learning [*obuchenie*] and development. Nowhere does Piaget develop this theory directly and he hardly mentions this question in his incidental remarks, but at the same time a definitive solution to this problem forms part of the system of his theoretical structures as a postulate of paramount importance, on which the whole theory stands or falls. It is implied in the theory in question, and our task consists of revealing it as a feature to which we can contrapose a corresponding point of departure of our own hypothesis.

Piaget describes the process of intellectual development in children as a gradual withering away of the characteristics of their thinking as they approach the final stage in their development. For Piaget, a child's intellectual development comprises a process of gradual displacement of the peculiar qualities and characteristics of childish thinking by the more powerful and vigorous adult thinking process. The starting point of this development is described by Piaget as the solipsism characteristic of infantile consciousness which, as the child adapts to the adult way of thinking, gives way to the egocentrism of childish thinking, which is a compromise between the peculiar features inherent in a child's consciousness and the characteristics of mature thinking. The younger the age of the children, the more pronounced are the signs of egocentrism which can be seen. The characteristics of children's thinking decline with age, as they are forced out from one sphere after another, until such time as they disappear altogether. The process of development is seen not as an uninterrupted emergence of new characteristics which are higher, more complicated and closer to

developed thought, out of more basic and primary forms of thinking, but as a gradual and uninterrupted replacement of one group of forms by another. The socialization of thinking is viewed like an external, mechanical replacement of individual features of a child's thinking process. From this point of view, the developmental process is quite like the process of displacing one liquid already present in a container by forcing another into it from the outside. In the process of development, everything new comes from the outside. The child's own peculiar characteristics do not play any constructive, positive, progressive or shaping role in the history of his intellectual development. They are in no way responsible for creating any of the higher forms of thinking. These higher forms simply take the place of the former ones. According to Piaget, this is the only law which applies to the intellectual development in children.

If one were to expand on Piaget's idea in a way that would include the more particular problem connected with development, without any doubt, one could maintain that what follows on from this idea directly would be an acknowledgement that antagonism is the only suitable name which could apply to those relationships which exist between teaching and development during the process of concept formation in children. To begin with, the form that children's thinking assumes is opposite to the form of mature thinking. Neither originates from the other one, but they are mutually exclusive. So, naturally, all the non-spontaneous concepts which have been acquired by the child from adults, not only will not have anything in common with the spontaneous concepts which are the product of the child's own active thinking, but they will inevitably be directly opposite to them in very many essential aspects. No other relationship between these two forms is possible, apart from a constant and unremitting antagonism, conflict and displacement of one by the other. One form has to clear off so that the other can take over. So, throughout the period of childhood development, two antagonistic groups of concepts, the spontaneous and the non-spontaneous, are forced to co-exist and they undergo changes with age, but only from the point of view of their quantitative ratio. At first one type predominates, but during the progression from one age group to another, there is a gradual increase in the number of the others. During school age, at about 11-12 years, as a result of the process of education, the non-spontaneous concepts finally displace the spontaneous ones, so that, according to Piaget, at this age the intellectual development of children appears complete and the most important act which represents the resolution of the entire drama of development, and which coincides with the period of puberty, the highest stage of intellectual development - the formation of fundamental, mature concepts - is excluded from the history of intellectual development, like a superfluous, unwanted chapter. Piaget maintains that, in real circumstances, at every stage of the way in the field of development of children's concepts, we come across real conflicts between their thinking and the thinking of the surrounding world, conflicts which result in systematic deformations of the legacy they receive from adults which occur in the minds of children. Furthermore, according to this theory, the entire content of the developmental process, without exception, can be reduced to one uninterrupted conflict between the antagonistic forms of thinking and the special

compromises which take place between them, which become established at every age and which can be gauged by the degree of decline of childish egocentrism.

The practical side of the contradiction in question consists of our inability to apply the results of the study of spontaneous concepts in children to the process of development of non-spontaneous ones. On the one hand, as we have seen, non-spontaneous concepts in children and particularly concepts which are formed during the process of schooling, do not have anything in common with the process of the children's own development of thinking; on the other hand, when considering any educational question from the point of view of psychology, an attempt has been made to transfer the laws of development of spontaneous concepts to the school teaching situation. As a result, as can be seen from Piaget's article 'Child psychology and the teaching of history', the result is a vicious cycle: 'But if the training of children to think historically', says Piaget,⁸ 'really . . . presupposes a critical or objective spirit, one of intellectual reciprocity and awareness of relationships or levels, *nothing is more suitable to determine the technique of history teaching better than the psychological study of the child's spontaneous intellectual tendencies*, no matter how naive and negligible they may seem at first glance.' But in the very same chapter an investigation of these spontaneous intellectual tendencies in children brings the author to the conclusion that what children's thinking really requires, is the same thing that makes up the basic goal of history teaching, i.e. a critical and objective approach, an understanding of the interdependencies and an awareness of relationships and stability. The result of all this is that, on the one hand, the development of spontaneous concepts can explain nothing about the question of acquisition of academic knowledge, and on the other, there is nothing more important from the point of view of teaching methods than the study of spontaneous tendencies in children. This practical contradiction is also resolved by Piaget's theory with the aid of the principle of antagonism which exists between teaching/learning [*obuchenie*] and development. It is obvious that a knowledge of spontaneous tendencies is important because they are the factors which are to be replaced during the process of education. Knowledge about them is as necessary as the need to know one's enemy. The continual conflict between mature thinking, which underpins school teaching, and the thinking of children needs to be illuminated to enable teaching methods to learn valuable lessons from it.

The task of this study is partly to form a working hypothesis and partly to test it with the help of experimental evidence. It consists, first of all, of overcoming the three fundamental misconceptions of what is one of the most outstanding contemporary theories, discussed above.

To counter the first of these erroneous ideas, we can offer a suggestion with the opposite meaning, according to which one would expect that the development of non-spontaneous, particularly academic concepts, which we are justified in considering as representing a higher and most pure and significant type of non-spontaneous concept from the theoretical and practical point of view, should be able to reveal all their basic qualities which are characteristic of children's thinking, at any given stage of their development, when subjected to a special investigation. By putting forward

this suggestion, we are basing ourselves on the simple premise previously developed, that academic concepts are not assimilated and learned by the child and are not taken up by memory, but arise and are formed with the help of the most extreme tension in the activity of his own thinking. And, with relentless inevitability, what emerges from this at the same time, is that the development of academic concepts should exhibit the peculiar characteristics of this high level of activity of children's thinking to the fullest extent. The results obtained from experimental studies entirely confirm this suggestion.

Against Piaget's second false idea, we can once again put forward a counter suggestion which has the opposite sense, according to which academic concepts in children, the purest type of non-spontaneous concepts, under investigation reveal not just certain features which are opposite to those which we know from the study of spontaneous concepts, but some which are common to both. The dividing line between these two types of concepts turns out to be highly fluid, passing from one side to the other an infinite number of times in the actual course of development. Right from the start it should be mentioned that the developments of spontaneous and academic concepts turn out as processes which are tightly bound up with one another and which constantly influence one another. On the other hand – this is how we have to develop our suggestions – the development of academic concepts should certainly be based on a certain degree of maturing of spontaneous concepts, which cannot be ignored in the process of formation of academic concepts, if for no other reason that direct experience teaches us that the development of academic concepts is only possible when the child's spontaneous concepts have reached a certain level peculiar to school age. Conversely, we have to suppose that the emergence of higher types of concepts, which academic concepts belong to, cannot remain without influence on the level of the previously formed spontaneous concepts, for the simple reason that both types of concepts are not encapsulated in the child's consciousness, are not separated from one another by an impermeable barrier, do not flow along two isolated channels, but are in the process of continual, unceasing interaction, which has to lead inevitably to a situation where generalizations, which have a higher structure and which are peculiar to academic concepts, should be able to elicit a change in the structure of spontaneous concepts. Whilst making this suggestion, we are basing ourselves on the fact that, whilst we are speaking about the development of spontaneous or academic concepts, what we really have in mind is the development of a single process of concept formation, which is happening under different internal and external conditions, but which remains unified in its nature and is not formed as a result of a struggle, conflict or any antagonism of two mutually exclusive forms of thinking. If we allow ourselves to anticipate the experimental results once again, they, too, entirely confirm this proposal.

Finally, we would counter the third idea by putting forward another assumption, which suggests that, so far as concept formation is concerned, not antagonism but relations of an infinitely more complex nature should exist between the processes of education and development. We should expect in advance that in the course of a

special study, teaching/learning [*obuchenie*] will be revealed as one of the fundamental sources of the development of concepts in children and a powerful force which guides this process. In this proposal, we are basing ourselves on the generally accepted fact that teaching/learning [*obuchenie*] is a decisive factor during school age which determines the entire subsequent fate of the child's mental development, including the development of his concepts, as well as on the consideration that higher types of academic concepts cannot arise in the child's mind in any other way except out of already existing lower, rudimentary types of generalization, and that, under no circumstances, can they be deposited in the child's consciousness from the outside. Again our research confirms this third and last assumption, and thus allows us to put the question about using psychological research data of children's concepts applicable to teaching and training problems in a completely different way from Piaget.

A comparative study between everyday life and academic social scientific concepts and their development during school age, carried out by Zh. I. Shif,⁹ can be interpreted in two different ways. Its first and most immediate task was to test experimentally the concrete part of our working hypothesis as regards the peculiar road which development of academic concepts follows in comparison with everyday ones. The second aim of this research was to find a solution to the general problem of the relationship between schooling and development, which would follow on from this one particular case. We think that within our experimental plan, both goals have been successfully reached.

Two more questions followed on from this which have to be taken into account when the problems discussed above are being put to the test. First of all is the problem of the nature of children's spontaneous concepts, which, hitherto, have been considered to be the sole exclusive subject worthy of a psychological study, and secondly, the general problem of the psychological development during school age which must, of necessity, be included in any particular investigation of children's concepts. Of course, these problems cannot be said to occupy as important a position in the study as the first two. So we are only able to speak about circumstantial evidence which the study has provided us with for the solution of these problems. But we think that these indirect results tend to confirm rather than prompt us to reject the ideas we have developed in our hypothesis in relation to both of these questions.

We consider the greatest significance of this study to be that it presents the problems of concept development during school age in a new light, and that it provides a working hypothesis which successfully explains all the facts which had been discovered in earlier studies and which has been confirmed by the present study by experimentally established new facts. Finally, by managing to work out a method for investigating children's real concepts, particularly academic ones, it has as a result, not only bridged the gap between investigating experimental concepts and the analysis of real everyday concepts in children, but has also revealed, from the practical point of view, a new, extremely important and theoretically fruitful sphere of research, which can almost be said to be of paramount importance for the whole

history of the intellectual development of the school aged child. It has demonstrated how the development of academic concepts can be scientifically investigated.

Finally, we consider the practical significance of this study to be that it has uncovered new possibilities for school paedology in real paedological analysis, i.e. an analysis which is always guided by the principle and point of view of development in the realm of schooling within the system of academic knowledge.¹⁰ At the same time, the study brings with it a number of direct conclusions in the sphere of educational theory related to the teaching of social sciences and illuminating, at the present time only in the roughest, most general and schematic forms, what is happening inside the head of each individual school child during the process of acquiring social scientific knowledge.

Unfortunately, we ourselves are aware of three very serious failings which have remained insurmountable in this, our first attempt to move in a new direction. The first of these is that a child's social scientific concepts have been approached more from a general than a specific point of view. For us, they served more as a prototype of any academic concept in general, rather than a definite and special type of one specific aspect of academic concepts. This is because during the early stages of a new study it was necessary to differentiate between academic concepts and everyday ones, and to demonstrate what characterizes social science [*obshchestvovedenie*] concepts as representing one type of academic concept. But the differences which exist within individual aspects of academic concepts (arithmetical, natural-scientific, social-scientific), could not become the subject of a study before a demarcation line, dividing academic and everyday concepts, had first been drawn.

These circumstances explain why the cycle of concepts which were included in this study of concepts is not representative of any kind of system of basic inherent concepts which make up the logical structure of the subject itself, but rather that it included a number of concepts which were empirically selected on the basis of programmatic material of separate, totally unconnected concepts. This also explains why the study has been more productive from the point of view of general laws of development of academic concepts in comparison with everyday ones, than of specific laws of social scientific concepts as such, and also that the social scientific concepts were being compared with everyday concepts taken from different spheres of social life.

The second insufficiency in our work, yet again obvious from our point of view, is due to the too general, summary, undifferentiated and unstratified examination of the structure of concepts and of the functions which are defined by a given structure. In the same way as the first flaw in our work has resulted in a situation where the most important problem of the internal connections between social science concepts was not properly clarified, so the second failing inevitably leads to the conclusion that the problem related to the system of concepts and the problem of communal relationships, which is fundamental in the life of a school aged child, and the only one which is capable of bridging the gap between investigating experimental concepts and their structure and the study of real concepts with their unity of structure and function,

generalization and thinking process, still remains insufficiently analysed. This simplification, unavoidable in the early stages, which we allowed for in the very organization of our experimental study, and which was dictated by the necessity of formulating the question as narrowly as possible, in its turn resulted in a simplified analysis of the intellectual operation included in the experiment, which would not have been acceptable under different circumstances. So, for example, in the problems which we did include, the various aspects of cause and effect dependencies, such as the empirical psychological or the logical 'because', were not stratified, as Piaget had done, whose strikingly superior approach from this point of view cannot be denied; and this fact in itself resulted in the effacement of the age boundaries within the summarily taken school age. But we were consciously forced to lose out on the fine points, and in the stratification of psychological analysis, in order to have some chance of achieving gains in the realm of precision and certainty in the answer to the basic question about the peculiar nature of development of academic concepts.

Finally, we think that the third shortcoming of this study is the insufficient experimental elaboration of the two questions discussed above, which arose incidentally during the course of the investigation – about the nature of everyday concepts and about the structure of psychological development in school aged children. The question of the connection between structural thinking in children, as it has been described by Piaget, and the fundamental features which characterize the very nature of everyday concepts (the absence of systemization and arbitrariness) and of the development of conscious realization and arbitrariness from the system of concepts which is being created, the fundamental question of the whole intellectual development of a school aged child – not only have both of these questions remained experimentally unresolved, but they have not even been formulated as problems in need of experimental solution. The reason for this is that both of these questions would have required a special study to be set up in order to achieve any kind of meaningful treatment. But this inevitably resulted in the criticism of Piaget's basic theories, developed in this paper, turning out to be insufficiently supported by experimental logic and therefore insufficiently shattering.

The reason why we have decided to place such emphasis on, from our own point of view, such obvious flaws in our conclusion is that this allows us to outline all the basic perspectives which open up at the point where our study is complete, and at the same time they allow us to establish the only possible right attitude to this work as the first, albeit extremely tentative, step forward in the new and infinitely fruitful realm, from the theoretical and practical points of view, of the psychology of thinking in childhood.

It only remains for us to say that during the course of this study, from the very beginning to the end, our working hypothesis and experimental investigation took on a different form than that which has been presented in this paper. During the living process of experimental work, things never appear the same as in a finished literary creation. In the interest of systematic narrative, we have had to include in the beginning things which only emerged later during the course of the study, or to

present in the end things which had arisen during the early stages or at the very beginning of the study. According to Lewin's statement, hypothesis and experiment, those two poles of the same dynamic force, formed, developed and grew whilst mutually cross-pollinating and promoting one another.

And so we see the most convincing proof of the probability and fruitfulness of our hypothesis, in the fact that the combined action of the experimental study and the theoretical hypothesis have produced results which are not only concordant but entirely identical. They have demonstrated that which constitutes the nucleus, fundamental axis and principal idea of all our work, namely that at the moment when a new word is acquired, the process of development of the corresponding concept does not end, but is only beginning. At the moment of the initial acquisition, the new word is not at the end, but at the start of its development. At that stage it is always an undeveloped word. The gradual internal development of its meaning also results in the maturing of the word itself. Tolstoy says that 'the word is almost always ready when the concept is ready',¹¹ whereas it was previously generally assumed that the concept is almost always ready when the word is ready.

Notes

This text, dated February, 1934, was the introductory article that Vygotsky wrote for the publication of Zh. I. Shif 1935: *Razvitie nauchnykh ponjatij u shkol'nika*. Moscow-Leningrad: Gosudarstvennoe Uchebno-Pedagogicheskoe Izdatel'stvo (pp. 3-17). Shif's book had a subtitle: *Issledovanie k voprosu umstvennogo razvitija shkol'nika pri obuchenii obschestvovedeniju* [Investigation of the question of mental development of the schoolchild at teaching/learning of social science curriculum].

- 1 The Russian term *nauchnoe ponjatie* is here rendered as 'academic concept' (i.e. concepts that emerge in children's use in conjunction with school education, in the context of academic curricular disciplines – in opposition to everyday concepts). An alternative (more widespread and literal) translation is 'scientific concept'.
- 2 In the Russian original: *prozessy sobstvenno obuchenija*, i.e. 'teaching/learning processes *per se*' (in contrast with acquisition of knowledge – *usvoenie znanija*).
- 3 This and the following quotes are taken from Leo Tolstoy's article 'The Yasnaya Polyana school in the months of November and December', which appeared in the January, March and April numbers of *Yasnaya Polyana* magazine in 1862. Yasnaya Polyana was the name of Tolstoy's estate where he started his experimental school for peasant children. See for the present text p. 123 of Pinch, A. and Armstrong, M. (eds) 1982: *Tolstoy on Education: Tolstoy's educational writings 1861-62*. London: The Athlone Press.
- 4 See p. 123 of Pinch and Armstrong (1982).
- 5 *Ibid.*, p. 125.
- 6 In the Russian original: *nauchnoe myslenie*.
- 7 See Piaget, J. 1923: *Le langage et la pensée chez l'enfant*. Neuchatel: Delachaux et Niestlé. Translated into English as (1926) *The Language and Thought of the Child*. London: Kegan Paul.

- 8 A reference to p. 13 of Piaget, J. 1933: *Psychologie de l'enfant et l'enseignement de l'histoire. Bulletin trimestriel de la Conférence Internationale pour l'enseignement de l'histoire*, 2, 8-13. That text was used by Shif and Vygotsky in its Russian translation by E. Zeiliger (see Shif, 1935, p. 79).
- 9 The reference here is to the study for which the present text served as an introduction.
- 10 Here Vygotsky refers to his redefinition of paedology ('child study' as it is better known in the English scientific literature). For him, paedology was supposed to be the general science of human development (as signified by his use of 'real paedological analysis' here), with branches of different kind in areas of application (hence his use of 'school paedology' here). For further knowledge of the issue, see our *Understanding Vygotsky* ch. 12.
- 11 See p. 123 of Pinch and Armstrong (1982).