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CULTURAL-HISTORICAL MODEL OF THE DEVELOPMENT OF THE GENERALIZATIONS SYSTEM. THE PROBLEM OF CONCEPT DEVELOPMENT*

The article describes the problem of development of the concepts system, interpreted as generalizations, in the cultural-historical context. The interpretational basis of the article is by L.S. Vygotsky's generalizations development conception. The author introduces the model of the development of the generalizations system, according to which generalizations are comprised of structural-functional aspects. Diversity of developmental forms of these aspects creates differentiation of quality of generalizations, which is described by the notion of hybridization. From Vygotsky's ideas the responsibility for the breakthrough of development of the generalization system concern the type of instruction available at the school age. This is the main cause of the change of the order of generalizations aspects and therefore the type of hybridization.

Introduction

Vygotsky belongs to those scientists who postulate that human consciousness can be researched by objective methods. The underpinnings of these methods are language and, among its various systems, Vygotsky focused on semantics. He developed research on generalizations which he understood as the unity of concepts and meanings: "The word always concerns the whole class of objects, and not some single object. Therefore *each word is a hidden generalization* [italics added]", and furthermore: "we have the right to treat the meaning [of the word – R.D.] as….*generalization, therefore a concept* [italics added]" (Wygotski, 1934/ 1989, pp. 21, 320)[1].

[1] Whenever appears in the text the name: Wygotski (Polish transcription of his name), the passage referred to is translated by the author of this article. The English transcription of his name (Vygotsky) indicates the English translation as citation source. Russian spelling refers of course to the original text.

A generalization as a unit[2] of consciousness is analyzed on three levels in his work. Besides the semantic level described above Vygotsky undertook the analysis at the level of mental functions (cf. note on p. 22) where generalization is presented as a unit of thinking and speech. The next level consists in generalization as a unit of language functions: representative and communicative. Analysis in the context of mental functions led Vygotsky to the problem of inner speech development (Vygotsky, 1934/1987, pp. 243-288). While research conducted on the semantic level gave birth to the conception of generalizations development (cf. Vygotsky, op. cit. pp. 121-242), and the analysis of language functions led to the formulation of the conception of language acquisition (cf. Vygotsky, 1931/ 1997, pp. 121-130; 1934/1998, pp. 243-260).

The model presented in this paper develops the semantic level of generalization analysis expanding and ordering Vygotsky's findings in that field. Therefore, the first part of the paper consists of the sources of the model in Vygotsky's conception and the second part concerns the proposal of putting his different ideas into one concise model of generalizations development. The examples of how the system functions concerns the school period as this is the time of great change in the mental functioning of the child.

The source of the model of generalizations system development in the works of Vygotsky. Characteristics of generalizations aspects

The problem of the relation of generalization to the object of reference. Interrelations

Vygotsky's well-known classification of the levels of generalization should be presented according to most developed stage of his conception when he researched the real concepts used by children in school and non-school environments.

In this research, Vygotsky introduced the following descriptive terminology: syncrets as generalized perceptions, complexes as generalized images, potential concepts as preconcepts, and real concepts as proper ones. In the contemporary accessible works of Vygotsky there are no descriptions of object reference of real generalizations. However they can be found in some fragments that Vygotsky used, in this case, the results of the artificial generalizations experiment[3]. He de-

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[2] Vygotsky presents generalization as the unit of analysis of consciousness. The unit is differentiated from the elements. The unit is characterized as that least part that possesses the properties of the whole. The element, however, comprises different features than does the whole. Vygotsky introduces here a chemical analogy and claims that the least unit of water is the particle described by the symbol: H_2O. The particle is comprised of the elements like oxygen and hydrogen.

[3] The experiment was confined to testing the artificial concept formation based on variations of three features such as width, height and depth of geometric figures. The experiment therefore could not test the relations of generality between concepts (cf. Vygotsky, 1934/1987, p. 129).

Table 1. Development of interrelations

Level of generality	Feature of generalization	Type of relation (sign – sign, relating to the types of object's features)
Syncrets	Subjective	Individually found features
Complexes	Characteristic	The most apparent features
Preconcepts	Common	Regular features
Concepts	Relevant	The most important features

Source: compiled by R. D. on basis of Vygotsky (1987-1999), Выготский (1982-1984)

scribes object reference of the preconceptual generalization *number* which is used in arithmetic, as the generalization of quantitative features. Whereas the object reference of conceptual generalization is formed as an abstraction of the quantitative features of a number and is described as the relation between elements that is estimated by given general algebraic rules. At that level of generalization it can be understood that the given algebraic formula is the notation of a certain number. It cannot be understood using the generalization of the number comprised of quantitative features, as is possible at the level of preconceptual generalization. Thus the object of reference of preconceptual generalization is still related to empirically tested object features, and the object of reference of conceptual generalization is based on non-empirical relevant features of objects, described as rules of preconceptual generalization organization.

We do not possess, however, any data concerning the understanding of object reference for syncrets and complexes except for general statements mentioned above that syncrets can be described as general perceptions and complexes as general imaginations.

But we can assume that syncrets describe objects of reference in a similar way as does exemplar theory (cf. Maruszewski, 1996, p. 202), according to which humans (usually children) generalize given phenomena by comparing new objects to earlier spotted exemplars of the given concept. On that basis, later in the developmental process the child comes to understand the object as prototype described by Rosch (1978). According to her proposal, a prototype is an abstraction that creates the center of a given category. Its borders are not sharp which makes for a situation of inclusion of the same exemplars in different categories. Therefore the object of reference of general imaginations should be understood as built of prototypical features. The latter is strongly against Haman's view (cf. 1993, p. 225) but accepted by Kielar (1983, p. 159).

The problem of relations between generalizations. Intrarelations

Vygotsky pointed to another type of relation, relevant to consciousness functioning, that of relations between generalizations. From the perspective of the

generalization carrier – the sign, there is the problem of the relation of one sign to another. Since it is evident that each sign represents a given generalization, there arises the question of the nature of the relations between generalizations as well as that of how it is correlated to the development of the above described relation between the sign and features of the object. According to Vygotsky, the basic question here is the notion of system.

Vygotsky differentiates degrees of generality and generality structure. The basic relation between generalizations is the difference of degrees of generalization, superordinate and subordinate relations, for example *vehicle* and *bicycle*. For Vygotsky it is evident that the relations between these two generalizations are always that the generalization <vehicle> is superordinate, which is more general than the generalization <bicycle>. Vygotsky noticed that the difference of degree of generality differs in quality depending on the degree of development of the generalization structure. A given level of that structure assumes a specific type of relation of superordinate and subordinate level, the difference of generality degrees: "…. each structure of generalization (syncrets, complexes, preconcepts, concepts) relates to aspecific system of generality and relations of generality between general and specific concepts…." (Wygotski, 1934/1989, p. 284).

According to Vygotsky, the system of generalizations is based on generality relations, and the existence of these relations presupposes the existence of the system. We could even assume that the notions of system and generality relations are synonymous with the order of generalizations. According to Vygotsky's postulate concerning the development of generalizations it can be assumed that the system of generalizations exists from the beginning of generalization development. Therefore he writes: "… the appearance of the first higher concept that stands above the concepts earlier formed, the appearance of concepts such as "furniture" or "clothes" is such an important symptom of the development of the meaningful aspect of the child's speech. It is no less important in this respect than the appearance of the first meaningful word" (Wygotski, 1934/1989, s. 285).

Vygotsky explicitly writes that, on each level of development of the generalization structure, there exist different relationships of degrees of generality between generalizations. Therefore each stage of generalization development means a different type of the generalizations system. For instance, the utterance of the three-year-old child : *my toy* expressed when noticing a teddy bear has a different meaning than the same utterance of a five-year-old child. In the first example the generalization *teddy bear* converges structurally in meaning with mom's *pendant*, daddy's *tie* and so forth, with the objects of the immediate manipulation of the child. In this very example the relation between the generalizations *toys -teddy bear* means that the bear belongs to the category of manipulatable objects. However, five-year-old child understands that *teddy bear* is a *toy*, that is, an object exclusively for children's use. But she/he does not understand yet that *car* can be named by mom as daddy's *toy*.

Table 2. Development of intrarelations

Level of generality	Feature of generalization	Type of relation (sign –sign representing different levels of generality)
Syncrets	Incidental	Relations of generality are unstable, some generalizations combine with others by chance, some generalizations are treated as superordinate and some as subordinate
Complexes	Associational	Superordinate and subordinate relations emerge on the basis of generalization which plays the role of association center
Preconcepts Concepts	Hierarchical Systemic	Relations between generalizations become hierarchical Hierarchical relations are organized in the system of relations

Source: compiled by R. D. on basis of Vygotsky (1987-1999), Выготский (1982-1984)

According to Vygotsky, the road from generalization to the object leads through other generalizations. Immediate relations between generalization and object were described by him as presyncretic, therefore not belonging to the symbolic system. In the case of subordinate generalization we have a two-sided relation, to the superordinate generalization and to the object, that is, the child knows that *teddy bear* signifies the object that she/he plays with and knows at the same time that *teddy bear* is a type of *toy*. Superordinate generalization refers to other superordinate generalizations belonging to the same level of generality for example, *vehicles,* and to a higher generalization only if the higher level exists in the child's consciousness. A superordinate generalization refers to a subordinate one. The child knows that *toys* are a group of different objects that he/she plays with. These particular relations between the system of generalization and objects Vygotsky describes as the measure of generality of a given generalization (cf. Vygotsky, 1934/1987 p. 227). See Table 2 for summary.

The problem of relations between superordinate generalization, subordinate generalization, and the object. Metarelations

The problem of metarelations corresponds to the issue of conscious awareness of the subject's intellectual operations, as Vygotsky writes:

"Conscious awareness is an act of consciousness whose object is the activity of consciousness itself… In the preschool age, the child is asked: "Do you know what your name is?" and the child answers: "Kolya". He is not consciously aware of the fact that the focus of the question is not what he is called but whether or not he knows his name. He knows his name, but is not consciously aware of his capacity in this respect "(Vygotsky, 1934/1987, p. 190).

If consciousness can be described as a system of generalizations, then conscious awareness is the act of generalization by which the structure described by the relation introduced in the model as metarelation emerges. However, not every

act of generalization refers to metarelations. In order to do so, the generalization should connect the superordinate generalization, the subordinate generalization, and the object of reference.

The relation between generalization and the object of reference, as I stated earlier, has to infer the existence of the other generalization mediating between the words designating the object and the superordinate generalization. But the fact of mediation does not signify that the subject is able to grasp in a single act of consciousness the relation between the object and the superordinate generalization. Metarelation is a structure that includes the structures of interrelations and intrarelations. The object of metarelation is not any external, concrete object but the earlier established relation sign-sign referring to the object. Therefore, there emerges the relation sign-(sign-object), which Vygotsky describes as taking one's own intellectual acts in words, as conscious awareness. The first sign represents superordinate generalization, the second one represents subordinate generalization.

Because the structure of metarelations develops by itself, its fully mature form appears at the highest level of generalization development. At the lower levels there are certain constraints concerning the described relation between inter- and intrarelations, for example, at the complexive level the constraints concern the lack of bilateral relations between the superordinate generalization, for instance, *toys*, the subordinate generalization *teddy bear,* and the words concerning the object *Booboo teddy bear*[4]. However, while there are possible relations between the super- and subordinate generalization and between the latter and the words representing the object, there are no possible mutual relations between inter- and intrarelations.

Referring to the above example, one can say that it is impossible for the child to say that *Booboo teddy bear* is a *toy* (cf. Macnamara, 1986/1993, p. 236), or that *teddy bear* is a *toy* and *Booboo teddy bear* is a *toy*. It is possible, however, for the child to say in certain situations that *teddy bear* is a *toy* and in others that *Booboo teddy bear* is *teddy bear*. Vygotsky described the kind of generalization as *toys* in the above example as spontaneous, and considered that it is impossible for the child to be consciously aware because of the fact that the child is focused more on the object than on the act of thought itself (cf. Vygotsky, 1934/1987 p. 191).

At the higher levels of generalization development (preconcepts, concepts) categories are more expanded and contain more intermediate generalizations, therefore the relations between inter- and intrarelations will be in those cases different. For instance, the description given by the subject that the *toys* which he/she possess are *objects to play with,* expresses a certain rule of structuring of a concrete set of toys, which is the sign of the metarelational structure at the level of preconcepts. Describing by the subject that *toys are for one's own pleasure*, is an

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[4] In this example the word: *Booboo* stands for the proper name given to the toy by the child.

Table 3. Development of metarelations

Level of generality	Feature of generalization	Type of relation (the object of conscious awareness represented by signs)
Syncrets	Not consciously aware	Subordinate generalization referring to the object – subordinate generalization
Complexes	Intuitive	Subordinate generalization – subordinate generalization
Preconcepts	Over-intuitive	Subordinate generalization referring to the object – subordinate generalization – superordinate generalization
Concepts	Consciously aware	Superordinate generalization – subordinate generalization – subordinate generalization referring to the object

Source: compiled by R. D. on basis of Vygotsky (1987-1999), Выготский (1982-1984)

example of metarelation at the level of concepts, because it expresses the abstract rule of binding the generalization and the word referring to the object (cf. Czub, 1998, p. 44).

Vygotsky describes the problem of conscious awareness as follows: ".… there's a great difference between the concept of unconscious and lack of conscious awareness. The elements that conscious awareness are lacking are not by any chance partly unconscious and partly conscious. They do not designate the degree of conscious awareness but the other direction of consciousness activity" (Wygotski, 1934/1989, p. 210). According to the development of metarelations presented in Table3 below, conscious awareness, on different levels of generality, concerns different ranges of the generality structure.

Creating the system of generalizations. Generalizing

Creating a system of generalization is described by Vygotsky as the basis of ordering representations of phenomena. The source of that ordering is the symbolic form of language in which ordering means a system of hierarchical organization of its elements. In logic, a hierarchical relation is described as the relation of inclusion. Estimation of the nature of both included and including elements is the key factor for explanation of inclusion and therefore the process of hierarchization. According to logic (cf. Sambor, 1997, p. 18), inclusion describes the situation of containing sets understood as a range of names. Names are treated here as designates of sets of given elements. Differentiated are the superordinate names – hyperonyms, which are characterized by broad range and narrow content, and subordinate names – hyponyms, with broad content and narrow range. For instance, for the name *vehicle* just a few features can be found that create its

content, however its range is broad, that is, many objects can be found designated by that name. It is the reverse situation for the name *car* as many features of the object can be given, but far fewer objects designating the name. A similar under-standing of inclusion is presented by Vygotsky who describes the basic relation between generalizations as that of generality (cf. Выготский, 1934/1982, p. 270). He described precisely only the higher types of generality, paying little attention to the question of inclusion on the lower levels of generality.

I think that inclusion can be described more precisely. After Sambor (1997), I introduce the following explanation of inclusion as a situation:

"… where each element *x*, independently of its nature, can be treated as part of the element *y*. In such a broad definition the term inclusion embraces:

a) the relation between classes (e.g., the class of tulips is included in the class of flowers)

b) the relation of membership (e.g., Pluto belongs to the class of dogs)

c) the part–whole relation (e.g., the nose is a part of the face)"

(Sambor, 1997, p. 23).

In the course of generalization development the subject governs the operation of inclusion. In the light of the above, the process of inclusion can be compared to Vygotsky's notion of generality, and the differentiation of inclusion is related to the differentiation of generality. Vygotsky presents generality as opposed to the structure of generalization:

"… concepts of different degrees of generality can be found in the case of one and the same generality structure. For instance, among the complexive con-cepts there are possible ones characterized by different generality degree such as 'flower' and 'rose'. But it should be stated that in this case the relation of the degree of generality of concepts expressed by the same words as 'flower-rose' will be different in the cases of different generality structures e.g. complexive and preconceptual structures … there can exist concepts at the same degree of generality in cases of different generality structures. For in-stance, in both complexive and conceptual structure 'flower' can have a gen-eral meaning for all species and concern all flowers. However, it should be stated that in cases of different generalization structures the generality will be of the same kind as in the logical and objective sense, not the psychological one. Therefore, the relation of the degree of generality 'flower-rose' will be different in the complexive and the conceptual structure. In case of the two-year-old, the relation is more concrete, the more general concept stands as if alongside the particular one, replacing it. In case of the eight-year-old, the former concept stands above the latter one…"

(Wygotski, 1934/1989, p. 283).

I think that, by reference to a broad understanding of inclusion, the difference between the type of generality found at a given generality structure can be pre-sented more precisely. The above analysis of the *flower-rose* relation in the case of the two-year-old child concerns inclusion of the part-whole type, therefore the

rose is treated as part of the flower and not as inclusion of the *rose* class in the *flower* class.

The interpretation of the generality notion as inclusion leads to the interpretation of creation of relations between generalizations as operations of creating a set. In logic, there are two basic differentiations of the notion of a set. The most basic understanding of that term is that of the set in a distributive sense, that is, when a group of elements is isolated by sharing some common feature. In a so created set some subgroup of elements can be isolated because of another common feature that is not shared by other elements. The relation of inclusion is established between these sets. However, there is another possible interpretation of the set, namely, as the collective one, where there is the relation between sets as between part and whole (cf. Chlewiński, 1999, p. 55; Varzi, 2004). As given above, the first sense of set describes the "classic" situation of inclusion based on the relation of membership. The second sense refers to inclusion based on the part-whole relation. The relation of membership as I consider it can be understood as a particular case of inclusion, where instead of a class there is single object.

I interpret therefore the basic difference in generalizing as the relation of inclusion. At the higher level of generality inclusion can be described in a distributive sense, whereas at the lower levels in a collective sense.

The process of generalizing can be compared to a concept's hierarchy as proposed by Rosch (1978). The main difference concerns category basis. Vygotsky claims, following classical conceptions, that category is based solely on abstractions of features of phenomena, whereas Rosch claims that there exists categories based on its boundaries. She differentiates generality on three levels: subordinate, basic and superordinate. Subordinate level is created on the basis of grouping of distinctive features, superordinate level on the basis of abstraction of common features. The basic level, however, is created on establishing the level of similarity to the prototype understood as an abstract "image" of the most typical item of the category. Rosch claims also that development of concepts starts with the naming of an object belonging to the basic level (cf. Rosch, 1978). An imprecise interpretation of that statement could parallel Vygotsky's claim that children first learn general words as, for example, *flower* and then particular words as, for example, *rose*, in relation to the same object. However, this is only a surface similarity, as Vygotsky claims that the generality of the generalization *flower* on the syncretic level is different from the generality of the same generalization on the preconceptual level. The difference concerns the fact that, in the second case, the system of concepts apart from generality already exists, whereas, in the first case, there is just the beginning of such a system. The *flower* and *rose*, in the mind of the two-year-old, signifies the same object or, more precisely, different features of the same object while the ten-year-old creates hierarchical relations between the two concepts.

Table 4. Development of generalizing

Level of generality	Feature of generalization	Type of operation
Syncrets	Preinclusive	Part-whole relation in reference to the part
Complexes	Subinclusive	Part-whole relation in reference to the whole
Preconcepts	Inclusive	Class inclusion in reference to subordinate class
Concepts	Overinclusive	Class inclusion in reference to superordinate class

Source: compiled by R. D. on basis of Vygotsky (1987-1999), Выготский (1982-1984)

Rosch's proposition contains the thought that conceptual development starts with connecting a given sign with a given range of reality. However, these relations Vygotsky describes as presyncretic and excludes them from the functioning analysis of the conceptual system. According to his conception, the beginning of the development of concepts is marked by the ability to create the relations of generality. Therefore, the expression *chair* appearing in the child's speech does not mark the onset of conceptual development. It is rather the last stage of perceptual development. Development of concepts starts with the moment of grasping the first relation *chair-furniture* (cf. Vygotsky, 1934/1987, p. 226).

Formation of an inner image of reality – representing

Representing is basically abstraction, which is related to analysis and synthesis. Vygotsky's attention focused on the operation of abstracting during discussion of the results of an experiment on the development of artificial generalizations. He concluded that at the basis of generalization there lies the process of abstraction together with processes of analysis and synthesis.

The object of real concepts is created by inclusion in the process of analysis that of synthesis of earlier abstracted features: "The concept arises when the number of abstracted features is being resynthesized and such an abstracted synthesis becomes the basic form of thinking" (Wygotski, 1934/1989, p. 144).

Summarizing the research on real concepts Vygotsky also refers to abstraction as the basic way of isolating an object's features. However, he highlights the fact that, in the real system of generalizations, abstraction concerns abstracted features. The question arises as to the difference between the processes of abstraction present at different levels of generalization and their relation to the processes of analysis and synthesis. The solution to this problem we owe to Rubinszetjn's (1962) work on the nature of thinking. In his theoretical proposals referring to Vygotsky's results (unfortunately, he did not mention the name of his great colleague), Rubinsztejn presents four processes as basic in generalization (in his terminology, concept) creation: *analysis, synthesis, abstracting, generalizing*. It is worth stressing that Rubinszetjn differentiates the process of generalizing from

the effect of that process, namely generalization, and describes the latter as a kind of intellectual unit (cf. Rubinsztejn, 1962, p. 60).

Rubinsztejn proposes a less subtle division of generality level than does Vygotsky, presenting just two of them: empirical and theoretical which corresponds in Vygotsky's conception to the levels of preconcepts and concepts. Against this background the form of given processes are analyzed. Analysis and synthesis are treated as inseparable, and mutually interdependent.

On the level of empirical concepts, analysis is based on isolating the distinct from the common features of cognized objects, while synthesis concerns the simple combining of similar phenomena. On the level of theoretical concepts, analysis concerns differentiating relevant and irrelevant phenomena, and synthesis the reorganization of concrete features on the basis of a relevant rule that enables their connection. The process of abstraction takes the following forms: on the empirical level there is an elementary abstraction, which consists in derivation of some perceived features of an object and isolation of others (Rubinsztejn, 1962, p. 48). However, theoretical abstraction refers to the transformation of already selected features. The generalizing process is divided by Rubinsztejn into simple generalizing on the basis of a signal feature that is an extremely strong stimulus, and verbal-conceptual generalizing. According to Rubinsztejn, the division into empirical and theoretical generalizing concerns the latter process and, therefore, according to the interpretation of his conception proposed here simple generalizing does not belong to the generality system because it is not related to the language system. Empirical generalizing is analyzed by Rubinsztejn in the form proposed by Lock as the relation of a word and the common features of an object. Theoretical generalizing concerns the relevant features of an object.

Rubinsztejn combines the above processes into one common course shaping generalization as an intellectual unit. Empirical generalization arises from comparison, a kind of synthesis consisting in combination of phenomena. On this basis the process of analysis leads to isolating common and different features. Finally, the process of abstraction enables the choice of common features. Theoretical generalization starts with analysis, which consists in differentiating between relevant and irrelevant phenomena, and then in the process of abstraction the relevant features are isolated. The final stage is the synthesis, which is a process of reorganization of the concrete and its changed construction based on covert, relevant features.

Vygotsky describes it as follows: "A preconcept is an abstraction of the number from the object and based on it a generalization of the numerical features of the object. The concept is an abstraction from the number and, based on it, a generalization of all relations between the numbers"(Wygotski, 1934/1989, p. 194). Rubinsztejn's proposal is closely related to Vygotsky's ideas, which enables its use in the construction of the model of generalization system development. The

Table 5. Development of representing

Level of generality	Feature of generalization	Type of operation
Syncrets	Impressive	Synthesis (comparing a set of impressions) – analysis (isolating common impressions) – abstraction (isolating impressions that impact the subject the most)
Complexes	Visual	Synthesis (comparing a set of images of the phenomena) – analysis (the choice of similar features) – abstraction (isolating visually perceived features that distinguish from the surroundings)
Preconcepts	Empirical	Synthesis (comparison of a set of schemas of the phenomena) – analysis (isolating of common and different features) – abstraction (the choice of common features)
Concepts	Theoretical	Analysis (differentiating relevant and irrelevant features) – abstraction (isolating of relevant features) – synthesis (reorganization of the concrete)

Source: compiled by R. D. on basis of Vygotsky (1987-1999), Выготский (1982-1984)

terms proposed below of the first developmental phases of the representing operation comes from Vygotsky, while the name of the last phase is taken from Rubinsztejn.

Accuracy of a generalization system – concluding

The operation of concluding means here establishing the truth of a generalization by referring it to other generalizations. This is related to the opinion of Macnamara (1986/1993) concerning the psychological sense of concluding, which is understood as a sequence of thoughts, where one thought refers to another (Macnamara, 1986/1993, p. 68). According to Macnamara, humans are endowed with a logical competence that can be related to the idea of universal grammar proposed by Chomsky. This competence is based on two separate mechanisms: interpretators and implicators. Interpretators are described as intentional acts referring a sequence of symbols to a certain range of reality (cf. Macnamara, *op., cit.* p. 64). Implicators are explained as a set of mechanisms of conclusion under the control of consciousness. Their functioning consists in a voluntary process of estimating the logical concluding appropriateness. In the model presented here, the process of concluding is connected to the overall process of concept development. It is the idea that a concept development is a complicated process by which a hierarchy is created and the concluding process ends it by creating a place for a certain concept (or, as I name it, after Vygotsky – a generalization).

From the perspective of logic, concluding is described as an operation of transition from acknowledgment of the premises to acknowledgment of the conclusion (Szaniawski, 1987, p. 205). The process is described as deductive reasoning, when as a result of the acknowledgment of premises one can come to a true conclusion. Therefore, there is an inferential relation between the premise and the conclusion. In logic it is assumed that it is impossible that from false premises one could infer a true conclusion. So the key problem here is how to investigate the true status of the premises. Each logical system has developed a particular set of rules, depending on the general assumptions of that system. In practice, the process of concluding is based on reference to the general laws of logic, as Kotarbiński writes: "… a result of appropriate concluding inferred from the premises, and is based on a given law of formal logic (highlighted by Kotarbiński)" (Kotarbiński, 1975, p. 135).

The process of induction is opposite to the above as it is the process by which a conclusion is not inferred logically from premises. Induction can be understood as a hypothesis choice that does not have to be true. It can be the effect of a partial opinion on its true status. A hypothesis is created out of given premises but the true relation between them does not have to be a necessary one.

Concluding may consist in another form of inductive reasoning described as creating causal-relations between the premises and the conclusion. That type of induction was introduced for the first time by Mill (1830/1962). He rejected the conception of enumerative induction and proposed his own described as an eliminative one. In that kind of induction the premises eliminate some hypotheses that are opposite to the conclusion. Contemporary logic interprets eliminative induction as a kind of deductive reasoning (cf. Mortimerowa, 1987, p. 219). In line with that view I will give some instances of reasoning known as the canon of agreement and the canon of difference, as the best known of Mill's proposals.

The canon of agreement, understood as deductive reasoning, takes the following form: the premise is comprised of two types of sentences, the first consists in sentences that are alternatives of many hypotheses stating a causal relation between the phenomena A1 and B (the relation is interpreted such that A1 is the necessary condition of B). The relation is tested whether A1 is the necessary condition of B, or A2 is the necessary condition of B, etc. The second type of premise is based on observation that in some circumstances not A2 but B happens, not A3 but B happens and so forth. The second type of premise is contradictory to the premises of the first type, with the exception of the conclusion that A1 is the necessary condition of B. Therefore, between the conclusion and its premises there exists the relation of inference, so that the conclusion is of a deductive type. The canon of difference is similar except that it supposes a different form of causal relation between A and B. The relation specifies that the phenomenon A is the sufficient condition of B. The rest of the procedure is analogous to the case of the canon of agreement.

Concluding, in the enumerative form, relies on joining the premises describing the frequency of given phenomena along with the conclusion that forms the generalization of the premises. The conclusion is therefore based on the assumption as to how many observed facts the conclusion should take into account. In order to do this, some other assumptions are needed, e.g., quantity and diversity of observed objects (cf. Mortimerowa, *op. cit.*). This way to conclude has two forms: perfect and imperfect. Perfect enumerative induction takes place when the premise follows the appearance of all objects belonging to the set of observed phenomena. Then again the conclusion infers logically the premises and therefore takes the form of deduction, for instance, stating the attendance of all the students after checking the attendance list. Imperfect enumerative induction takes place when the conclusion is based on several phenomena belonging to the set of these phenomena. Within logic, in this case the conclusion does not infer the premises, therefore it is not reliable, deductive reasoning.

A broad interpretation of the concluding operation as a way of linking thoughts, as proposed by Macnamara, allows for including Vygotsky's conception to the problems discussed here. According to him, logic as a discipline researching the relation of generalization between concepts is not concerned with the psychological status of generalizations and their development. This problem is central in Vygotsky's conception and for the model of generalizations system development proposed here. As the model is based on general formulations, not specified by Vygotsky, concerning different features of generalizations, some of my proposals are new to Vygotsky's conception.

The operation of concluding is in the proposed model, derived from the dichotomy: scientific concepts and everyday concepts, which Vygotsky used in his polemic on the opinion of Piaget concerning the determinants of concept development. Whenever Vygotsky used the term everyday concepts he frequently referred to spontaneous concepts. In discussion on concept development the range of the terms converge, as Vygotsky uses them interchangeably (cf. Wertsch, 1996, p. 27). The basic difference between a scientific and an everyday concept is the level of conscious usage of generalizations. Scientific concepts enable conscious operation on generalizations, which is basically the estimation of a hierarchy of the concepts. This is the reason why I introduce the operation of concluding. As presented above, concluding consists of changes in some thoughts that are the premise to another that is the conclusion.

Concluding is related to the situation of conscious awareness. It refers to Vygotsky's view concerning the development of consciousness based on the generalization system. The system develops by conscious awareness. If the basis of consciousness is the system of generalizations, therefore conscious awareness concerns the operations performed on these generalizations. Conscious awareness is the result of a long process of generalization development and allows for the inclusion of a new generalization on a new, higher level of generality. It should

be stated that concluding is an operation performed on generalizations, therefore a conscious one. The situation is not like that of practical activities on the basis of which you can notice logical operations. In this sense, concluding does not refer to the Piaget's claims (1955/1970) concerning the nature of intellectual development by practical activity. Concluding determines new word meanings, new generalizations in the objective and systemic aspect. Concluding enables a given generalization in an adequate relation to the word representing the object as well as to other generalizations. Concluding provides the knowledge of how they combine. Piaget, however, rejects the idea of the influence of the verbal system on cognitive development, describing intellectual development as a progression of the subject's activity performed on elements. What dominates his view on human development is the notion of the relation between operations and the structures that emerge as the result of the operations. The main difference between Piaget and Vygotsky concerns the role of the language system in the intellectual development of the human being. According to the latter the language system introduces logical rules into our behavior, and what we find as the metarules, for instance, logical calculus could not exist before the evolution of the language system. However, the research of Piaget and his school is useful in understanding the human intellect and would lead to a better understanding of mental functioning if it took into consideration the language as well. Vygotsky's cultural-historical consciousness approach offsets the research on the human intellect within the language system claiming that at its core lies the meaning system which is interpreted as the system of generalizations.

Concluding is the operation of referring of relations between premises and conclusion to adequate scheme of given relation described in given language of formal logic. A subject is consciously aware of real generalization by treating it as a particular case of superordinate generalization that is the scheme of given concluding. The stages of concluding development can be presented as a gradual progression of certain methods of reasoning. The higher levels of generality refers to the verbalization abilities of more complicated types of conclusion. Therefore the progression of conclusions is organized as a hierarchical system.

An example of the role of the concluding operation in generalization development can be the generalization *car*. A child in the first stage of generality development, at the syncretic level, combines the word *car* with concrete objects, for example, his own toys. Then he observes that words like *green, big, Ford, plastic* appear frequently with the word *car*, so then he makes a generalization on the basis of enumerative induction. The child is able to verbalize the conclusion saying for example *I got a green car; plastic, big, Ford, there are cars.* Certainly it is an imperfect enumeration, so it is not deduction. But we can notice in his verbalization a clear division between the first part – enumerating "different" kinds of cars, which is the premise, and the second part, which is the conclusion.

Table 6. Development of concluding

Level of generality	Feature of generalization	Type of operation
Syncrets	Individual	Enumerative induction
Complexes	Authoritative	Eliminative induction
Preconcepts	Everyday	Syllogistic deduction
Concepts	Scientific	Logic deduction

Source: compiled by R. D. on basis of Vygotsky (1987-1999), Выготский (1982-1984)

The model of generalization system development

Basic assumptions of the model

The basic assumptions of the model are presented below:
1. the system of generalizations is a structural-functional unity
2. the structure of generalizations is based on relations between the elements
3. the elements of the structure are arbitrary language signs
4. the function of generalization is comprised of operations performed on the elements
5. there are the following types of relations:
    (a) interrelations – presenting the equivalent relation between signs referring to the object and its features,
    (b) intrarelations – presenting the sub- and superordinate relation between the signs referring to the place of the concept in the conceptual system,
    (c) metarelations – presenting the relation of interrelations and intrarelations
6. there are the following types of operations:
    (a) representing – abstracting and analyzing the features of the object
    (b) generalizing – establishing the relation between signs
    (c) concluding – establishing the relation between signs referring to the hierarchical relations and the signs referring to the features of the object
7. there are permanent structural-functional relations:
    (a) representing – interrelation
    (b) generalizing – intrarelation
    (c) concluding – metarelations
8. there are the following variable structural-functional relations:
    (a) interrelation – generalizing
       interrelation – concluding
    (b) intrarelations – representing
       intrarelations – concluding
    (c) metarelations – representing (the higher format of generalization)
       metarelations – generalizing (the higher format of generalization).

Table 7. The model of generalization system development (digit signifies the format of generalization in developmental order, 1-syncrets, 2-complexes, 3-preconcepts, 4-concepts)

	MODUS					
	Structure			Function		
			ASPECT			
	Interrelations	Intrarelations	Metarelations	Generalizing	Representing	Concluding
			FEATURE			
4	Relevant	Systemic	Consciously aware	Overinclusive	Theoretical	Scientific
3	Common	Hierarchical	Over-intuitive	Inclusive	Empirical	Everyday
2	Characteristic	Associative	Intuitive	Subinclusive	Visual	Authoritative
1	Subjective	Incidental	Not consciously aware	Preinclusive	Impressive	Individual

Source: compiled by R. D. on basis of Vygotsky (1987-1999), Выготский (1982-1984)

The previous assumptions concerning the structural-functional nature of the generalization are presented collectively in Table 7.

There are two dimensions at the basis of the generalization analysis, which I provisionally describe as vertical and horizontal. The vertical dimension analyzes generalization from its most general to most particular characteristics. According to that dimension the generalization comprises two modi – a structural and a functional one. Each modi comprises of three types of aspects, and each aspect is characterized by the given feature unfolded at the given format of generalization development. The category of format concerns the vertical analysis and describes the developmental dynamics of generalization aspects. Each aspect is characterized by a different feature depending on the format. The generalization format should be understood as a concrete real developmental form of generalization aspects that are unfolded at a given stage of consciousness development.

The notion of generalization format combines semantic analysis of generalization with its analysis in the context of development of the higher mental functions[5]. Vygotsky treats generalization as the effect of cultural influence over the

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[5] Vygotsky differentiated the notions: lower mental functions and higher mental functions. The former is the way the biological structures work as, for example, perception, memory, attention, thinking. These functions are the effect of the evolution of living organisms and every healthy representative of the more developed species is endowed with them. The higher mental functions are the effect of cultural development of humans and their formation depends on the quality of participation of the subject in a given culture. The basic unit of the lower functions concern the reaction related to the stimulus-object action. Whereas the unit of higher functions concerns meaning and is connected to the stimulus-sign action. The objects as stimuli create the real objectivity of the natural world. The signs create objective ideal space of the cultural world. Every higher mental function, as mediated by signs, leads to the other cultural way of behavior, for example, perception mediated by meaningful formation differs from the natural one in a way that enables division of the visual field into any kind of category.

Figure 1. Relations between the aspects of generalization characteristic of the syncretic and complexive format of generalization. Double-line arrows designate permanent structural-functional relationships
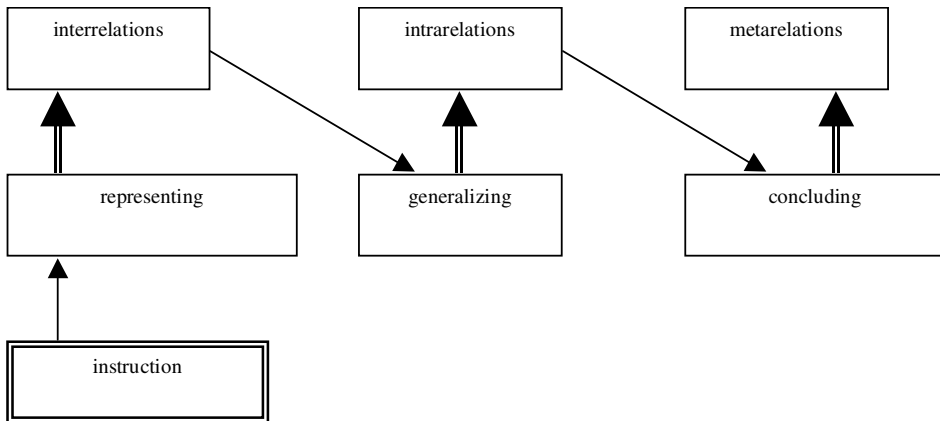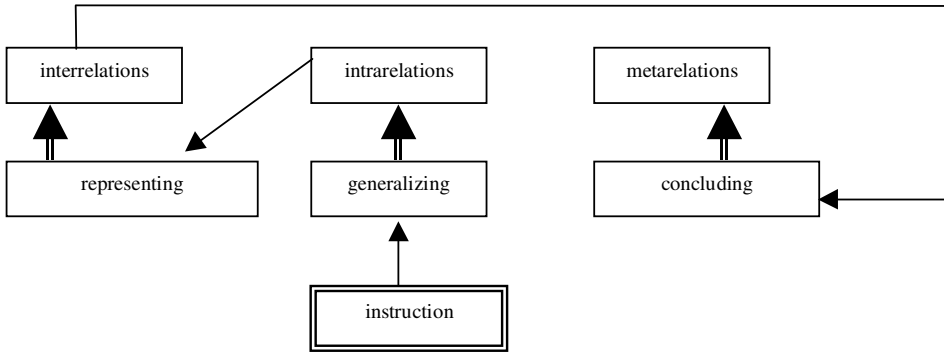

Source: my compilation - R.D.

consciousness development of the subject. From the biological point of view, consciousness is based on organization between primal functions of mind which, cautiously, can be compared to the contemporary differentiated modes of information processing as perception, memory, attention, thinking. Each mental function has its time of dominance in the course of the subject's development. The biological development of humans interfers with the cultural one, which, as Vygotsky claims, consists in including the system of generalizations in the functioning of the subject. It affects interfunctional and intrafunctional change. The former one concerns change within the interfunctional organization, which is described by Vygotsky as an outer construction of consciousness, and leads to the domination of one mental function over other functions. The second change concerns the inner construction of consciousness and is related to the system of meanings, as Vygotsky writes: "… the change of the system of relations between particular functions is tightly bound to word meaning, that is, that word meaning starts to mediate mental processes" (Wygotski, 1934/2002, p. 124).

For instance, in the period of development between the first and third year of a child's life Vygotsky perceives many changes in the structure of mental functions introduced by speech development such as isolation of the perceptive function from undifferentiated functional unity that characterized the earlier stage of development, the ability to categorize from the visual field, and so forth. However, there exist limits of generalizations at this stage because the meaning of words is confined to the visual field solely. Therefore the ability of cultural influence over the subject is confined by the mental function developing at the given stage of development. There-

Figure 2. Relations between the aspects of generalization characteristic of the preconceptual and conceptual format of generalization. Double-line arrows designate permanent structural-functional relationships

Source: my compilation - R.D.

fore, every generalization format represents a collection of confinements concerning the development of the system. Every generalization format relates to the dominance of a given mental function. In the case of syncrets, it is the function of perception, for complexes, it is the function of memory, for preconcepts, the function of attention, and for concepts, the function of thinking.

Each generalization format enables a possible sequence of generalization aspects. The form of that sequence depends on the type of instruction possible at a given level of development. From the semantic perspective Vygotsky differentiates the instruction type according to the generalization that is created in the process. So, according to that criterion, instruction divides into two types. One focuses on the aspect of interrelations and concerns syncretic and complexive generalization development (see Figure 1). The other is connected to the aspect of intrarelation and concerns preconceptual and conceptual generalization development (see Figure 2).

The above figures correspond to a graphic representation of the differentiation concerning spontaneous and nonspontaneous concepts introduced by Vygotsky. The spontaneous concepts are created voluntarily without the presence of any conscious intellectual process. The nonspontaneous concepts develop through the verbal training with significant people surrounding the child, and are created with the use of conscious intellectual processes. The above division is comparable to the contemporary division of information processing according to which there is a bottom-up processing – from concrete perceptions of phenomenon features to the general categories and a top-down processing from general categories to concrete perceptions (cf. Maruszewski, 1996, p. 14).

Therefore the first type of instruction relates to the development of spontaneous generalizations and instruction of the second type relates to the development

of nonspontaneous generalization. I think that the division of generalizations proposed here can be related to Vygotsky's views on the nature of the process of instruction: ".… every instruction requires preceding from the period of embryonic development, to the period … of introductory, preparatory instruction" (Wygotski, 1934/1971, s. 530).

According to Vygotsky's claims, spontaneous and nonspontaneous concepts concern two different formats of generalization, and it should be clarified what is an inner differentiation of the formats in the proposed division. I consider the hypothesis that in an adjacent pair of generalization formats the underdeveloped one plays the preparatory role for the development of the other. Therefore, the syncretic format plays a preparatory role for the development of the complexive format. These formats do not extend beyond visual interpretation of reality, and the syncretic interpretation is related to the subject's impressions rather than a complexive one. The preconceptual and conceptual format presents reality in a symbolic way, but the first one is based on experience and the second one is purely symbolic.

According to Vygotsky's view on the language functions (cf. introduction) it can be stated that the communicative function dominates in the development of the "visual" formats. Therefore during communication with others the child develops a visual image of the world, and in the case of "symbolic" formats the development is dominated by the representative function. The above statements show that Vygotsky treated the language system in consciousness development as the basis of forming the conceptual system. Bruner (1986, p. 78) refers to this when stating that development of humans comes from the discovery in language of the narrative forms of tales and then it leads to the basis of logical calculus.

Instruction as a factor introducing changes to the relations between the aspects of generalizations

The conception presented here enables a better description of Vygotsky's intuitions concerning the role of instruction in the school period in the generalization system development. Instruction is treated as a relevant factor in human development, as a symptom of culture influence on biologically determined processes of the organism's maturation. I outlined above the conception of higher mental function development which results in mutual determination of basic factors of consciousness development. According to Vygotsky's opinion, widely known, the quality of effective instruction should be ahead of a given maturational processes. The efficiency of instruction relates to the concept of sensitive periods in development, which are understood as the proper time for a particular influence on stimuli of a given type. For Vygotsky, instruction is effective when it is directed to the sensitive period of development of a given ability. Contemporary developmental psychology (cf. Brzezińska, 2000), differentiates the sensitive pe-

riod of development from the optimal period. Both concern relations between the stimulation and a given developmental effect.

Sensitive period signifies a relatively long period during which a given stimulation should work to enable development of a given function. As an instance of this situation, there is the empirically confirmed hypothesis of Lenneberg[6] (1967, in: Lock, 1997), concerning the sensitive period of grammar development, boundary of which lies around the beginning of adolescence period that is estimated at approximately 11-12 years. Above the boundary the acquisition of grammar is not possible, which is confirmed by data taken in the research of so-called Wild Children (cf. Genie's case described by Curtiss, 1977, in Jones, 1995). However, the optimal period is also described as the critical one, and is characterized by a short period of sensitiveness to strictly defined stimuli. These periods pertain to simple sensory or motoric functions (cf. Lorenz's research on imprinting phenomena, in Brzezińska, 2000, p. 133).

Vygotsky used the notions of sensitive and optimal period interchangeably, however the characteristics show that to the problem of instruction, the term *sensitive period*, suits best. In the context of instruction the sensitive period is created by the maturing abilities of the subject: " The research demonstrates that of all didactic and educational endeavors the most important are those features that at the beginning of instruction have not yet matured" (Wygotski, 1934/1971, p. 521).

Therefore Vygotsky had to estimate the upper and lower boundary of the sensitive period. The lower boundary relates to the actual level of a subject's abilities, and its upper boundary is established by the degree that help offered by the more advanced participant of culture in the given ability is used. For a given ability the zone of proximal development is established. Vygotsky described also the concept of the zone as the difference between the subject's ability to perform on his own, and the subject's ability to cooperate with another individual. The abilities within the zone create the *proximal developmental future* for a given type of functioning.

In the case of generalization development the horizon of the nearest future is created by the next level of the generalization format and within the format the given aspect of the generalization. It is clearly visible in Table 7 where the format immediately "over" the given one creates the zone of proximal development for the former format. In the school period the format creating the zone of proximal development is the preconceptual one.

The most important change that happens in the school period is the change in the developmental sequence of the generalization aspects presented in point 8 at the beginning of that chapter. The new type of instruction that appears in the school period provides for creation of a new level of generalizing and afterwards,

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[6] However, contemporary findings try to undermine resoluteness of his claims, but the general conclusion concerning the critical period of grammar acquisition is still valid (cf. Jones, 1995).

by cooperation with an adult in the zone of proximal development, it leads to a change of representation and as a consequence a change of concluding. What is the difference between the above mentioned type of instruction and the earlier ones? Vygotsky presents the progression of instruction types that converges with the progression of the format generalization development. The criteria of instruction types are the relation between the actions of a teacher and actions performed independently by the subject.

The first type of instruction is described as spontaneous, since it is triggered by the child's affect and could not be modified by surrounding people. It concerns the child in the first three years of life. The second type of instruction is described as spontaneous-reactive and is characterized by the fact that when the teacher wants to transfer to a child any content he/she must take into consideration the interests and motivations of the child, otherwise it leads to the inability of providing the process of instruction. This type dominates in the preschool period. In the school period, however, reactive instruction is possible. The teacher is able to provide his/her own syllabus based on the objectives of the process of knowledge transfer. As a division of instruction types depends on the generalization formats another type of instruction can be deduced, which I will describe as reflecting, to highlight that it is based on the knowledge of students and requires conscious transformation of that knowledge. I think that that type of instruction is basic in andragogics, as it dominates in higher education and is the basis for self-learning of adults.

Reactive instruction is based on the primary verbal definition[7] (cf. Выготский, 1934/1982, p. 186) that is on receiving, during the educational process readymade relations between the signs representing given generalizations. The described above intrarelations (relations of the sign-sign type) are created by the generalizing operation, which for the preconceptual format takes the form of the inclusion operation, that is a class containment. The linguistic sign is treated as designating a given class of phenomena, within which there are other phenomena related to different signs. The problem is that the subject does not know what is the range of the class of the phenomena related to the given sign. The next step is the estimation of the range resulting in the development of the representing operation. It creates the relation between the signs relating to the object's features. In that way the features of objects of a given class are marked. That relation marks the class boundary, that is, the basis of the hierarchy introduced by the primary verbal definition. The end of the process is the operation of concluding that relies on referring the class hierarchy (intrarelations) to the words relating to the given features of the examples (interrelations). That reference takes the form of con-

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[7] Worth noting here is that the term was absolutely inaccurately translated by Minick (translator of Vygotsky's last work – Thinking and Speech), who omitted or misunderstood the Russian term: *первичный* – primal.

cluding by a certain scheme. In the school period the scheme takes the form of classical syllogistic concluding, where the first premise describes the relations of inclusion and the second describes creation of the object's features. The conclusion creates a metarelation that is the ability to join inter- and intrarelations at the same moment of consciousness. Appropriate examples are presented below:

Within the subject *integrated instruction* at the second grade of primary school in Poland, the generalization *poem* is introduced by the following primary verbal definition: "The poem is literary work, in which speech is organized in a defined form. The poem can be written in stances or in a continuous form. It can contain rhymes or be rhymeless. The opposition to the poem is the prose" (Obara, 2005, p. 8).

The generalization *poem* appears in the relation of generalization *literary work*. At the introduction of this definition the child "learns" that such a relation exists but does not know what kind of object it concerns, that is, what kind of features of an object determine the class boundaries, which names appeared in the definition. In the next part of the definition there appears the features of the described object, but their "acquisition" by the child requires the operation of representing. Therefore much analyzing and synthesizing leads to the abstracted features which can be taken as common ones and can determine the boundaries of the classes. However, for quite a long time the relation between the generalizations *poem* and *literary work* will not be clear to the child.

A different direction of instruction in the school period is the effect of the type of instruction described by Vygotsky as spontaneous-reactive in comparison to the preschool period. The zone of proximal development is created, in this case, on the basis of the representing operation. As described above, this type of instruction relies on highlighting the object's reference. The operation of generalizing and concluding appears next. As an example here is the way of instructing the generalization *self-dependence*. The generalization is introduced as follows: "… I would like to know, who of you can put on your underpants? And who can put his/her slippers on? I am also much interested in who can eat by him/herself?". Of course children would give positive answers after each question. "I can see that you are self-dependent and I am really glad of it. … Children who listen to their mom, eat by themselves, pee in the potty, put the toys in their place – there are polite and self-dependent ones" (Trawińska, 1988, p. 204).

In the above example introduction of a new generalization does not take the form of a primary verbal definition. The way of giving an instruction requires from the child finding the range of the phenomena grasped by a name. With the help of synthesis and analysis the children find the features of behaviors which correspond to the given expression. The operation of generalization is based on finding the relations between generalizations by associations. They are based on relations between the ranges of the names connected by part-whole inclusion. That is why in this example the relation between the generalization *self-depend-*

ent and the generalization *polite* takes the form that for the child to be self-dependent is part of being polite.

In the above example, concluding is based on enumerative induction and relies on connecting all behaviors expressed without the help of adults as self-dependent but assuming that these behaviors are accepted by the adults. Behaviors understood as impolite but de facto self-dependent, that is, *going out* or *taking sweets without permission and so forth* is understood as impolite and therefore as not independent. The difference between the development of generalization in the preschool and school period presents variable relationships described in point 8. During the preschool period the operation of representing leads to the operation of generalizing, but in the school period the situation is reversed, namely, the operation of generalizing leads to that of representing.

Therefore the shape of the zone of proximal development differs for each developmental period. In the preschool period instruction is based on the operation of representing that leads to creating the hierarchy between the generalizations found in the part-whole relation and, later on, to concluding based on eliminative induction. But in the school period the specificity of reactive instruction is founded on generalizing operation and relies on creating a hierarchy understood as inclusion of classes of separate categories. Concluding in this period is confined to creating deductive sentences in the form of classical syllogism. The situations are described in point 8b.

The role of the hybrid generalization in mental development in the school period

The problem of hybridity can be understood at lest at two levels. As Cole (2000) reports in a biological perspective hybridity of a given organism differentiates from the two zones of species' purity. Therefore the hybrid is a mixture of two species, that can start the new one. In the cultural perspective, hybridity is a general type of culture functioning, which interrelates so that pure types cannot be extracted. Hybridity in relation to the generalization system is defined in the context of a mixture of pure types as a stage in generalization development. A state of permanent hybridization is also possible in the situation when the development of generality is broken by some reasons.

The features of the generalization system presented so far, require explanation in developmental reality. Each aspect of generalization takes the form, according to the assumptions summarized in Table 7, of a given developmental type delimited by the level of generality accessed by a given subject at a given moment of development. The hybrid generalization is a generalization of which at least one aspect is characterized by properties adequate for the adjacent generalization format. The form of hybrid generalization is described as the sequence of the generalization aspect of development. There are eight stages of the hybridization process (see Table 8).

Table 8. The stages of the hybridization process of generalizations

Format of generalization	Stage of generalization	Aspects of generalization
Syncrets	1	Representing – interrelation
	2	Generalizing – intrarelation
Complexes	3	Representing – interrelation
	4	Generalizing – intrarelation
Preconcepts	5	Generalizing – intrarelation
	6	Representing – interrelation
Concepts	7	Generalizing – intrarelation
	8	Representing – interrelation

Source: my compilation - R.D.

Table 8 should be understood in the following way: in the third column there are aspects of the generalization which are already developed to the level presented in the first column. Therefore the fifth stage of hybridization means that, at the level of preconcepts, the generalizing and the intrarelation takes the form of that format. Other aspects are not developed to the level of preconcepts and they reach only the level of complexes. For instance, a child at the second grade relates a given sign with an object on the basis of characteristic features, but the aspects of generalizing and intrarelation are at the preconceptual level. The sixth stage of hybridization means that representing, interrelations, generalizing and intrarelation takes the preconceptual features but concluding remains at the lower level. At the moment when the latter reaches the level of preconceptual format, a given generalization stops being a hybrid generalization.

As an instance of the described situation I will use the above mentioned case of development of the generalization *poem* introduced at the second grade of primary school. The acquisition by the child of primary verbal definition of the generalization *poem* in the form: "Poem is a literary work, in which speech is organized in a defined form. The poem can be written in stances or in a continuous form. It can contain rhymes or be rhymeless. The opposition to the poem is the prose", leads to a generalizing operation and the structure of intrarelations whereas the operation of representing and the structure of interrelations along with generalizing and metarelations are at the level of a complexive format. Therefore at the described period the generalization *poem* can be characterized as shown in Table 9.

The aspects in italics belong to a higher–preconceptual generalization format, the others to the complexive format. The described situation takes place at the beginning of the new generalization acquisition where the form of generalizing leads to the hierarchical intrarelations. A child hearing the above definition cre-

Table 9. Analysis of aspects of the generalization *poem* introduced at the second grade of primary school

Generalization *poem*	
Aspects	Developmental form of aspects
Generalizing	*Inclusive*
Intrarelations	*Hierarchical*
Representing	Visual
Interrelations	Characteristic
Concluding	Authoritative
Metarelations	Intuitive

Source: my compilation - R.D.

ates hierarchical relations between the generalization *poem* and the generalization *literary work*. He/she knows that these generalizations pertain to different ranges of reality, that the first range is contained in the other. He/she does not know, however, how to differentiate a poem from a non-poem, or rather he/she knows but it is "complexive", concrete knowledge. This means that looking for examples of poems the child will use their characteristic features. In one of the chapters above the characteristic features were described as prototypical as proposed by Rosch. Therefore the child may describe *poem* using a set of typical features such as, for instance: *appearing in certain situations at school ceremonies, existing similarity between certain words, specific graphical pattern, and so forth*.

The operation of concluding, at the complexive format, resembles the process of eliminative induction, that is, at the basis of observation of occurrence of certain features related to others by the word *poem,* in the child's mind appears the set of features related to the specific signs (words) that are connected with that sign *poem*. At the basis of the other type of observation, that is, another set of features that does not relates to the sign *poem* the child is able to conclude, that a poem is characterized only by the most frequently used set of features along with the sign *poem*. However, the operation of concluding must be verbalized otherwise it would be just mere imagination. For the child the generalization *poem* is related to the generalization *literary work,* but with all the features that the former level of generalization has equipped it with.

The next stage of development of the generalization *poem* (the operation of representing at the level of preconcepts) is the change concerning the set of the collection of features that can be described as a *poem*. The necessary condition of development in this case is the existence of the superordinate generalization *literary work*, as it enables the comparison of the two subcategories within the main category. Comparing of different types of *literary works* leads to the isolation of common features *of the poem, of the short story, of the novel*. It provides the

development of interrelation, which are based on a group of abstracted common features, for instance: *graphical pattern of verses, existence of rhymes, rhythms, and so forth.*

The next step of preconceptual development of that generalization is a different type of concluding based on the syllogistic deduction. The child does not use only observation, but he/she tries to use information from the teacher. He is therefore able to formulate the conclusion: *If the work I can see in front of me has a specific graphic form, has the rhythm and rhymes, therefore it is a poem.* The ability to formulate such conclusions enables organizing metarelations at the overintuitive level and opens for the subject the ability to reflect instruction which stands for the beginning of the next format of generalization development namely, the conceptual one.

Conclusion

Vygotsky discovered that in the school period the new type of instruction introduce changes into the developmental sequence of generalization aspects. As an outcome part of words related to the object's features "lack" reference and other words "lack" words related to the superordinate generalizations. School instruction is the source of such a differentiation. For the first time in ontogeny the child meets with social influence that is different from the one earlier experienced. As Vygotsky's research shows this is the optimal type of instruction in the mentioned period of a subject's development. According to the view presented in this article, instruction is based on the effect of hybridization of generalizations, a process which is the consequence of the heterogeneity of human consciousness.

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