

Original Research Paper

The Rise of Abstract Thinking in History. The Developmental Approach Illuminates the Foundations of the Russian Socio-Historical Psychology

Georg Oesterdiekhoff

Department of Sociology, Karlsruhe Institute for Sociology, Germany

Article history

Received: 10-01-2022

Revised: 28-02-2022

Accepted: 03-03-2022

Email: Oesterdiekhoff@t-online.de

Abstract: Luria's empirical study in Uzbekistan and Kirgistan belongs to the core of the Russian School of Socio-Historical Psychology. The goal of this article is to examine that research again and to disclose its true fundamentals. All the tests Luria had used in Central Asia come from developmental psychology. However, neither Luria nor his followers fully understood the foundations and consequences of that research, something the article makes very clear. The article exposes that the results show that illiterate people from Central Asia have the same negative test results as preschool or primary school children, while the literate people solved the test items as successfully as older school children do. The present paper shows firstly that Luria does not always make it clear that the test procedures originate in developmental psychology. The study secondly works out that Luria does not present the test results won by child psychology and does not compare them with his test results obtained in adults. It is demonstrated thirdly that the positions of Luria, Cole, and Scribner, according to which the test results are not useful for demonstrating similarities between children and adults of pre-modern cultures, are wrong. The article fourthly evidences the parallels between ontogenetic cognitive structures and those of pre-modern adult cognitive structures as something Luria had proven without realizing it. The article fifthly evidences that every single task Luria had used originates in developmental psychology. This study shows for the first time that neither Luria himself nor his subsequent interpreters have understood the scientific significance of his empirical results.

Keywords: Piagetian Theory, Russian Cultural-Historical School of Psychology, Developmental Stages, Higher Psychological Processes, Literacy and Illiteracy, Education and Socialization, Cultural Relativism

Introduction

In 1931 and 1932, Luria and his colleagues carried out an empirical study among people in Kirgistan and Uzbekistan to scientifically investigate the thought processes of pre-modern peoples. They wanted to answer old questions of ethnology and folk psychology, in which way the modes of thought of pre-modern peoples differ from the ways of thinking of modern peoples. They also wanted to find out how people's ways of thinking change when they gain access to modern culture and the school system. It should be noted that during this period the Soviet state made efforts to modernize these regions of Central Asia. Therefore, Luria discusses in the initial part the questions raised by authors such as Tylor, Lévy-Bruhl, Boas, Piaget, and Thurnwald. He discusses racial

theories and the law of biogenetic recapitulation. In particular, Luria refers to findings of child and developmental psychology. All the testing methods Luria used originate from developmental psychology. They were devised by child psychologists who wanted to test the mental development of children. They regularly show that pre-school children and sometimes also primary school children, especially in the lower grades, do not yet pass these tests. School children after their 10th-year master all the tasks that Luria administered. Some tests are taken by children as young as six years old and other, more difficult tests are taken by children around the age of 11.

Luria's results now show that illiterate people do not usually pass any of these tests. They also show that school-educated people usually pass the tasks successfully. Luria

concluded that only access to school education and modern culture enables people to develop a higher level of thinking, consciousness, and personality. However, Luria has shown that the thinking of illiterate adults of pre-modern cultures has remained at the level of children. However, Luria himself rejects this conclusion without being able to give any factual reasons for this rejection.

The present study now shows that Luria often mentions in only one sentence that the respective test procedure comes from child psychology. Sometimes he omits this reference at all although he was certainly aware of this origin. Not in a single case does Luria present the test results won by child psychology. Thus he cannot compare the test results won by child psychology with the test results obtained in adults. Furthermore, the present study shows that Luria does not even once make the statement that he has now shown that illiterate test subjects have the same characteristics as children. Luria thus effectively blocks access to a complete interpretation. The present study fills the gaps by listing the test results won by child psychology for each test and by drawing the necessary conclusions. It always examines exactly what Luria has omitted to leave the parallels between the two groups in the dark.

Luria has left out gaps and denied the true conclusion. However, he did not present false interpretations and he did not distort the data. However, the Luria following American interpretation, associated in particular with the names Cole and Scribner, tried to draw the interpretation of the data completely out of the camp of stage theory and deficit theory and to reposition it under the umbrella of relativistic interpretations. This American group has tried to minimize and level the test results. It denies the justification of stage theories and interprets the deficit results differently than Luria himself. Luria left gaps open, whereas Cole and Scribner tried simply to deny the deficits.

The present study refutes the relativistic interpretation of the American research group, which has had considerable influence on the sciences. It shows that Luria has demonstrated similarities between children and adults of pre-modern cultures without having consciously registered this.

This study goes through the following steps analysis, discussion, and argumentation. Firstly, it presents and discusses the main tasks Luria had used in his empirical study in Central Asia. Secondly, it examines whether or not Luria had hinted at the origin of the tasks he used in child psychology. It is revealed that sometimes Luria omitted that crucial mention. Thirdly, it will be scrutinized whether Luria presented some related empirical results concerning children's performance conducted by developmental psychology. It will be shown that Luria mostly omitted that even then when he frequently hints at the fact that the task was used in developmental psychology elsewhere in the world. That omission, however, is crucial because it covers the parallels between ontogenetic and cross-cultural findings. This omission covers the truth about the real sources of the

findings won by Luria himself. Fourthly, this article presents some empirical surveys and results won by child psychology, concerning every single empirical task Luria had used in his study. As far as the overview reaches, nobody else among the researchers studying Luria had done this necessary work by now. Only by this method is it possible to show the true foundations and consequences of Luria's empirical study. Luria's omissions paved the way to the victory of the currently prevailing relativistic interpretations led by Cole, Scribner, and others. These authors have tried to break any link between developmental psychology and Luria's research (and cross-cultural psychology generally), being very successful concerning impact and influence in the academic world. This article fifthly shows the errors conducted by the relativistic interpretation and completely falsifies them concerning every single argument. On the whole, the article shows for the first time in the history of the Russian School that Luria's study has to be assigned to strict interpretations of developing mentalism, that is to the understanding of the existence of strict parallels between ontogenetic and historical courses.

Classification of Colors

Many or perhaps all primitive peoples and archaically structured peoples lack the words for the basic colors (green, yellow, red, blue). Even if some of them have come into possession of the categorical designations through transfer, they do not use them (Luria, 1982: 22-23; Everett, 2008; Berlin and Kay, 1969; Ember, 1978). They do not use the categorical terms, but visual-graphical ones such as "peach-colored", "brick-colored" or "fox-colored". In Luria's study, the collective farm activists and students predominantly used the categorical terms, while the illiterate rural dwellers used the graphic and figurative terms by far the most.

Consequently, the illiterate groups do not classify objects according to their primary colors, even when asked to do so. They react to the proposed classification of different objects, all of which are, for example, yellow, into a common group (the group of yellow objects), with answers such as "it can't be done, 'None of them are the same, you can't put them together, 'they're not at all alike', or 'this is like calf's dung and this is like a peach.'" (Luria 1982: 27) Instead, they chose color classifications based on the degree of saturation of the color or its brightness. So, they sorted dark blue, dark red, or dark green objects into one common group and pale blue, pale red, and pale green objects into another common group. The degree of saturation is therefore the decisive criterion in their eyes, while the basic color seems unimportant to them. Or they classify according to the brightness of the color.

In a subordinate clause, Luria (1982: 22) interprets the illiterate classification behavior as a manifestation of elementary thinking or a lower level of intellectual capacity. However, this interpretation is incidental and is not elaborated in any way. Luria only describes the phenomenon

and does not attempt to explain it. Therefore, he does not refer to the findings of developmental and clinical psychology when investigating this phenomenon. The psychologists Gelb and Goldstein (1924) had already shown that aphasias who suffer a loss of abstract thinking as a result of brain damage also reject categorical classifications of colors and group them exclusively according to the degree of saturation. They had already explained this phenomenon: A weakly developed mind is more attracted to saturation than to the primary color. The attraction to the degree of saturation has a stronger effect than the desire to classify according to the commonality of the basic color. Complementarily, they explained the development of the classification according to primary colors as a consequence of the development of abstract thinking. According to these authors, the only school-educated people from developed cultures use the primary colors for classification.

Luria does neither refer to these clinical research findings nor child psychology. The latter one had also found that preschool children first reject classifications according to primary colors and instead classify according to saturation level or brightness. Only when two objects have the same red or blue color are they seen as equal. "Pale red" and "dark red" have nothing in common in the eyes of early childhood. Developmental psychology also explains the development of categorical classification as a consequence of the development of abstract thinking (Cramausse, 1911; Werner, 1959: 179-180).

Luria did not even attempt to explain illiterate classification behavior in terms of developmental psychology. He, therefore, failed to recognize that (modern and traditional) children apprehend and classify colors in a similar way to adults from pre-industrial societies. He therefore also failed to recognize that it is the structures of childlike thinking that underlie the phenomenon he documented. He should have discussed whether illiterate people of pre-modern cultures remain on the mental level of children in the field of logical thinking and whether this test result might even be interpreted as a first indication that they could generally be on the level of children. Luria, therefore, does not recognize the actual nature and significance of the phenomenon.

Graphical and Categorical Classification

Pre-school children, aphasics, and illiterate adults from pre-industrial societies do not classify objects according to concepts and logical criteria, but according to practical contexts. Piaget's school calls these elementary classifications collections, while the Russian school calls them complexes. The concrete-visual type of classification, therefore, leads to "collections" respectively "complexes", while the abstract-categorical type of classification leads to abstract, conceptual, or

logical classifications. According to the abstract-categorical type of classification, birds, lions, mice, and horses belong to the category of animals, while knives, axes, saws, and shovels are into the category of tools. The abstract-categorical type of classification, therefore, refers also to objects that are not considered at present and could encompass them when wished or needed. All members of a specific concept belong to the defined group just for logical reasons, no matter whether they are in the mind of some people at a special moment or not. More, this type of classification is flexible because it can choose different concepts or categories to classify any group of objects. "A system of logical classes is based, as we have mentioned, primarily on a sum of relations of similarities and differences which represents the comprehensions of the various encompassing or encompassed classes... The elements or individuals qualified by these relations are quantified by the concepts "all", "some" (including "one"), and "none" and the defined extensions correspond to the comprehensions characterized that way." (Piaget and Inhelder, 1973, vol. 1: 76; transl. by G. O.)

Pre-school children, aphasics, and illiterate adults of pre-industrial societies reject this form of classification and do not use it even when it is proposed to them. Instead, they classify by assigning objects to practical contexts. They arrange objects in such a way as to create common situations of, for example, working, eating, or living. They describe objects as similar when they fit together intuitively and practically. They describe objects that do not fit into a common situation as dissimilar, even if they belong to a common term or category (Luria, 1982: 79).

This phenomenon has been described by Gelb and Goldstein (1924) concerning aphasias. The developmental psychologists Vygotski (1981: 104-166), Piaget and Inhelder (1973), and Werner (1959: 160-171) have described the concrete-visual type of classification as typical for pre-school children, too. Piaget and Inhelder (1973, vol. 1: 45, transl. by G. O.) describe the childlike classification behavior as follows: "When a child is given objects to classify, he or she is doing so according to various similarities, but only by putting them in spatial situations because he or she still does not master logical inclusions (just due to the incapacity of coordinating temporally ordered similarities and matching relations of a part to the whole ...) and is therefore satisfied by partial and situational comprehensions."

Luria now shows that illiterate adults of pre-industrial societies exclusively form complexes or collections and reject logical-abstract classifications. His interview transcripts, which he cites, all show the pattern of the protocol quoted below.

"Subject: Mirzanb, age thirty-three, uneducated; works in a village; has been in Fergana once, never in any other city. Is shown drawings of Glass-saucepan-spectacles-bottle.

Answer (A): I don't know which of the things doesn't fit here. Maybe it's the bottle? You can drink tea out of the useful glass. The spectacles are also useful. But there's vodka in the bottle that's bad.

Commentary (C): Uses principles of 'utility' to classify objects.

Question (Q): Could you say that the spectacles don't belong in this group?

A: No, spectacles are also a useful thing

C: The subject is given a complete explanation of how three of the objects refer to the category of cooking vessels

Q: So wouldn't it be right to say the spectacles don't fit in this group?

A: No, I think the bottle doesn't belong here. It is harmful!

Q: But you can use one word-vessels-for these three, right?

A: I think there's vodka in the bottle, that's why I didn't take it... Still, if you want me to... But, you know, the fourth thing (spectacles) is also useful

C: Disregards generic term

A: If you're cooking something you have to see what you're doing and if a person's eyes are bothering him, he's got to wear a pair of glasses

Q: But you can't call spectacles a vessel, can you?

A: If you're cooking something on the fire, you've got to use the eyeglasses or you just won't be able to cook." (Luria 1982: 57-58)

If one proposes a logical-abstract classification to these test persons, it is called stupid and wrong and the person proposing is called ignorant (Luria, 1982: 54). "Every attempt to suggest the possibility of categorical grouping met with protest: That's wrong. Some stupid fellow told you that, he doesn't understand anything. Even when we pointed out that similar objects belonged in one category, these subjects were unconvinced; they interpreted the instruction to group similar things to mean selecting necessary or suitable objects. References to general terms (e.g., tools, vessels) did not overcome their tendency to group objects in concretely effective ways. They disregarded generic terms or considered them irrelevant, in no way essential to the business of classification." (Luria, 1982: 77).

80% of the illiterate adults in Luria's sample applied the visual-graphic form of classification and only four percent the abstract-categorical form, with 16% of them applying both forms. All those who had attended school for at least one or two years, on the other hand, used the abstract-categorical form exclusively (Luria, 1982: 78). In explaining the facts of the case, this time Luria relies for pages on Vygotski's explanations. Vygotski had found out that only in the course of the first school years did

schoolchildren learn to use the abstract-categorical form of classification. Vygotski (1981: 104-166) explained that school stimulates children to develop abstract thinking respectively the higher psychological processes. Thus, it is not a matter of learned school knowledge, but of the transition from elementary to elaborate thought processes. These higher psychological processes develop only when school and modern culture affect the mind and cognition. Luria thus supports Vygotski's explanation, which consists of his combination of developmental psychology and socialization theory. Adults without school education retain throughout their lives the same forms of concrete and visual thinking that are found in modern culture only in children. They do not develop the logical and abstract thinking that older children and young people develop in modern culture (Luria, 1982: 48-53).

As one can see, in analyzing this phenomenon Luria succeeds in providing a developmental psychological explanation much better than in the topic discussed earlier. It must be pointed out that aphasias have lost abstract thinking because they have brain damage. Modern adolescents and adults have mastered logical and abstract thinking, which is not found in people without modern education. Furthermore, illiterate adults from pre-industrial cultures could have learned it if they had been exposed to modern educational influences in time. Finally, higher psychological processes can only develop if people can participate in certain educational processes. This is the sum of Luria's findings.

Luria does not, however, ask the question of how to interpret the similarities between children and pre-modern illiterate adults in the areas of logic and the ability to abstract. Are they a (second) indication that adults of pre-industrial cultures do not develop mentally any further than children? Or has the phenomenon to be understood as a modular deficit solely?

The Similarity Test

The next test applied by Luria is the so-called similarity test, well-known for its application within Alfred Binet's laboratory. The test person is asked to determine similarities between two given objects. It was found that it is usually easier for persons to describe the differences than the similarities. The reason for that is that differences can be described by that one can see from the objects while the similarities commonly have to be determined by abstraction and generalization. It requires higher intellectual efforts to determine similarities between visibly different objects than to describe the perceivable differences. Then the determination of similarities is based on abstractions apart from the descriptive reproduction of concrete features of objects.

Luria asked his subjects about the resemblances between cucumber and rose, crow and fish, horse and man, landowner and farmhand, chicken and dog, etc.

“Subject: Maksud, age thirty-eight, illiterate, works in Lalazar region.

Question: What do a chicken and a dog have in common?

Answer: They’re not alike. A chicken has two legs, a dog has four. A chicken has wings but a dog doesn’t. A dog has big ears and a chicken is small.

Commentary: Describes differences rather than similarities:

Q: You’ve told me what is different about them. How are they alike?

A: They’re not alike at all.

Q: Is there one word you could use for them both?

A: No, of course not.

Q: What word fits both a chicken and a dog?

A. I don’t know...

Subject: Sakhumb, age thirty-four, a peasant from the village of Yardan, illiterate:

Q: What do a mountain and a poplar have in common?

A: A poplar needs water to grow, but God made the mountains. That’s how they come to be standing there.

C: Points out differences

Q: But what likeness is there between them?

A: There’s no likeness. We’ve lived in these mountains a long time and never seen any likeness between those things

Q: Could you say that mountains and poplar are both tall?

A: Mountains are very big, but a poplar’s small. In some places they’re level, but mountains are huge and a poplar’s small. I’m looking at them now and I don’t see any likeness at all

C: Refuses to try and detect similarity.” (Luria 1982: 81-83)

Luria does not refer at all to developmental psychology in explaining the phenomenon. Since Vygotski (1981: 193-196) dealt with the similarity test in connection with children and the test originated in developmental psychology, one must assume that Luria was nevertheless aware that children have similar difficulties in identifying similarities. The phenomenon has been described by Claparède (1918) and Piaget (1981: 150, 212), too. Pre-school children are usually unable to name the similarities between, for example, bees and flies. One or two school years are usually sufficient to trigger the reflection processes necessary for this task. Children from the seventh year onwards, therefore, master this task. In Luria's study, all those

who had attended school for at least one year were able to give the right answers.

The test shows especially the lack of abstract and conceptual thinking. If illiterate people of pre-industrial cultures show a lack of abstract thinking like children do, the question arises as to how far the parallels between children and pre-industrial adults go. Luria did not take the similarity test as an opportunity to raise this question.

Definitions

Children and illiterates of pre-industrial cultures cannot define, i.e., define objects. One must be able to think conceptually and systematically to formulate the concept of a phenomenon. A concept presupposes both the unification and generalization of individual characteristics and their separation and abstraction. All insignificant features must be omitted and all essential provisions must be listed to be able to make a definition. Piaget had pointed out that children are only capable of making individual judgments and not general judgments. Furthermore, children do not logically compare statements with each other but juxtapose them. Since children cannot think reflexively, they cannot put their thoughts into a logical context. To be able to define, however, one must be able to offset and compare several sentences with each other. To give an example: Children define mothers as women-and, not as women who have given birth to children. It is conceptual thinking (Vygotski, 1981: 151-159) or formal-logical thinking (Piaget, 1981: 153-160) that makes definitions possible. This is why both Vygotsky and Piaget concluded that children can only define from the age of 11.

Children use pseudo-concepts instead (Werner, 1959: 205). "For the child, to define a thing or a term means to designate what that thing does, or more often, what can be done with it." (Vygotski, 1981: 155, transl. by G. O.) "Binet asked a 5-year-old child, for example, what a car was. The child gave the following answer: 'Men get in, you give the horse a lash with the whip and then the horse runs' as you can see, the name here is entirely figurative, describing and understanding undifferentiated." (Vygotski, 1981: 155, transl. by G. O.)

Luria notes that illiterate people are not able to define either, but those who have attended school for one or two years are.

"Subject: Ili-Khodzh., age twenty-two, a peasant from a remote village, illiterate:

Q: Try to explain to me what a tree is

A: “Why should I? Everyone knows what a tree is, they don’t need me telling them

C: Rejects the need for explanation

Q: Still, try and explain it

A: There are trees here everywhere; you won't find a place that doesn't have trees. So what's the point of my explaining?

Q: But some people have never seen trees, so you might have to explain.

A: Okay. You say there are no trees where these people come from. So I'll tell them how we plant beetroots by using seeds, how the root goes into the earth and the leaves come out on top. That's the way we plant a tree, the roots go down...

C: Tries to explain by pointing out distinct features of an object.

Q: How would you define a tree in two words?

A: In two words? Apple tree, elm, poplar.

C: Enumerates instead of defining." (Luria 1982: 86-87)

Luria characterizes the response behavior of the people similarly to Werner and Piaget judged that of the children. The Kashgarians "refused to define a given concept, insisting that it was senseless to define or talk about perfectly obvious things. 'The sun is the sun, everyone knows that' ... In some cases, they told us how it operated, pointed out its functions, described its appearance – its physical attributes." (Luria, 1982: 86).

Luria (1982: 85) knew that children learn to define at school only. He also knew that the adult people who had attended school had learned to define. However, Luria does not work out that the inability to define is rooted in the childlike peculiarities of thinking. He does not refer to a description of the childlike stage of thinking, for example, to the statements of Piaget and Werner. One could assume that Luria thinks that learning to define is simply a technique of learning, just a technique learned at school. In any case, Luria does not discuss this crucial problem. In Vygotski's view, however, the facts are clear: Definitions are not simply school knowledge, but the manifestation of more highly developed thinking, a higher level of mind. In this example, too, Luria should have concluded that illiterate people of pre-industrial cultures are characterized by features of thinking that in modern culture are only found in children. Again, Luria does not even raise the question of the nature of the commonalities and therefore the actual issue is not even addressed by him.

Hypotheses and Syllogisms

Hypotheses and syllogisms belong together thematically, but Luria treats them in two separate chapters. Luria notes that his illiterate Kashgarian subjects are not willing to accept hypotheses they do not believe in. If, in their eyes, the conditions from which they are to infer contradict their practical experience, they reject them.

"Subject: Khamrak, age thirty-six, a peasant from a remote village, slightly literate:

Q: From Shakhimardan to Vuadil is three hours on foot, while to Fergana it is six hours. How much time does it take to go on foot from Vuadil to Fergana?

A: No, it's six hours from Vuadil to Fergana. You're wrong... It's far and you wouldn't get there in three hours

C: Computation is readily performed, but a condition of the problem is not accepted

Q: That makes no difference; a teacher gave this problem as an exercise. If you were a student, how would you solve it?

A: But how do you travel on foot or horseback?

C: Slips back to a level of concrete experience

Q: It's all the same-well, let's say on foot

A: No, then you won't get there! It's a long way... if you were to leave now, you'd get to Vuadil very, very late in the evening

C: Condition that contradicts experience is not accepted

Q: All right, but try and solve the problem. Even if it's wrong, try to figure it out.

A: No! How can I solve a problem if it isn't so?!

C: Refusal to solve a conditional problem." (Luria, 1982: 129-130)

Luria does not provide a developmental explanation of the phenomenon and does not discuss its causes. However, he proves that school-educated people have learned to tackle tasks dealing with hypotheses.

It is therefore necessary to go beyond Luria. The phenomenon finds its explanation in the peculiarities of childlike thinking. Children up to about 10 years of age refuse to conclude any hypotheses. Children at the stage of pre-operational thinking know only elementary deductions, children at the stage of concrete operations master concrete deductions and only children at the stage of formal operations know formal deductions. Still, concrete deductions are characterized by the fact that children accept only those hypotheses which they consider to be correct and which correspond to their experience. Only formal deductions involve the adoption of points of view in which one does not believe.

"Suppose dogs had six heads. How many heads would there be in a yard with 15 dogs?" Children are incapable of grasping a simple logical necessity (in case you suppose... then it follows from that) and making a pure hypothesis (let's suppose that...). Only children at the level of formal deductions separate the real from the logical necessity and conclude logically. The formal deduction, therefore, presupposes the ability to detach oneself from one's own beliefs and

standpoint and to test any assumption by concluding from any premises. The formal deduction, therefore, presupposes the ability to adopt foreign points of view and to remain with rigor with hypotheses for the time being, instead of returning to one's conviction in the course of the mental operation. The hypothesis and the logical conclusion only emerge in the mind of the child when it can formulate: "I understand you. Let us accept your point of view. But if it were true... then it followed... because..." The formal deduction, therefore, examines thoughts in which one does not believe at all, as it were for their own sake." (Piaget, 1981: 80-87, 246-248, transl. by G. O.).

The lack of competence to adopt hypotheses is a contributory cause of children's failure to understand and apply syllogisms. Children only learn to understand syllogisms at the age of about 10 years. Apart from the willingness to adopt hypotheses, there must be other prerequisites for mastering syllogistic thinking. There must be the ability to understand the logical implications of different propositions. The statements of sentences must not simply be juxtaposed but must be put into a logical context. Finally, children must understand the meaning of quantifiers such as "all" and "some", a state of affairs that is not given in the early years (Piaget, 1981: 124-137; Piaget and Inhelder, 1973, Vol. 2: 95-168).

It is the totality of conditions underlying the higher stages of psychological development that makes syllogism possible. Conversely, it is the totality of the factors underlying childlike thinking that causes the initial lack of understanding of syllogisms. Inability to general statements, parataxis, syncretism, lack of introspection, irreversibility of thought processes, elementary deduction, a tendency to contradictory statements, lack of understanding of the relationship between part-wholeness and quantifiers, inability to add and multiply statements and to adopt premises, lack of logic and relational judgments, the narrowness of the field of attention, the narrowness of the short-term memory as well as egocentrism form an entire complex that causes the lack of understanding of syllogisms. It is the entanglement of these factors that causes the failure of syllogistic conclusions (Piaget, 1981; Bucciarelli and Johnson-Laird, 1999; Tulviste, 1979; Vargas and Stenning, 2020; Oesterdiekhoff forthcoming).

Luria now found that only his educated subjects mastered syllogisms, but not his illiterate subjects. This result has been repeatedly confirmed in various studies conducted around the globe. Two or three years of schooling are enough to encourage people from different cultures to understand syllogisms. However, their

illiterate neighbors do not understand syllogisms, just as children under ten do not (Cole and Scribner, 1974; Cole *et al.*, 1971; Tulviste, 1977, 1979, 1991).

"Subject: Khamrak, age forty, a miller from a remote village, illiterate.

The cotton syllogism is presented. Q: Cotton can grow only where it is hot and dry. In England, it is cold and damp. Can cotton grow there?

A: No, if the soil is damp and chilly, it can't.

Q: Now, in England, it is damp and chilly. Will cotton grow there?

The subject's wife volunteers, 'it is chilly here too.

Q: But there it is always cold and damp. Will cotton grow there?

A: Me, I don't know... I don't know what the weather is like there!

C: Data of minor premise are ignored; resorts to personal experience.

Q: Cotton can't grow where it is cold; it's cold in England. Does cotton grow there or not?

A: I don't know... if it's cold, it won't grow, while if it's hot, it will. From your words, I would have to say that cotton shouldn't grow there. But I would have to know what spring is like there, what kind of nights they have.

C: Possibility of inferring from your words, but reference to lack of personal experience." (Luria, 1982: 110-111)

Luria (1982: 114-115) gives the same reasons for the failure of his subjects that Piaget had listed: No understanding of the logical relationship between sentences, no understanding of general sentences, and no willingness to judge from hypotheses in which one does not believe. Luria (1982: 102) refers to Piaget as the person who showed that children do not initially understand syllogisms but learn them later in the course of their mental development. One can assume that Luria's explanation for the behavior of his subjects comes directly from his knowledge of Piaget's analysis. Although this specific reference is not found in Luria's text, the agreement of the three factors listed with Piaget's considerations and his general reference to the authorship of his interest in the study of syllogisms should suffice to prove that Luria knew that child psychology explains the late development of syllogistic thinking in the child.

But then Luria would have had to conclude that illiterate adults from pre-industrial cultures are characterized by a level of development of thought that is typical of children. He would have had to conclude that illiterate adults from pre-industrial cultures remain at the intellectual level of children, whereas only school-

educated adults from modern industrial societies develop intellectually. However, he does not draw this conclusion. He does not even discuss the problem (Tulviste, 1977; 1979; 1991; Oesterdiekhoff, 2009; 2012a-b; 2013a; 2016a-c, forthcoming).

Problem-Solving

Luria also examined the ability of his test subjects to systematically approach and process abstract tasks. When working on the task, one must fully engage with the question, take into account all necessary conditions and leave out all superfluous ones. Then the task must be worked on systematically. It turned out that the illiterate test subjects refused to submit to this procedure and that they tried to treat the tasks with a minimum of attention and mental effort.

"Subject: Mukhamed, age twenty, a peasant from the village of Karasu, slightly literate.

The following problem is given: It takes thirty minutes to go on foot to a certain village, or five times faster by bicycle. How long will it take on a bicycle?

Subject answers immediately: One minute!

C: Guesswork instead of a solution

Q: How did you know?

A: If he goes fast, he will get there in one minute. You said, a man goes on foot to your village. How long will a bicycle take?

C: Problem breaks down upon repetition of the conditions

The problem is repeated (the subject repeats the conditions correctly):

A: In about one minute, perhaps a little more, perhaps a little less

C: Again guesswork

Q: If a man takes thirty minutes and a bicycle goes five times faster, how will it get there in one minute?

A: I haven't seen how they go, but I imagine that they could get there in one minute

C: Again guesswork, with an arbitrary change in the condition

Q: Well, you figure it out

A: Well, by my reckoning, it would be like this: Perhaps a minute, perhaps a half a minute

C: Reference to lack of practical experience." (Luria, 1982: 122)

Luria explains the test behavior by the following considerations. The test persons do not adjust to the problem and do not try to solve it within the framework of logic and systematics. They are satisfied with rough estimates (Luria, 1982: 120, 125).

In this section, Luria does not even mention the data won by developmental psychology. The question can therefore not be answered here whether Luria borrowed this issue from Piaget or not. Piaget (1981: 26-27) had already shown that pre-school children are happy to settle for rough estimates for such tasks. The children's answers correspond to those of Luria's test subjects, as the following protocol shows.

"Mour (7;10). Q: You need fifty minutes to go to Carouge. You are five times faster by taking a bicycle. That is? -A: You need less than a minute.-Q: Why? -A: fifty minus five times, fifty minus fifty equals 0."... Ober (8;0) answers with twenty-five and then with five to the same question. Q: How did you do that? -A: I have withdrawn twenty-five from fifty, no five, five times faster than equals forty-five. I intended to withdraw twenty from fifty... I took the half of fifty!" (Piaget, 1981: 149) (translated by G. O.)

Self-Awareness

Luria (1982: 144-145) opposes the view of some classical philosophers that man's awareness of himself is innate and is given to all people equally. Instead, he assumes that illiterate people of pre-industrial cultures have little awareness of themselves. They cannot describe their inner qualities well, their psychological characteristics, and their very individual character. They have, according to Luria, a low self-reflexivity. Consequently, self-awareness and self-reflexivity only develop under the conditions of modern industrial societies. Only people with a school education can reflexively think about themselves.

"Subject: Karambai Khamb., age thirty-six, a peasant from the village of Yardan, illiterate:

Q: Well, now, take yourself, Karambai, and your guest here, Ismat. What is the difference between you?

A: There's no difference at all. Once there's a soul it means we're the same

Q: What shortcomings and good qualities do you have? What's your character like? Do you know what character is?

A: Yes!

Q: People can be good or bad, hot-tempered or calm. What sort of person are you?

A: What can I say about my own heart?

Q: But who could tell about your heart other than you?

A: How can I talk about my character? Ask others; they can tell you about me. I can't say anything.

C: Reference to the fact that others can judge a man's character

Q: What would you like to change or improve in yourself?

A: I was a farmhand; I have a hard time and many debts, with a measure of wheat costing eighteen rubles that's what troubles me

Q: Well, people are different and have different characters; what are you like?

A: If I have a lot of money, I buy things and then I'm happy; if I don't have things I'm sad.

C: Describes your situation from the circumstances." (Luria 1982: 149-150)

Luria claims that his illiterate subjects are not able to characterize themselves psychologically. Instead, they tend to describe the external circumstances of their lives. "As a rule, they either refused to name positive or negative qualities in themselves or dealt with the question by describing concrete and material aspects of their lives. They frequently found it much easier for them to characterize other people than to characterize themselves." (Luria, 1982: 147).

Luria (1982: 146) states only in very few sentences that child psychology has shown that children cannot characterize themselves psychologically at first. He thus shows, at least implicitly, that child psychology has given him this question. However, he does not discuss any concrete research findings on child psychology in this regard. I will repeat this here to prove that these parallels between children and illiterate adults do indeed exist in this area. With this, I am filling the gap that Luria left open in his book. He had been content with a blanket reference instead of showing the parallels based on empirical material from child psychology.

Peevers and Secord had listed four stages in the development of self-awareness and reflexivity. In the first stage, the children can only point to external things ("she is a friend of Sarah" or "the house where she lives has a cellar"). In the second stage, some very general characterizations and classifications such as "he is nice" or "he is a boy scout" are successful. Only in the third stage can personal interests and convictions be named. The fourth stage only begins in the second decade of life. Only now are special dispositions and character structures worked out (Secord and Peevers, 1982). This research result does not stand alone but has been replicated again and again by developmental psychologists (Shantz, 1983: 499; Selman, 1984; Aronfreed, 1964; Barenboim, 1981; Bernstein, 1980).

Ethnographic studies also show that primitive peoples exhibit difficulties in describing psychological dispositions that Luria identified (Hallpike, 1979; Oesterdiekhoff, 2009: 303-307).

One can also see from this example that Luria is satisfied with a blanket reference to child psychology. He does not work out the parallels. He does not show that the system of self-reflection in illiterate people stops at the level of children. He does not even raise the question of the possibility of the existence of the corresponding common ground.

Luria's Own Interpretation of his Research Results

The starting point of Luria's research was the criticism of the widespread assumption that mankind has not changed in the course of history and would still think by the same patterns today as it did thousands of years ago. Luria sees this thesis as being held mainly by philosophers, philosophers who claim that logic and thought, reflexivity and rationality are immutable and unhistorical. Philosophers have sometimes claimed that human beings are even born already equipped with logic, religion, and philosophy and that their reason is biologically given to them and is already present at birth (Luria, 1982: 144, 161, 163-164; Luria and Vygotski, 1992: 40).

Luria instead assumes that thinking, reason, and logic have only gradually developed from simple beginnings and that only school-educated people from industrial societies have reached the stage of thinking that can be described as consistently logical, abstract, and theoretically oriented. The people of Uzbekistan are by no means at a completely primitive level of culture. Rather, they live as illiterate village farmers in the middle of the Soviet Union during the ongoing process of industrialization and modernization. Nevertheless, their thinking is still on the lower levels, as they have not had access to modern education and modern industrial culture. Thinking, psyche, and consciousness are culturally conditioned and dependent on historical transformations (Luria, 1982: 10).

People undergo profound psychological and mental changes when they have access to modern industrial culture and education. "The facts show convincingly that the structure of cognitive activity does not remain static during different stages of historical development and that the most important forms of cognitive processes—perception, generalization, deduction, reasoning, imagination, and analysis of one's inner life—vary as the conditions of social life change and the rudiments of knowledge are mastered." (Luria, 1982: 161)

The people of pre-industrial societies think concretely, figuratively, and elementarily. Only modern people develop abstract, logical, conceptual, theoretical, and systematic thinking. "The generalized way in which reality is reflected also undergoes radical restructuring... Thinking processes begin to involve more and more abstraction and generalization... Gradually we see the transition from the sensory to the rational... Human thought begins to rest on broad logical reasoning... Finally, there are changes in self-awareness of the personality, which advances to the higher level of social awareness and assumes new capabilities for objective, categorical analysis of one's motivation, actions, intrinsic properties, and idiosyncrasies." (Luria, 1982: 162-163)

So, Luria does not see the psychological changes simply as the acquisition of special skills and knowledge.

These changes are also not constrained to simple learning of new knowledge and new technologies. Rather, Luria sees the changes as a transformation of the whole system of thinking, psyche, and personality. People of pre-industrial societies are on a simpler level of mind than people of industrial societies.

Often Luria refers to developmental psychology and suggests, at least implicitly, that the peculiarity of thinking found in the people is also found in children. Nevertheless, Luria is reticent about comparing people with children. In many examples, Luria provides only a general reference to developmental psychology. In not a single example does Luria directly present empirical findings of developmental psychology to compare them with his findings from Uzbekistan.

However, the present reconstruction of Luria's Uzbekistan study has shown that there is no difference between children and illiterate people in all areas of thought. All the characteristics of thinking that Luria has shown among the people are also the characteristics that child psychology has found to be typical for children. This study I am conducting here is certainly the first work that has fully demonstrated these parallels present in Luria's work. Luria has thus demonstrated, without realizing it and without understanding it, that the people's thinking stops at the level of children. There is no doubt that Luria neither registered the parallels between children and illiterates nor understood the conclusion that must necessarily be drawn.

Interestingly, M. Cole comes close to this conclusion in his preface to Luria's book when he writes "Luria's style of interpreting these data is similar to the tradition that attributes performance differences between groups in two cultures to the same processes that give rise to performance differences between younger and older children within the same culture. This line of interpretation has an honorable history, as shown in the work of Greenfield and Bruner (1966) and work carried out in the Piagetian tradition (Dasen and Berry, 1974)." (Cole in Luria, 1982: XV).

Luria himself yet denies the assumption of parallels between children and adults of pre-modern cultures. "Notions about individual development reproducing the development of the species ('the biogenetic law' or the 'law of recapitulation'), which became widespread in their day, clearly produced little and yielded only superficial and reactionary conclusions, for example, that the thought processes of primitive peoples closely resemble those of children and indicate the 'racial inferiority of backward peoples.'" (Luria, 1982: 6).

Luria and Vygotski instead believe that contemporary man must be seen as the result of three developmental paths that cannot be reduced to one another and are therefore independent of each other. The development from ape to man, from primitive to

civilized man, and from child to adult are three independent developmental paths that are not in an inner connection with each other. They claim that each of these developmental paths prepares the other - and not more (Luria and Vygotski, 1992: 87, XI-XIII). They do not want to exclude one or the other parallel between child and primitive. Thus, in their book "Ape, Primitive Man and Child" they strictly distinguish the psychological characteristics of so-called primitive and civilized people. Furthermore, they deal with primitive adults and (modern) children in different chapters. It is then noticeable, however, that the characteristics they describe in children and primitive adults are very similar or even the same. Both groups have attested a lack of abstract thinking, an eidetic organization of memory and perception, a concrete behavior in classifications, a lack of logical thinking, etc. (Luria and Vygotski, 1992: 39-110). Thus also in this book, there is a contradiction between the facts and the theoretical conclusion, which can also be found in the Uzbekistan study.

Luria did not understand that the parallel between child and adult of pre-industrial societies does not stem from the theoretical possibility that the child might recapitulate mankind's history, but from the fact that adults of pre-industrial societies do not develop structurally further than children due to cultural conditions. He could easily have developed this idea if he had thought just a little bit further. He should have concentrated on the facts first. He should have realized that the phenomenon he described in the people had already been described by psychologists in children. That would have been easy since he knew the origin of the test procedures in child psychology. Luria only slightly hints at the possibility of parallelism between the two groups. However, he does not show the parallels in a single example. He had nevertheless noticed that education and culture affect the structural development of the mind. If these incentives are lacking, there is no development of adults above the level of children. Luria had all the facts at his disposal to arrive at this conclusion. Yet he was so far away from it that he probably did not even suspect this theoretical solution. He had provided proof of the child nature of pre-industrial man without even the slightest suspicion of that.

The Parallels Beyond Luria

Cross-cultural psychology has replicated Luria's test results in other pre-industrialized peoples, thus showing that the results can be generalized and do not show any Uzbek

peculiarity (Cole and Scribner, 1974; Dasen and Berry 1974; Hallpike 1979; Tulviste 1977, 1979, 1991; Oesterdiekhoff, 2009; 2011; 2012a-b; 2013a; 2016c; Piaget, 1974; Ibarra, 1994). However, the parallels between children and pre-modern adults go much further than the Luria study shows. Early children's language finds its full parallel in the languages of primitive peoples: Absence of tenses, passive and plural, and absence of subordinate clauses, disjunctions, and conjunctions. Furthermore, both groups have an intense tendency to syllable duplication and onomatopoeia (Oesterdiekhoff, 2009).

Both groups interpret moral laws in the light of physical laws and interpret physical laws as moral imperatives. They interpret events as actions of mystical powers and therefore ignore the categories of causality, chance, and probability. Pre-industrial nations do not develop the category of chance that modern children develop after the seventh year. Both groups view clouds, rocks, waters, and mountains as living beings that can think and act. Since both groups understand events as intentions, they believe in the power of magic. Both groups believe in the power of magic over the world, i.e., in the realizability of wishes utilizing rites and sayings. In modern children, magical thinking is strong until the seventh year, in pre-modern peoples it is lifelong. Both groups believe in the transformability of objects and persons into all kinds of other beings. Modern children believe in metamorphosis until the seventh year, pre-industrial peoples lifelong. Both groups believe in witches, sorcerers, ghosts, and monsters. Both groups believe that dreams are perceptions of real events or the visit of the soul to real places. Both groups do not recognize the purely subjective status of dreams. Both groups believe in the truth of myths and legends. Premodern adults believe myths to be real, just as modern children do up to about the seventh year (Piaget and Inhelder, 1969; Piaget, 1959; 1981; Werner, 1959; Radding, 1985; Hallpike, 1979; Oesterdiekhoff, 2009; 2011; 2012a-b; 2013a; Dux, 2014; Rindermann, 2011).

Empirical studies show that pre-industrial peoples do not develop beyond moral stages 2 or 3 according to Kohlberg. In industrial cultures, these stages describe the moral thinking of children. According to empirical studies, pre-modern peoples regard rules of law as unchangeable, just as children do. Both groups largely ignore the intention in attributing responsibility, a phenomenon called objective responsibility. Criminal law history calls this phenomenon *Erfolgshaftung*. Children believe in the justice inherent in nature and decide disputes by drawing straws etc. Pre-industrial nations often decide on legal issues with the help of the ordeal, i.e., with poison probes, reaching into fire or hot water, or judicial duels. The ordeal is thus rooted in the mentality of the child. Small children support strict punishments. Pre-industrial nations also sanction minor offenses with drastic punishments, often with brutal corporal punishment and execution (Piaget, 1932; Hallpike, 2004; Radding, 1985; Oesterdiekhoff, 2009; 2011; 2013a-; 2016a-b; Rösen, 2012).

All phenomena that developmental psychology has described as typical for children are also those that cross-cultural psychology and ethnology have described as typical for pre-modern adults. The parallels cover the whole range of logical, physical, social, legal, political, religious, and moral thinking. Children and adults of pre-modern cultures are thus in the same psychological stages and differ from each other only in knowledge and life experience. A certain part of the people from antiquity and early modernity stands on intermediate levels. Furthermore, the process of transformation has not stopped but continues today (Oesterdiekhoff, 2012b; 2013b; 2016a-c; Werner, 1959; Hallpike, 1979).

On this basis, the history of law, culture, politics, philosophy, science, religion, and morals can be reconstructed in terms of developmental psychology. The development of society and culture can be described in terms of developmental psychology.

The Luria study belongs in the context of these notions. Table 1.

Table 1: How much did Luria understand the similarities between children and illiterate adults of pre-modern societies?

	Phenomenon known in a child psychology	Different stages of the phenomenon described by Luria	Younger children and illiterate people manifest the lower stages of the phenomenon	Luria hints at the fact that the test procedure and the phenomenon originate in child psychology	Luria adds the empirical test results won by child psychology	Oesterdiekhoff contributes the empirical test results won by child psychology to evidence the similarities
Color terms	Yes	Yes	Yes	No	No	Yes
Classifications	Yes	Yes	Yes	Yes	No	Yes
Similarity test	Yes	Yes	Yes	No	No	Yes
Definitions	Yes	Yes	Yes	No	No	Yes
Hypotheses	Yes	Yes	Yes	No	No	Yes
Syllogisms	Yes	Yes	Yes	Yes	No	Yes
Problem-Solving	Yes	Yes	Yes	No	No	Yes
Self-awareness	Yes	Yes	Yes	Yes	No	Yes

The Relativistic Interpretation of Luria's Usbekistan Study

In the Soviet Union, the publication of the results was suppressed for decades. Luria was accused of degrading ethnic minorities and for the simple fact of having used testing methods (Cole, 1988: 140). The report was not published until 1974 in Moscow and in 1982 in the USA (Harvard University Press). The research group around Michael Cole and Sylvia Scribner tried to continue the work of the Russian School. They replicated some of Luria's findings by re-applying his test procedures in some developing regions in the southern hemisphere. It turned out that illiterate adults from developing regions respond in the same way as Luria's test persons. However, the American authors tried to interpret the test results differently from Luria. Moreover, they also tended to interpret Luria's results differently from his interpretation. Further, they tried to attribute to Luria a different interpretation than that which he had made.

Scribner (1985: 132) claims that there is a big difference between the Russian and Geneva schools. The Geneva School would claim that individual deficits could reflect the presence or absence of entire psychological stages. According to Scribner, however, the Russian School assumes that deficits can only ever be understood in modular terms. Test results, therefore, reflect only very limited competencies. In 1988 Cole (1988: 140) supported Scribner's interpretation of Luria, whereas in 1982 he had still claimed the opposite (Cole in Luria, 1982: XV). Now it is unquestionable that Scribner's interpretation is untenable. Luria had left no doubt that the test procedures reflect entire systems of thought. According to Luria, illiterate adults of pre-industrial cultures are on a different level of psyche, personality, consciousness, and thinking overall than modern adults do (Luria, 1982: 161-163).

Jahoda (1980: 126) contradicted Scribner and correctly stated that there is no real fundamental opposition between the Luria system and the Piaget system. Neither Cole nor Scribner succeeded in interpreting both Luria's and their test results as if they only reflected deficits that can be limited in their range. To do so, they would have had to show that their illiterate test subjects exhibit formal-operational structures, at least in some areas. Neither Luria's test results nor their offer this possibility. Luria, for example, did not show in a single example that his illiterate people had an elaborate pattern. Cole's and Scribner's test results likewise do not provide any corresponding evidence (Cole and Scribner, 1974; Cole, Gay, Glick, and Sharp, 1971; Oesterdiekhoff, 2017, forthcoming).

In particular, Cole and Scribner oppose the possibility of interpretation, Luria's results could prove similarities between children and pre-modern adults (Cole, 1988: 140; Scribner, 1985: 132). Luria had himself also objected to this interpretation. However,

Cole gets into a contradiction when, in 1982, he finally places Luria in the tradition that precisely formulated such parallels (Cole in Luria, 1993: XV).

The American group of researchers denies in principle stage differences between different ethnic groups. The identified deficits are irrelevant and the tests always only reflect what is important to one group but not to another, they maintain. Each group only develops the skills it needs. If certain ethnic groups are not capable of maintaining volume, this is unimportant, as the volume test is only a game, they pretend. Luria's test items are school assignments that have no meaning outside school, according to their relativistic interpretation (Cole, 2005: 206; Cole and Subbotsky, 1993: 106, 111; Cole, 1988: 149).

As a consequence, this means that the ability to identify stages is denied to the usual tests made for that task. This leads to the abolition of developmental psychology, stage theory, and test psychology. Differences between children and adults can no longer be measured then (Cole and Subbotsky, 1993 claim and demand just that).

There is a difference between data and data interpretation in Luria. He didn't understand that his data showed similarities between children and pre-modern adults. But he didn't deliberately distort the interpretation of the data. With Cole and Scribner, there is no longer any factual connection at all between the data obtained and the interpretation presented. Their interpretation reflects obedience to Political Correctness values. The authors adhere to the prevailing ideology of cultural relativism and thus have had a great influence (Oesterdiekhoff, 2017).

Conclusion

Heinz Werner and Jean Piaget belonged among those authors describing psychological similarities between children and premodern (or archaic) adults. Numerous authors belonging to several disciplines have been contributing to that task or idea over the past 200 years, especially in the time 1850 to 1950. Many representatives of psychoanalysis and developmental psychology shared related opinions. During the past 20th century, Jean Piaget was the central figure concerning that research idea.

The Russian school, led by Luria, Vygotski, and Leontiev, followed that tradition by using their methods and research tasks, but not by obedience to the central idea mentioned. Their research manifests a contradiction between their research praxis and their overall understanding and interpretation. As they apply tests used among children and thus coming from child psychology to measure the achievement of adults, they must have known that they compare children with premodern adults when they discover common empirical results and disclose common achievements. In case children and premodern adults master the same tests respectively and

fail the same tests then it is obvious that there are common features to report concerning the two groups. In case educated, modern adults master tasks only literate adolescents achieve then it is apparent that only modern adults attain the adolescent stage of psychological development. Luria and his colleagues willingly or did not evidence both cases, that is, they proved the validity of the existing parallels between children and premodern adults.

However, they delivered only the empirical data without naming the theoretical insights, conclusions, and interpretations. Instead, they retained and covered the full consequences actually to be drawn. They resorted to the narrower interpretation that premodern adults are only capable of lower forms of cognition and could not attain the stage of "higher psychological processes". Such remarks display only half of the truth. Premodern, illiterate adults manifest the same forms of mind, logic, and abstraction as younger children do-that is what their research has proven.

The Luria following research tradition, led by Cole and Scribner, filled the gaps by even enlarging the gulf between data and theory, empirical results, and theoretical conclusions. They did so by denying that the whole research may belong to any developmental traditions and by interpreting the task achievements as being mere conventions.

This study has shown that the Russian school of psychology has delivered empirical data that has to be assigned to strict traditions of developing mentalism. There does not exist any gap between the school of Geneva and the Russian school. The Russian school has proven the fact that there exist parallels between children and archaic adults and that there has been a psychogenetic advancement of humankind during past centuries and generations, during the course of the rise of the modern, industrial world.

Ethics

This article is original and contains unpublished material. The corresponding author confirms that all of the other authors have read and approved the manuscript and that no ethical issues are involved.

References

- Aronfreed, J. (1964). The origin of self-criticism. *Psychological Review*, 71(3), 193. doi.org/ 10.1037/ h0047689
- Barenboim, C. (1981). The development of person perception in childhood and adolescence: From behavioral comparisons to psychological constructs to psychological comparisons. *Child development*, 129-144. doi.org/10.2307/1129222

- Berlin, B., & Kay, P. (1969). Basic color terms: Their universality and evolution. California UP.
- Bernstein, R. M. (1980). The development of the self-system during adolescence. *The Journal of Genetic Psychology*, 136(2), 231-245. doi.org/10.1080/00221325.1980.10534117
- Bucciarelli, M., & Johnson-Laird, P. N. (1999). Strategies in syllogistic reasoning. *Cognitive Science*, 23(3), 247-303. doi.org/10.1207/s15516709cog2303_1
- Claparède, E. (1918). *La conscience de la ressemblance et de la différence chez l'enfant*.
- Cole, M. & Scribner, S. (1974). *Culture and thought*. New York: John Wiley & Sons.
- Cole, M. (1988). Cross-cultural research in the socio-historical tradition. *Human Development*, 31, 137-157. doi.org/10.1159/000275803
- Cole, M. (2005). Cross-cultural and historical perspectives on the developmental consequences of education. *Human development*, 48, 195-216. doi.org/10.1159/000086855
- Cole, M., & Subbotsky, E. (1993). The fate of stages past: Reflections on the heterogeneity of thinking from the perspective of cultural-historical psychology. *Schweizerische Zeitschrift für Psychologie*, 2, 103-113. <http://lhc.ucsd.edu/People/MCole/Schweizerische.pdf>
- Cole, M., Gay, J., Glick, J. A., & D. W. Sharp (1971). *The cultural context of learning and thinking*. New York: Basic Books.
- Cramausse, E. (1911). *Le premier éveil intellectuel de l'enfant*. Paris: Alcan.
- Dasen, P. & Berry, J. W. (1974). *Culture and cognition. Readings in cross-cultural psychology*. London: Methuen & Co.
- Dux, G. (2014). *Historico-genetic theory of culture: On the processual logic of cultural change*. Bielefeld: Transcript Verlag.
- Ember, M. (1978). Size of the color lexicon: Interaction of cultural and biological factors. *American Anthropologist*, 80(2), 364-367.
- Everett, D. (2008). *Don't sleep, there are snakes. Life and language in the Amazonian jungle*. New York: Pantheon Books. ISBN: 1846680409.
- Goldstein, K., & Gelb, A. (1924). *Psychologische Analysen hirnpathologischer Fälle*. Berlin. <https://link.springer.com/article/10.1007/BF00444167>
- Hallpike, C. (1979). *Foundations of primitive thought*. Oxford: At the Clarendon Press.
- Hallpike, C. (2004). *The evolution of moral understanding*. London: Prometheus Research Group. <https://psycnet.apa.org/record/2004-21672-000>
- Ibarra, L. (1994). Las dificultades de Jean Piaget para vincular el desarrollo ontogenético y filogenético del conocimiento. *Iztapalapa* 35, 77-88. <https://revistaiztapalapa.izt.uam.mx/index.php/izt/article/download/1236/1391>

- Jahoda, G. (1980). Theoretical and systematic approaches in cross-cultural psychology. *Handbook of cross-cultural psychology*, 1, 69-141.
- Luria, A. R. & Vygotski, L. S. (1992). *Ape, primitive man and child*. Orlando, Florida: Deutsch Press. ISBN: 1878205439.
- Luria, A. R. (1982). *Cognitive development. Its cultural and social foundations*. Cambridge, MA: Harvard University Press.
- Oesterdiekhoff, G. (2009). *Mental growth of humankind in history*. Norderstedt: Books on Demand. ISBN-10: 3837093182.
- Oesterdiekhoff, G. W. (2011). *The steps of man towards civilization. The key to disclosing the riddle of history*. Norderstedt: Books on Demand. ISBN-10: 3842342888.
- Oesterdiekhoff, G. W. (2012a). *Die geistige Entwicklung der Menschheit*. Weilerswist: Velbrück.
- Oesterdiekhoff, G. W. (2012b). Was the pre-modern man a child? The quintessence of the psychometric and developmental approaches. *Intelligence. A Multidisciplinary Journal*, 40, 470–478. doi.org/10.1016/j.intell.2012.05.005
- Oesterdiekhoff, G. W. (2013a). *Die Entwicklung der Menschheit von der Kindheitsphase zur Erwachsenenreife*. Wiesbaden: Springer Verlag. doi.org/10.1007/978-3-531-19931-3
- Oesterdiekhoff, G. W. (2013b). The role of Piagetian cross-cultural psychology to humanities and social sciences. *American Journal of Psychology*, 126, 4, 477–492. doi.org/10.5406/amerjpsyc.126.4.0477
- Oesterdiekhoff, G. W. (2016a). Developmental psychology as answer to the question: Can the human disciplines achieve scientific foundations comparable to biology in consequence of Darwin, or to physics in consequence of Newton and Einstein?, *European Journal of Psychological Studies*, vol. 8, issue 2, 68-107. doi.org/10.13187/ejps.2016.8.68
- Oesterdiekhoff, G. W. (2016b). Child and ancient man. How to define their commonalities and differences. *American Journal of Psychology*, vol. 129, no. 3, 297-314. doi.org/10.5406/amerjpsyc.129.3.0295
- Oesterdiekhoff, G. W. (2016c). Is a forgotten subject central to the future development of sciences? Jean Piaget on the interrelationship between ontogeny and history. *Personality and Individual Differences*, 98, 118-126. doi.org/10.1016/j.paid.2016.03.098
- Oesterdiekhoff, G. W. (2017). What went wrong with cross-cultural psychology over the last 40 years? The developmental approach in opposition to two main ideologies of our time, cultural relativism and universalism of mind. *Human Evolution*, vol. 32, No. 1-2, 95-138.
- Oesterdiekhoff, G. W. (2022). Understandings of syllogisms in ontogeny and history. The contributions of J. Piaget, A. R. Luria, M. Cole & S. Scribner in comparison. *American Journal of Psychology*, Vol. 135, No. 1, pp. 77-96.
- Piaget, J. & Inhelder, B. (1969). *The psychology of the child*. New York: Basic Books.
- Piaget, J. & Inhelder, B. (1973). *Die Entwicklung der elementaren logischen Strukturen. Zwei Bände*. Düsseldorf: Schwann Verlag (English version: *The early growth of logic*, London 1964).
- Piaget, J. (1932). *The moral judgment of the child*. New York: The Free Press.
- Piaget, J. (1959). *The child's conception of the world*. New York: Littlefield, Adams and Co.
- Piaget, J. (1974). Need and significance of cross-cultural studies in genetic psychology. In P. Dasen & Berry, J. (Eds.), *Culture and cognition* (pp. 299-310). London: Methuen & Co.
- Piaget, J. (1981). *Urteil und Denkprozess des Kindes*. Frankfurt: Ullstein Verlag (English version: *Judgment and reasoning in the child*. New York: Littlefield, Adams and Co. 1959).
- Radding, C. M. (1985). *A world made by men. Cognition and society 400-1200*. Chapel Hill, NC: The University of North Carolina Press.
- Rindermann, H. (2011). Intelligenzwachstum in Kindheit und Jugend. *Psychologie in Erziehung und Unterricht*, 58, 210-224. doi.org/10.2378/peu2011.art29d
- Rüsen, J. (2012). Humanism. *Anthropology – axial ages – modernities* (pp. 55-80). In: Kozlarek, O., Rüsen, J. & E. Wolff (Eds.), *Shaping a humane world. Civilizations – axial times – modernities – humanisms*. Bielefeld: Transcript. doi.org/ 10.1515/transcript.9783839419410.55
- Scribner, S. (1985). Vygotski's uses of history. In: J. V. Wertsch (Ed.), *culture, communication and cognition*. New York: Cambridge University Press. ISBN-10: 0521338301.
- Secord, P. F., & Peevers, B. H. (1982). Genese und Attribuierung von Person-Konzepten. In: W. Edelstein & M. Keller (Hrsg.), *Perspektivität und Interpretation* (pp. 47-78). Frankfurt am Main: Suhrkamp.
- Selman, R. (1984). *Die Entwicklung des sozialen Verstehens*. Frankfurt am Main: Suhrkamp. (English version: *The growth of social understanding*, New York 1980). https://ixtheo.de/Record/04023603X
- Shantz, C. U. (1983). Social cognition. In: P. Mussen (Ed.), *Handbook of child psychology, Vol. III: Cognitive development*. New York: Wiley & Sons.

- Tulviste, P. (1977). Toward an interpretation of parallels between ontogenesis and historical development and thought. *Studies of sign systems No. 8. Scientific Notes of Tartu University Vol. 411. Tartu, Estonia.*
- Tulviste, P. (1979). On the origins of theoretic syllogistic reasoning in culture and the child. *Quarterly Newsletter of the Laboratory of Comparative Human Cognition*, 1, 73-80.
https://www.academia.edu/download/31005136/Acta474_1978problemy.pdf#page=4
- Tulviste, P. (1991). *The cultural-historical development of verbal thinking.* New York: Nova Science Publisher.
- Vargas, F., & Stenning, K. (2020). Communication, goals, and counterexamples in syllogistic reasoning. *Frontiers in Education*, 17 April 2020.
doi.org/10.3389/feduc.2020.00028
- Vygotski, L. S. (1981). *Denken und Sprechen.* Frankfurt am Main: Fischer Verlag. (English version: *thought and language*, Cambridge, Mass. 1962).
- Werner, H. (1959). *Einführung in die Entwicklungspsychologie.* Leipzig: Barth. (English version: *Comparative psychology of mental development.* New York: Follet 1948).