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The problem of the cultural development of the child

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The problem

In the process of development the child not only masters the items of cultural experience but the habits and forms of cultural behaviour, the cultural methods of reasoning. We must, therefore, distinguish the main lines in the development of the child's behaviour. First, there is the line of natural development of behaviour which is closely bound up with the processes of general organic growth and the maturation of the child. Second, there is the line of cultural improvement of the psychological functions, the working out of new methods of reasoning, the mastering of the cultural methods of behaviour.

Thus, of two children of different ages the elder can remember better and more than the younger. This is true for two entirely different reasons. The processes of memorizing of the older child have undergone, during his additional period of growth, a certain evolution – they have attained a higher level – but only by means of psychological analysis may we reveal whether that evolution proceeded on the first or on the second line.

Maybe the child remembers better because his nervous and mental constitutions which underlie the processes of memory were developed and perfected, because the organic base of these processes was developed; in short, because of the mneme or mnemic functions of the child. However, the development might follow quite a different path. The organic base of memory, mneme, might remain substantially unaltered during the period of growth, but the methods of memorizing might have changed. The child might have learned how to use his memory in a more efficient way. He could have mastered the mnemotechnical methods of memorizing; in particular, he may have developed the method of memorizing by means of signs.

In fact both lines of development can always be revealed, for the older child not only remembers more facts than the younger one, but he remembers them in a different way. In the process of development we can trace that qualitative change in the form of behaviour and the transformation of some such forms into others. The

child who remembers by means of a geographical map or by means of a plan, a scheme or a summary, may serve as an example of such cultural development of memory.

We have many reasons to assume that the cultural development consists in mastering methods of behaviour which are based on the use of signs as a means of accomplishing any particular psychological operation. This is not only proved by the study of the psychological development of primitive man, but also by the direct and immediate observation of children.

In order to understand the problem of the cultural development of the child, it is very important to apply the conception of children's primitiveness which has recently been advanced. The primitive child is a child who has not undergone a cultural development, or one who has attained a relatively low level of that development. If we regard children's primitiveness in an isolated state as a special kind of underdevelopment, we shall thereby contribute to the proper understanding of the cultural development of behaviour. Children's primitiveness, i.e. their delay in cultural development, is primarily due to the fact that for some external or internal cause they have not mastered the cultural means of behaviour, especially language.

However, the primitive child is a healthy child. Under certain conditions the primitive child undergoes a normal cultural development, reaching the intellectual level of a cultural man. This distinguishes primitiveness from weakmindedness. True, child's primitiveness may be combined with all the levels of natural capacities. Primitiveness, as a delay of cultural development, nearly always retards the development of a defective child. It is often combined with mental retardation.

But even in this mixed form, primitiveness and weakmindedness remain two phenomena essentially different in kind, the origins of which are totally different. One is the retardation of the organic or natural development which originates in defects of the brain. The other is a retardation in the cultural development of behaviour caused by insufficient mastery of the methods of cultural reasoning.

Take the following instance. A girl of nine years, quite normal, is primitive. She is asked, 'in a certain school some children can write well and some can draw well. Do all children in this school write and draw well?' She answers, 'How do I know; what I *have not seen with my own eyes*, I am unable to explain. If I had seen it with my eyes . . .'.

Another example: a primitive boy is asked, 'What is the difference between a tree and a log?' He answers, 'I have not seen a tree, nor do I know of any tree, upon my word'. Yet there is a lime tree growing just opposite his window. When you ask him, 'And what is this?' he will answer, 'This is a lime tree'.

The retardation in the development of logical reasoning and in the formation of concepts is due here entirely to the fact that children have not sufficiently mastered the language, the principal weapon of logical reasoning and the formation of concepts. Petrova [1925, p. 85], the author of the work containing the above examples, states: 'Our numerous observations prove that the replacing of one *imperfect* language by another equally imperfect always prejudices psychic development. This substitution of *one form* of reasoning *by another lowers especially the psychic activity wherever the*

latter is in any case weak'.[1] In our first example, the girl has changed her imperfect Tartar language for the Russian, and has not fully mastered the use of words as means of reasoning. She displays her total inability to think in words, although she speaks, i.e. can use the words as means of communication. She does not understand how one can draw conclusions from words instead of relying on one's own eyes. The primitive boy has not as yet worked out a general abstract concept of 'tree', although he knows individual kinds of trees. That reminds us that in the language of many primitive races there is no such word as 'tree'; they have only separate words for each kind of tree.

The analysis

Usually the two lines of psychological development (the natural and the cultural) merge into each other in such a way that it is difficult to distinguish them and follow the course of each of them separately. In case of sudden retardation of any one of these two lines, they become more or less obviously disconnected as, for example, in the case of different primitiveness.

The same cases show that cultural development does not create anything over and above that which potentially exists in the natural development in the child's behaviour. Culture, generally speaking, does not produce anything new apart from that which is given by nature. But it transforms nature to suit the ends of man. This same transformation occurs in the cultural development of behaviour. It also consists of inner changes in that which was given by nature in the course of the natural development of behaviour.

As has already been shown by Höffding, the higher forms of behaviour have no more means and data at their disposal than those which were shown by the lower forms of that same activity. In the words of the author:

> The fact that the association of ideas, when we reason, becomes the object of special interest and conscious choice, does not, however, alter the laws of associations of ideas. The thought, properly speaking, can no more dispense with these laws than an artificial machine with the laws of physics. However, psychological laws as well as physical ones can be utilized in such a way as to serve our ends.[2]

When we purposely interfere with the course of the processes of behaviour, we can do so only in conformance with the same laws which govern these processes in their natural course, just as we can transform outward nature and make it serve our ends only in conformance with the laws of nature. Bacon's principle, 'Natura parendo vincitur', is equally applicable both to the mastering of behaviour and to the mastering of the forces of nature.[3]

This indicates the true relation between the cultural and primitive forms of behaviour. Every cultural method of behaviour, even the most complicated, can

always be completely analysed into its component nervous and psychic processes, just as every machine, in the last resort, can be reduced to a definite system of natural forces and processes. Therefore, the first task of scientific investigation, when it deals with some cultural method of behaviour, must be the analysis of that method, i.e. its decomposition into component parts, which are natural psychological processes.

This analysis, if carried out consistently and to completion, will always give us the same result. This proves precisely that there can be no complicated or high method of cultural reasoning which did not in the last resort consist of some primary elementary psychological processes of behaviour. The methods and insignificance of such analysis can best be explained by means of some concrete examples.

In our experimental investigations we place the child in such a situation that he is faced by the problem of remembering a definite number of figures, words or some other data. If that task is not above the natural abilities of the child, he will master it by the natural or primitive method. He remembers by creating associative or conditional reflexive connections between the stimuli and reactions.

However, we rarely obtain such a situation in our experiments. The task set the child is usually above his natural capacities. It cannot be solved in such a primitive and natural method. We put before the child some object, quite irrelevant to the task set, such as paper, pins, string, small shot, etc. We thus obtain a situation very similar to the one which Köhler created for his apes. The problem occurs in the process of the natural activity of the child, but its solution requires some detour or the application of some means. If the child finds such a solution, he takes recourse to signs, the tying of knots on the string, the counting of small shots, the piercing or tearing of paper, etc.

Such memorization based on the use of signs is regarded by us as a typical instance of all cultural methods of behaviour. The child solves an inner problem by means of exterior objects. This is the most typical peculiarity of cultural behaviour. It also distinguishes the situation created in our experiments from the Köhler situation which that author, and afterwards other investigators, tried to apply to children. There the problems and their solutions were entirely in the plane of external activity, as opposed to ours which are in the plane of internal activity. There an irrelevant object obtained the 'functional importance'[4] of a weapon, here it acquires the functional importance of a sign.

Mankind moved along the latter path of development of memory based on signs. Such an essentially mnemotechnical operation is the specifically human feature of behaviour. It is impossible among animals.

Let us now compare the natural and cultural mnemonics of a child. The relation between the two forms can be graphically expressed by means of the schematic triangle in figure 5.1: in case of natural memorization a direct associative or conditional reflexive connection is set up between two points, *A* and *B*. In case of mnemotechnical memorization, utilizing some sign, instead of one associative connection *AB*, the others are set up *AX* and *BX*, which bring us to the same result, but

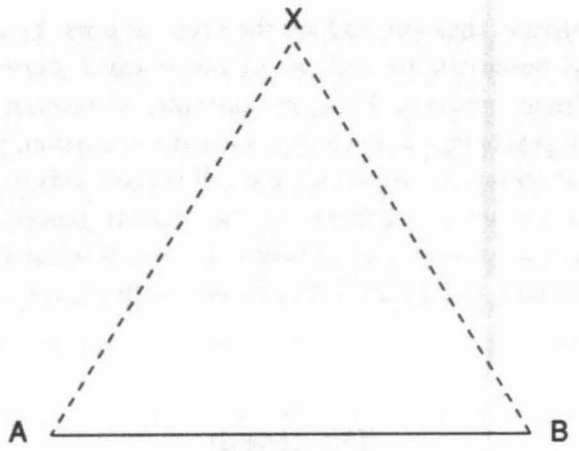

Figure 5.1

in a roundabout way. Each of these connections *AX* and *BX* is the same kind of conditional–reflexive process of connection as *AB*.

The mnemotechnical memorizing can thus be divided without remainder into the same conditional reflexes as natural memorizing. The only new features are the substitution of two connections for one, the construction or combination of nervous connections, and the direction given to the process of connection by means of a sign. Thus new features consist not in the elements but in the structure of the cultural methods of mnemonics.

The structure

The second task of scientific investigation is to elucidate *the structure* of that method. Although each method of cultural behaviour consists, as it is shown by the analysis, of natural psychological processes, yet that method unites them not in a mechanical, but in a structural way. In other words, all processes forming part of that method form a complicated functional and structural unity. This unity is effected, first, by the task which must be solved by the given method, and secondly, by the means by which that method can be followed.

The same problem, if solved by different means, will have a different structure. If a child in the above mentioned situation turns to the aid of external memorizing means, the whole structure of his processes will be determined by the character of the means which he has selected. Memorizing on different systems of signs will be different in its structure. A sign or an auxiliary means of a cultural method thus forms a structural and functional centre, which determines the whole composition of the operation and the relative importance of each separate process.

The inclusion in any process of a sign remodels the whole structure of psychological operations, just as the inclusion of a tool remodels the whole structure of a labour

operation. The structures thus formed have their specific laws. You find in them that some psychological operations are replaced by others which cause the same results, but by quite different methods. Thus, for example, in memorizing mnemotechnically, the various psychological functions, such as comparison, the renewal of old connections, logical operations, reasoning, etc., all become aids to memorizing. It is precisely the structure which combines all the separate processes, which are the component parts of the cultural habit of behaviour, which transforms this habit into a psychological function, and which fulfills its task with respect to the behaviour as a whole.

The genesis

However, that structure does not remain unchanged. That is the most important point of all we know concerning the cultural development of the child. This structure is not an outward, ready-made creation. It originates in conformance with definite laws at a certain stage of the natural development of the child. It cannot be forced on the child from outside, it always originates inwardly, although it is modelled by the deciding influence of external problems with which the child is faced and the external signs with which it operates. After the structure comes into being, it does not remain unchanged, but is subject to a lengthy internal change which shows all the signs of development.

A new method of behaviour does not simply remain fixed as a certain external habit. It has its internal history. It is included in the general process of the development of a child's behaviour, and we therefore have a right to talk of a genetic relation between certain structures of cultural reasoning and behaviour, and of the development of the methods of behaviour. This development is certainly of a special kind, is radically different from the organic development and has its own definite laws. It is extremely difficult to grasp and express precisely the peculiarity of that type of development. In basing our position on critical explanations and on a series of schemes suggested by experimental investigations, we shall try to take certain steps toward the correct understanding of this development.

Binet, who in his investigations was faced by these two types of development, tried to solve the problem in the simplest fashion. He investigated the memory of eminent calculators, and in this connection had occasion to compare the memory of a man endowed with a truly remarkable memory with the memory of a man endowed with an average memory; the latter, however, was not inferior to the former in memorizing a huge number of figures. Mneme and mnemotechnics were thus for the first time contrasted in experimental investigation, and for the first time an attempt was made to find an objective difference between these two essentially different forms of memory.[5]

Binet [1894, pp. 155–86] applied to his investigation and the phenomenon under investigation the term 'simulation of memory'. He believes that most psychological operations can be simulated, i.e. replaced by others resembling them only in

external appearance, but differing from them in their essence. Thus mnemotechnics, according to Binet, is a simulation of eminent memory, which he calls artificial memory as distinguished from natural memory. The mnemotechnician who was investigated by Binet memorized by means of a simple method. He substituted word memory for figure memory. Every figure was replaced by the corresponding letter, the letters joined on in words, and the latter in phrases. Instead of a disconnected series of figures, he only had to remember and reproduce a sort of short story of his own invention. This example clearly shows us to what extent mnemonical memorizing leads to the substitution of certain psychological operations for others.

It is precisely this fundamental fact which was obvious to the investigators. It caused them to refer to this particular case as a simulation of natural development. This definition can hardly be called a successful one. It points out correctly that even though the two operations were similar (both calculators memorized and reproduced an equal number of figures with equal precision), yet in its essence one of the operations simulated the other.

If this definition was calculated to express *only* the peculiarity of the second type of memory development, we could not object to it. But it is misleading in that it conveys the idea that we have to deal here with simulation in the sense of false appearance, or deceit. This is the practical standpoint suggested by the specific conditions of investigations of individuals who appear on the stage with various tricks, and who are, therefore, apt to deceive. This is rather the standpoint of the investigating magistrate than the psychologist.

After all, as is admitted by Binet [1894, p. 164], such a simulation is not simply deceit. Every one of us possesses some kind of power of mnemotechnics, and mnemotechnics itself, in the opinion of that very author, should be studied in schools, the same as mental counting. Surely the author did not mean to say that the art of simulation should be taught in schools.

The definition of that type of cultural development as a 'fictitious development', i.e. one leading only to fictitious organic development, appears to us equally unsatisfactory. Here again the negative aspect of that case is correctly expressed; namely, that with a cultural development, the raising of the function to a higher level or the raising of its activity is based not on the organic, but on the functional development, i.e. on the development of the method itself. However, this term also conceals the undoubted truth that in this case we have not a *fictitious*, but a *real* development of a special type, which possesses its own definite laws.

We should like to emphasize from the outset that this development is subject to the influence of the same two main factors which take part in the organic development of the child, namely the biological and the social. The law of convergence of the internal and external factors, as it was called by Stern, is entirely applicable to the cultural development of the child.[6] In this case as well, only at a certain level of the internal development of the organism does it become possible to master any of the cultural methods. Also an organism internally prepared absolutely requires the determining influence of the environment in order to enable it to accomplish that

development. Thus, at a certain stage of its organic development the child masters speech. At another stage he masters the decimal system.

However, the relation of the two factors in the development of this kind is materially changed. The active part is here played by the organism which masters the means of cultural behaviour supplied by the environment. But the organic maturation plays the part of a *condition* rather than a motive power of the process of cultural development, since the structure of that process is defined by outward influences. All means of social behaviour are in their essence social. A child mastering Russian or English and a child mastering the language of some primitive tribe, masters, in connection with the environment in which he is developed, two totally different systems of thinking.

If the doctrine that in certain spheres the behaviour of the individual is a function of the behaviour of the social whole to which he belongs is valid at all, it is precisely to the sphere of the cultural development of the child that it must be applied. This development is conditioned by outward influences. It can be defined as outer rather than as inner growth. It is the function of the social–cultural experience of the child. At the same time it is not a simple accumulation of experience as was stated above. It contains a series of inner changes which fully correspond to the process of development in the proper sense of that word.

The third and last problem of investigation of the child's cultural development is the education of the *psychogenesis* of cultural forms of behaviour. We shall give here a short sketch of the scheme of this process of development, as it transpired in our experimental investigations. We shall try to show that the cultural development of the child passes – if we may trust the artificial surroundings of the experiment – through four main stages or phases which follow consecutively one after another.

Taken as a whole, these stages form a complete cycle of cultural development of any one psychological function. The data obtained by means other than experiments fully coincide with the scheme set by us, fully agree with it, and thus acquire a definite significance and hypothetical explanation. Let us follow briefly the description of the four stages of the child's cultural development according to their consecutive changes in the process of the simple experiment described above.

The first stage could be described as the stage of primitive behaviour or primitive psychology. The experiment reveals this in that the younger child tries to remember the data supplied to him by a primitive or natural means in accordance with the degree to which he is interested in them. The amount remembered is determined by the degree of his attention, by the amount of his individual memory and by the measure of his interest in the matter.

Usually only the difficulties which the child meets on this path bring him to the second stage. In our experiments it usually took place in the following way. Either the child himself, after more or less protracted search and trials, discovers some mnemotechnical method, or we lend him our assistance in case he is unable to master the task with the resources of his natural memory. For example, we place pictures in

front of the child and choose words to be memorized in such a way that they should be in some way naturally connected with those pictures. When the child who has heard the words looks at the picture, he easily reproduces a whole series of words, since such pictures, irrespective of the child's consciousness, will remind him of the words which he has just heard.

The child usually grasps very quickly the method which we suggest to him, but does not usually know by what means the pictures help him to remember the words. He usually reacts in the following manner: when a new series of words is given to him, he will again – but now on his own initiative – place the pictures in front of him, and look at them every time a word is given to him. But since this time there is no direct connection between words and pictures, and the child does not know how to use the pictures as a means of memorizing a given word, he looks at the picture and reproduces not the word he was given, but another suggested by the picture.

This stage is conventionally called the stage of 'naive psychology', by analogy with what the German investigators (Köhler, Lipmann) call the 'naive physics' in the behaviour of apes and children when using tools. The use of the simplest tools by children presupposes a certain naive physical experience of the simplest physical properties of one's own body and those of objects and tools with which the child is familiar. Very often that experience proves insufficient and then the 'naive physics' of an ape or a child avails him nothing.[7]

We note something similar in our experiment when the child grasped the external connection between the use of pictures and the memorizing of words. However, the 'naive psychology', i.e. the naive experience gathered by him concerning his own processes of memorizing proved to be insignificant, so that the child could not use the picture adequately as a sign or a means of memorizing. Contrary to the magical thinking of a primitive man when the connection between ideas is mistaken for the connection between things, in this case the child takes the connection between things for the connection between ideas. In the former case the magical reasoning is due to insufficient knowledge of the laws of nature: in the latter, to insufficient knowledge of its own psychology.

This second stage is usually transitory in its importance. In the course of the experiment the child usually passes on very quickly to the third stage of the external cultural method. After a few attempts the child usually discovers, if his psychological experience is rich enough, how the trick works, and learns how to make proper use of the picture. Now he replaces the processes of memorizing by a rather complicated external activity. When he is given a word, he chooses out of a number of pictures in front of him the one which is most closely associated with the word given. At first he tries to use the natural association which exists between the picture and word, but soon afterwards passes on to the creation and formation of new associations.

However, in the experiment even this third stage lasts a comparatively short time and is replaced by the fourth stage, which originates in the third. The external activity of the child remembering by means of a sign passes on into internal activity. The external means, so to speak, becomes ingrown or internal.

The simplest way to observe this is the study of a situation in which a child must remember given words by using pictures placed in definite order. After a few times the child usually learns the pictures themselves. He has no further need to recur to them. He already associates words given with the titles of pictures, the order of which he already knows. Such 'complete ingrowing' is based on the fact that inner stimuli are substituted for the external ones. The mnemotechnical map which lies before the child becomes his internal scheme.

Along with this method of ingrowing we observe a few more types of transition from the third into the fourth stage; of these we shall mention only the two principal ones. The first may be termed 'seam-like ingrowing'. The seam connecting two parts of organic texture very rapidly leads to the formation of the connecting texture, so that the seam itself becomes unnecessary. We observe a similar process in the exclusion of the sign by means of which some psychological operation was at first carried out.

We can best observe it in a child's complicated reactions of choice when every one of the stimuli offered to him is associated with the corresponding movement by means of an auxiliary sign, e.g. the above mentioned picture. After a series of repetitions the sign becomes no longer necessary. The stimulus is the immediate cause for the corresponding action.

Our investigation in that sphere has entirely confirmed the fact already established by Lehmann,[8] namely that in a complicated reaction of choice, certain names or other associative intermediaries are interposed at first between the stimulus and the reaction – associations which serve as a connecting link between the two. After exercise, these intermediate links fall out and the reaction passes immediately into a simple sensory or motor form. The period of reaction, according to Lehmann, decreases correspondingly from 300σ to 240σ and 140σ. Let us add that the same phenomenon, but in a less obvious form, was observed by investigators in the process of simple reaction which, as shown by Wundt, may dwindle away to a simple reflex under the influence of exercise.[9]

Finally, the third type of transition from the third stage to the fourth, the 'growing in' of the external method into the internal, is the following: the child, after mastering the structure of some external method, constructs the internal processes according to the same type. He starts at once to use the inner schemes, tries to use his remembrances as signs, the knowledge he formerly acquired, etc. In this connection the investigator is struck by the fact that a problem once solved leads to a correct solution in all analogous situations even when external conditions have changed radically. We are naturally reminded here of the similar transpositions which were observed by Köhler [1921] in the ape which once solved correctly the task set for it.

The four stages which we have described are only a first hypothetical scheme of the path along which the cultural development evolves. However, we wish to point out that the path indicated by that scheme coincides with certain data which are already at hand in the literature on the psychology of this question. We shall quote three instances which reveal coincidences with the main outline of our scheme.

The first example has to do with the development of a child's arithmetical ability. The first stage is formed by the natural arithmetical endowment of the child, i.e. his operation of quantities before he knows how to count. We include here the immediate conception of quantity, the comparison of greater and smaller groups, the recognition of some quantitative group, the distribution into single objects where it is necessary to divide, etc.

The next stage of the 'naive psychology' is observed in all children and is illustrated in a case where the child, knowing the external methods of counting, imitates adults and repeats 'one, two, three' when he wants to count, but does not know for what purpose or exactly how to count by means of figures. This stage of arithmetical development was reached by the girl described by Stern. He asked how many fingers he had and she answered that she could only count her own fingers.[10] The third stage is when counting is made by the aid of fingers, and the fourth stage when counting is effected in the mind and the fingers are dispensed with. Counting in the mind is an illustration of 'complete ingrowing'.

It is equally easy to locate in this scheme the development of memory at a given age for any child. The three types indicated by Meumann [1912], the mechanical, the mnemotechnical and the logical (pre-school age, school age and mature age), obviously coincide with the first, third and fourth stages of our scheme. Meumann [1911, pp. 394–473] himself attempts elsewhere to prove that these three types represent a genetic series in which one type passes into another. From that standpoint the logical memory of an adult is precisely the 'ingrown' mnemotechnical memory.[11]

If these hypotheses are in any way justified, we should obtain another proof of how important it is to use the historical standpoint in studying the highest functions of behaviour. In any case there is one very weighty bit of evidence which speaks in favour of this hypothesis. It is first of all the fact that verbal memory, which precedes the logical memory, i.e. the memorizing in words, is a mnemotechnical memory.

We are reminded that Compayré has formerly defined language as a mnemotechnical tool.[12] Meumann was right in showing that words have a two-fold function in regard to memory. They can either appear by themselves as memorizing material or as signs by the aid of which we memorize.[13] We should also remember that Bühler has established by experimentation that memorizing of meaning is independent of the memorizing of words and of the important part played by internal speech in the process of logical memorizing, so that the genetic kinship between the mnemotechnical and logical memory should clearly appear owing to their connecting link, verbal memory.[14] The second stage, which is absent in the scheme of Meumann, probably passes very quickly in the development of memory and therefore escapes observation.

Finally, we must point out that such a central problem in the history of the child's cultural development as the development of speech and reasoning is in accord with our scheme. This scheme, we believe, allows us to discover a correct solution of this most complicated and puzzling problem.

As we know, some authors consider speech and reasoning as entirely different processes, one of which serves as the expression and the outer clothing of the other. Others, on the contrary, identify reasoning and speech, and follow Müller in defining thought as speech minus the sound. What does the history of the child's cultural development teach us in that connection? It shows first of all that genetically reasoning and speech have entirely different roots. This by itself must serve as a warning against the hurried identification of those concepts which differ genetically. As is established by investigation, the development of speech and reasoning both in ontogenesis and phylogenesis goes up to a certain point by independent paths. The pre-intellectual roots of speech, such as the speech of birds and animals, were known long ago. Köhler [1921] was successful in establishing the pre-speech roots of intellect. Also the pre-intellectual roots of speech in the ontogenesis, such as the squeak and lisping of a child, were known long ago and were thoroughly investigated. Köhler, Bühler and others were successful in establishing the pre-speech roots of intellect in the development of the child. Bühler proposed to call this age of the first manifestations of intellectual reactions in a child preceding the formation of speech the chimpanzee age.[15] The most remarkable feature in the intellectual behaviour both of apes and of the human child of that age is the independence of intellect from speech. It is just that characteristic which led Bühler [1929, pp. 15–20] to the conclusion that the intellectual behaviour in the form of 'instrumental thinking'[16] preceded the formation of speech.

At a certain moment the two lines of development cross each other. This moment in the child's development was regarded by Stern as the greatest discovery in the life of a child. It is the child himself who discovers the 'instrumental function' of a word. He discovers that 'each thing has its name'.[17] This crisis in the development of a child is demonstrated when the child starts to widen his vocabulary *actively*, asking about everything 'What is it called?' Bühler, and later on, Koffka, pointed out that there is a complete psychological similarity between this discovery of the child and the inventions of apes. The child's discovery of the functional importance of a word as a sign is similar to the discovery of the functional importance of a stick as a tool. Koffka stated: 'the word enters the structure of the thing just as a stick does for the chimpanzee in the situation which consists in the desire to acquire fruits'.[18]

The most important stage in the development of reasoning and speech is the transition from external to internal speech. How and when does this important process in the development of internal speech take place? We believe that the answer to this question can be given on the strength of the investigations carried out by Piaget on the egocentrism of children's speech.[19] Piaget showed that speech becomes internal psychologically prior to its becoming internal physiologically. The egocentric speech of a child is internal speech according to its psychological function (it is speaking to oneself) and external in form. This is the transition from external to internal speech, and for this reason it has great importance in genetic investigations. The coefficient of egocentric speech falls sharply at the threshold of school age (from

0.50 to 0.25). This shows it is precisely at that period that the transition to internal speech takes place.

It is easy to observe that the three main stages in the development of reasoning and speech which we quoted above fully correspond to the three main stages of cultural development as they appear consecutively in the course of experiment. Pre-speech reasoning corresponds in this scheme to the first stage of the natural or primitive behaviour. 'The greatest discovery in the life of a child',[20] as shown by Bühler and Koffka, is entirely analogous to the invention of tools, and consequently corresponds to the third stage of our scheme. Finally, the transition of external speech into internal speech, the egocentrism of a child's speech, forms the connecting link between the third and fourth stage, which means the transformation of the external activity into an internal one.

The method

The peculiarities of the child's cultural development demand the application of the corresponding method of investigation. This method could be conventionally called 'instrumental' as it is based on the discovery of the 'instrumental function' of cultural signs in behaviour and its development.

In the plan of experimental investigation this method is based on the 'functional method of double stimulation', the essence of which may be reduced to the organization of the child's behaviour by the aid of two series of stimuli, each of which has a distinct 'functional importance' in behaviour. At the same time the *conditio sine qua non* of the solution of the task set the child is the 'instrumental use' of one series of stimuli, i.e. its utilization as an auxiliary means for carrying out any given psychological operation.

We have reasons to assume that the invention and use of these signs, as an auxiliary means for the solution of any task set the child, present *from a psychological standpoint* an analogy with the invention and use of tools. Within the general inter-relation, stimulus *vs.* reaction, which is the basis of the usual methods of a psychological experiment, we must distinguish, in conformance with the ideas which we here stated, a *two-fold function* of the stimulus in regard to behaviour.

The stimulus in one case may play the part of object in regard to the act of solving any particular problem given to the child (to remember, compare, choose, estimate, weigh a certain thing). In another case it can play the part of a means, by the aid of which we direct and realize the psychological operations necessary to the solution of the problem (memorizing, comparison, choice, etc.). In both those cases the functional relation between the act of behaviour and the stimuli is essentially different. In both cases the stimulus determines, conditions and organizes our behaviour in quite different and specific ways. The peculiarity of the psychological situation created in our experiments consists in the simultaneous presence of the stimuli of both kinds, each playing a different part both quantitatively and functionally.

Expressing the idea in the most general form, the main promise lying at the root of this method is as follows: the child, in mastering himself (his behaviour), goes on the whole in the same way as he does in mastering external nature, e.g. by technical means. The man masters himself externally, as one of the forces of nature by means of a special cultural 'technic of signs'. Bacon's principle of the hand and the intellect could serve as a motto for all similar investigations: 'Nec manus nuda, nec intellectus sibi permissus multum valet: instrumentis et auxiliis res perficitur'.[21]

This method in its very essence is a historical–genetic method. It carries into investigation a historical point of view: 'behaviour can only be understood as the history of behaviour' (Blonsky). This idea is the cardinal principle of the whole method.

The application of this method becomes possible, (a) in the *analysis* of the composition of the cultural method of behaviour, (b) in the *structure* of this method as a whole and as a functional unity of all the component processes, and (c) in the psychogenesis of the cultural behaviour of the child. This method is not only a key to the understanding of the higher forms of a child's behaviour which originate in the process of cultural development, but also a means to the practical mastering of them in the matter of education and school instruction.

This method is based on natural science methods of studying behaviour, in particular on the method of conditional reflexes. Its peculiarity consists in the study of complex functional structures of behaviour and their specific laws. The objectiveness makes it akin to the natural science methods of studying behaviour. This method of investigation is connected with the use of objective means in psychological experimentation.

When we investigate the highest functions of behaviour which are composed of complicated internal processes, we find that this method tends in the course of the experiment to call into being the very process of formation of the highest forms of behaviour, instead of investigating the function already formed in its developed stage. In this connection, the most favourable stage for investigation is the third one, that is the external cultural method of behaviour.

When we connect the complicated internal activity with the external one, making the child choose and spread cards for the purpose of memorizing, and move about and distribute pieces, etc. for the purpose of creating concepts, we thereby create an objective series of reactions, functionally connected with the internal activity and serving as a starting point for objective investigation. In so doing we are acting in the same way as, for instance, one who wanted to investigate the path which the fish follows in the depths, from the point where it sinks into water until it comes up again to the surface. We envelop the fish with a string loop and try to reconstruct the curve of its path by watching the movement of that end of the string which we hold in our hands. In our experiments we shall at all times also hold the outer thread of the internal process in our hands.

As an example of this method we may cite the experimental investigations carried out by the author, or on his initiative, concerning memory, counting, the formation

of concepts and other higher functions in children's behaviour. These investigations we hope to publish in a separate study.[22] Here we only wanted to describe in a most concise and sketchy form the problem of the child's cultural development.

Notes

First published as Vygotski, L. S. 1929: The problem of the cultural development of the child II. *Journal of Genetic Psychology*, 36, 415–32. In a footnote it was said that A. R. Luria of the Editorial Board had received the paper for publication on 20 July 1928. The paper was essentially a translation of a paper that Vygotsky published somewhat earlier in *Pedologija* [*Pedology*], a journal which he co-founded. See Vygotsky, L. S. 1928: Problema kul'turnogo razvitija rebenka. *Pedologija*, 1, 58–77. The article formed the second in a series of three published in the *Journal of Genetic Psychology* on the problem of the cultural development of the child (see note 1 in the preceding chapter). The research on which it was based was carried out by Vygotsky, Luria, Leont'ev and their students at the Psychological Laboratories of the N. K. Krupskaja Academy of Communist Education in Moscow.

1 See Petrova, A. 1925: Deti-primitivy. Psikhologicheskij analiz [Child-primitives. A psychological analysis]. In M. Gurevich (ed.), *Voprosy pedologii i detskoj psikhonevrologii* [*Questions of Pedology and Psychoneurology*] (pp. 60–92). Moscow: Zhizn'i Znanie.

2 See Höffding, H. 1907: *Psychologie in Umrissen auf Grundlage der Erfahrung*, p. 240 Leipzig: Reisland.

3 Actually 'Natura non vincitur nisi parendo' ('Nature to be commanded must be obeyed') See Bacon, F. 1620/1960. *The New Organon and related writings*, p. 39 New York: Macmillan Publishing Company.

4 'Funktionswert'. See p. 26 of Köhler, W. 1921: *Intelligenzprüfungen an Menschenaffen*. Berlin: Julius Springer.

5 See Binet, A. 1894: *Psychologie des grands calculateurs et des joueurs d'échecs*. Paris: Librairie Hachette et Cie.

6 Stern's convergence theory said that in child development heriditary ('Vorwelt') and environmental ('Umwelt') factors merge or converge into a qualitatively new, meaningful whole – the personality. This led him to reject extreme views, such as nativism and empiricism, and to criticize quantative estimations of the contribution of either heridity or environment to specific mental abilities. See, for example, pp. 95–121 of Stern, W. 1919: *Die menschliche Persönlichkeit*. Leipzig: Johann Ambrosius Barth.

7 'Naive physics' See Lipmann, O. and Bogen, H. 1923: *Naive Physik*. Leipzig: Verlag von Johan Ambrosius Barth.

8 See Lehmann, A. 1905: *Die körperliche Ausserungen psychischer Zustande. Vol. 3: Elemente der Psychodynamik*. Leipzig: Reisland.

9 For a discussion of Wundt's reaction time research, see Boring, E. G. 1957: *A History of Experimental Psychology*. New York: Appleton-Century-Crofts.

10 Actually a boy of four years old. See p. 344 of Stern, W. 1927. *Psychologie der frühen Kindheit*. Leipzig: Quelle Meyer.

11 See Meumann, E. 1912: *Ökonomie und Technik des Gedächtnisses*. Leipzig: Klinkhardt; Meumann, E. 1911: *Vorlesungen zur Einführung in die experimentelle Pädagogik. Bd. I.* Leipzig: Engelmann.

12 Refers to Compayré, G. 1893: *L'évolution intellectuelle et morale de l'enfant*. Paris: Hachette.

13 Refers to pp. 412–13 of Meumann, E. 1911: *Vorlesungen zur Einführung in die experimentelle Pädagogik. Bd. 1*. Leipzig: Engelmann.

14 See pp. 205–7 of Bühler, K. 1918: *Die geistige Entwicklung des Kindes*. Jena: Verlag von Gustav Fischer.

15 'Schimpansenalter'. See Bühler, K. 1929: *Abriss der geistigen Entwicklung des Kindes*. Leipzig: Quelle & Meyer, p. 48.

16 'Werkzeugdenken'. See Bühler, ibid.

17 'Dass jedes Ding einen Name habe'. See pp. 135–6 of Stern, W. 1927: *Psychologie der frühen Kindheit*. Leipzig: Quelle & Meyer, or pp. 190–7 of Stern, C. and Stern, W. 1928/1981: *Die Kindersprache*. Darmstadt: Wissenschaftliche Buchgesellschaft.

18 See Koffka, K. 1925: *Die Grundlagen der psychischen Entwicklung. Eine Einführung in die Kinderpsychologie*. Osterwieck am Harz: Verlag von A. W. Zickfeldt, p. 243.

19 See pp. 34–49 of Piaget, J. 1923/1959: *The Language and Thought of the Child*. London: Routledge & Kegan Paul.

20 Words used by the Sterns to express the importance of the phenomenon discussed in note 17 – that children suddenly discover that all things have names. See p. 190 of Stern, C. and Stern, W. 1928/1982: *Die Kindersprache*. Darmstadt: Wissenschaftliche Buchgesellschaft.

21 'Neither the naked hand nor the understanding left to itself can effect much. It is by instruments and helps that the work is done.' See p. 39 of Bacon, F. 1620/1960: *The New Organon and related writings*. New York: Macmillan Publishing Company.

22 This may refer to 'Tool and symbol in child development' (see chapter 7), in which some of the experimental research into higher psychological functions is discussed. But the finer details can only be studied by reading the monographs, doctoral dissertations and graduate theses that Vygotsky's co-workers and students published over the years. The results of the memory research, for example, were published by Leont'ev, A. N. 1931: *Razvitie pamjati. Eksperimental'noe issledovanie vysshikh psikhologicheskikh funkcij* [*The Development of Memory. An experimental study of the higher psychological functions*]. Moscow-Leningrad: Uchpedgiz. Reports on the formation of concepts were published by Shif, Zh. I. 1935: *Razvitie nauchnykh ponjatij u shkol'nika* [*The Development of Scientific Concepts in the Schoolchild*], Moscow-Leningrad: Uchpedgiz; and Zankov, L. V. 1935: *Ocherki psikhologii umstvenno-otstalogo rebenka* [*Outlines of the Psychology of the Mentally Retarded Child*]. Moscow: Uchpedgiz. See Van der Veer, R. and Valsiner, J. (1991) for a detailed discussion of part of the research.