



## **USE OF CONCEPTS AND SCHOOLING PROCESS: THE CASE OF ILLITERATE AND LITERATE ADULTS**

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**ABSTRACT.** This paper examines the forms of relations that people establish with their schooling processes. The question about the possibility of developing a literate standard in the orality of illiterate adults will be discussed from two angles: a) first, we will argue the extent to which engaging in everyday activities, without completing the formal cycles of schooling, allowed the study's illiterate participants to develop a standard that we assume as literate in its orality; b) then, we will analyze how the level of abstraction in the concepts with scientific structure formulated by illiterate participants differ from that presented by literate participants.

**Keywords:** word meaning structure; literacy; border zone; cognitive development

### **1. Introduction**

The general idea that guides this paper is considering the notion of border (Marsico, 2013; Marsico and Iannaccone, 2012) as a privileged space to discuss questions concerning the forms of relations that people establish

with their schooling processes. On the one hand, we know that schooling institutions organize their activities aiming to modify, in a determined manner, the students that become immersed and continue in their progressive cycles. By this approach, homogeneity is indicated as a component of the process. On the other hand, when we focus on the personal modes of appropriation of the collective experience enabled by the schooling process, what is evident is the notion of heterogeneity. In the following exposition, this notion will be privileged, because it is exactly its absence of uniformity that permits us to establish the connection between the two aspects that perform this work's intent: first, to present a discussion regarding the development of the word meaning structure and the role of formal schooling in promoting this process; and second, to assume the metaphor of *border* as a heuristic resource for discussing questions about the passage from the illiterate condition to the literate condition.

Intending to deal with the first purpose, we will examine of the results of a study with literate and illiterate adults<sup>1</sup>. By means of this examination, indications will be given which will establish connections to the second subject we intend to address, with regard to the border situation configured in the transition from one condition, the illiterate, to the other, the literate. With this metaphor, we will follow the variation demonstrated by the research participants in relation to the circumstances presented, with emphasis on the semi-literate state, which distinguishes the passage between the two extreme conditions. We intend to explore the tensions established in this intermediate zone, pointing out limitations and potentialities in the approach assumed here.

## **2. The literate societies and cognitive development of adults**

Several studies have been conducted that discuss issues related to specific training conducted by the school and its impacts on cognitive development. In this case, it is the result of a study on the relations between the schooled and un-schooled modes of thought, carried out in order to understand how non-literate adults belonging to literate societies, those that are organized around the writing (in contrast to societies that don't have writing) handle concepts with regard to different levels of abstraction. Therefore, the responses on tests of cognitive processes of two groups of participants - literate and illiterate - were taken as research object.

Brockmeier and Olson (2002), in an article on the spread of the literate culture, emphasize that the debate on the relationship between culture and mind has been a topic of academic interest since at least the Enlightenment, and the issues of written language and written culture have become the

focus of debate only in the last decades of the twentieth century. They attribute the origin of this interest to various disciplines, such as sociology, anthropology, history and psychology, and locate in one of the lines of this debate, as a starting point in a psychological context, the studies conducted by Vygotsky and Luria in the 1930s in Central Asia. These authors intended to understand, through these studies, how changes in socioeconomic conditions affect human consciousness. To do so, they attempted to assess the effects of modernization, which included formal education and the collectivization of labor, on forms of perception and thought (Brockmeier & Olson, 2002; Luria, 1990; Van der Veer & Valsiner, 1996).

Among the general results of the pioneering research, Vygotsky and Luria described the modes of interaction between the changes in cultural circumstances and people's minds, specifying that the literate participants of the research were better able to think abstractly and in a self-reflexive manner, when considered in comparison to non-literate participants. Vygotsky and Luria also indicated that the cultural institution of writing not only allowed people to think differently, in a context entirely intralinguistic, if necessary, but also highlighted writing and speaking (language) as central tools of consciousness.

From these studies opened up an important field of study, considering what was patented as the approach of Luria and Vygotsky for the dialectics of literacy, thinking and culture. Vygotsky and Luria conducted experiments on classification. Vygotsky was interested especially in formal schooling because he understood the school as capable of developing complex forms of thinking. Fundamental to the following description are the distinctions that Vygotsky (2009) established between everyday concepts and scientific concepts. This is the set of theories of cultural-historical psychology that integrates the topic of concept formation that, according to Van der Veer and Valsiner (1996), became an evident interest of research for the author from 1927 to 1934.

Considering the fundamental idea that word meaning changes, in the sense that words mean different things at different stages of development of semiotically mediated thought, how the information is encoded may vary, giving rise to the two most common types of word meaning structure: so-called "everyday concepts" thinking or "scientific concepts" thinking. The word meaning structure (WMS) involves the description of the system of relationships, the way the symbols are connected. In thinking driven by everyday concepts, the words encode information based on perceptual attributes of the referents. Thus, word meanings are limited by the characteristics and contexts of the external referents. In thinking guided by the scientific concept, the structure of word meaning is abstract and

hierarchical, its construction is formally logical and does not depend on immediate reflection on reality.

In this point, it is important to make clear that “scientific concept” is a very unfortunate term used by Vygotsky to name this use. Scientific concept is characterized first of all with its intralinguistic hierarchical structure; at the same time, it may have no connection to science. Any syllogism, for example, is a case of scientific concepts, and yet most of the syllogisms we can find in philosophy have no scientific content.

Toomela (2003a) proposes to refer to this operation as language use, and makes clear, from the formulations of the authors of cultural-historical psychology, that these different modes of use can be organized in hierarchical levels, where each level follows different principles that determine the possible types of relationships between words, establishing possibilities and restrictions. We also assume with this author that, as a consequence of this theory, the possible ways of connection between words, whether mostly everyday or scientific, are related to different mental operations.

In this line of interest, Toomela (2003b) developed a study that examined the interactions between three factors: 1) the structure of the dominant word meaning (formulation of concepts in everyday or scientific terms); 2) the level of cognitive skill; and 3) personality characteristics. As a result, the study found that participants who had a predominantly everyday conceptual structure, or who had comparatively low levels of cognitive skill, don't reveal a personality structure consistent with the solution proposed by the five-factor model (Big Five - McCrae & Costa); contrary to what happened to the group of participants who exhibited a predominantly scientific conceptual structure or that had higher levels of cognitive skill.

These results led the author to conclude that personality would be influenced by a cultural factor - the structure of word meaning - and to question ideas of universality and biological determination of the Big Five model. In particular, the results displayed by people with fewer years of formal schooling reinforced this conclusion. Further studies have also demonstrated that the dominant type of word meaning structure is related to differences in many cognitive and noncognitive processes of mind; among them cultural values, attitudes towards the use of drugs, self-esteem, academic achievement in different subjects, drawing abilities, different cognitive abilities etc. (Tammik & Toomela, 2013; Toomela, 2003b, 2005, 2008, 2010; Toomela & Kikas, 2012; Toomela, Tomberg, Orasson, Tikka & Nõmm, 1999).

In 2004, the research object of this paper began, in the interest of performing a comparative study that allows investigating certain relations

between cultural factors and personality. The Brazilian sample of this study<sup>2</sup>, conducted in conjunction with Toomela, consisted of 109 participants (40 illiterate and 69 literate; all illiterate adults being of low socioeconomic status). Participants are from Salvador and other cities of the interior of Bahia.

From the point of view of cognition, the question on which aspects are involved in learning to live in a literate culture is central to this study. We believe that this learning involves everyone, schooled or otherwise, especially in urban centers, where support in written information is crucial for survival (Kleiman, 2001; Oliveira, 2003; Tfouni, 2006; Vóvio, 2007). So, the goal was to formulate some understanding about how illiterate adults belonging to literate societies relate to word meaning in relation to the different levels of abstraction, which have been explored in comparison, in this group of participants, the relationships between: a) the condition of illiterate (non-literate or semi-literate) and literate (schooled); b) the type of predominant word meaning structure (everyday or scientific); and c) the degree of cognitive abilities. With this we aim, ultimately, to expand the discussion about the development of the structure of word meaning and the role of formal schooling in promoting this process.

That said, we consider as an important point to our argument the indication of Oliveira (1996, cited by Oliveira, 2003) according to which the educational institution figures, in urban societies, as a fundamental formation space, to the point of defining “the very conception of human development” that guides ongoing social practices. According to this conception, the adult conceived as a full and well formed citizen, *can only be constructed by passing through school*, since “The exclusion of the schooling process, as well as any forms of impoverishment in the school experience would be, (...) failing to promote the individual's access to fundamental aspects of their own culture” (Oliveira, 2003, p. 4. Emphasis added).

On the other hand, several studies situated in the literacy approach<sup>3</sup>, whose authors question the exclusivity of formal schooling as a means of access to literate systems of knowledge, point out that in modern literate societies, pragmatic knowledge about the working mechanisms of discourse also configures a possibility. In this regard, Pereira (1998) defends the thesis that some political institutions, trade unions included, are effective literacy agencies as much as they approach the orality of illiterate adults to the literate orality with regards to their argumentative characteristics. Therefore these studies, which focus on the role of work, question the issue of social practices of development of the reading and writing skills, calling attention to the role of broader social activities that

take place outside of the school, as effectively demanding and promoting notions learned in school.

In the theoretical framework defined here, orality (speech) is regarded as a symbolization of the first order, and writing, more abstract, a symbolization of the second order<sup>4</sup>. The formal instruction transmitted by the schooling process puts those who participate in it in conditions to alternate between writing and oral language. As in this study, the illiterate participants responded orally to the test that evaluates the structure of word meaning, literate orality here means formulating a concept orally with the formal characteristics of scientific conceptual structure (Vygotsky, 1998). We consider it important to remember the historical fact that formal schooling is not, theoretically, the only way to develop a hierarchical, abstract, formally logical thinking, scientific conceptualization, insofar as since the time of ancient Greece, this development of thought modality has been achieved. In this respect, save some distinctions, we tend to agree with the authors of the literacy approach. However, with the spread of the practice of education, this development was institutionalized in school, to the point that, as a general rule, the authors, who are dedicated to investigating the topic of cognitive functioning of adults people in different contexts, stressed the importance of the schooling process to promote training targeted for the management of theoretical operations, a process that involves acquiring certain cultural tools that support the organization of thinking (Luria, 1990; Oliveira, 2003; Toomela, 2003b; Vóvio, 2007; Vygotsky, 2009).

Thus, in order to present a discussion of the development of word meaning and the role of formal schooling in fostering this process, we formulated the following questions: a) Considering the importance of the process of schooling on the development of abstract, logical-formal thought (guided by the scientific concept), in light of the demands of today's literate societies, how does the conceptual structure of illiterate adults participating in the research present itself? b) Have such adults developed orality organized by a literate pattern? From these investigations, we explore comparatively the relationships between: a) the illiterate condition (unschooled or semi-schooled) and the literate condition (formally schooled); b) the type of predominant conceptual structure (everyday or scientific); and c) the degree of cognitive skill. The broader question that guided this study was: How do illiterate adults belonging to literate societies relate to word meaning in relation to different levels of abstraction? From that point, we move to the section that contains a brief description of the method that guided the work.

### **3. Description of the method (instrument, procedure and presentation of participants)**

In conducting the study we followed ethical procedures established in the Psychologist's Code of Professional Ethics<sup>5</sup>. All participants were informed about the objectives, justification and procedures of the study. Additionally, they were informed of the limit of use of information to be acquired, and assured of confidentiality. They were also told they were free to abort the process at any time and with no inconvenience, in keeping with the character of voluntary participation. The instrument whose results will be analyzed is the test for identifying the type of the word meaning structure (WMS), presented as Annex to this paper.

#### **3.1. Structure of word meaning test**

To evaluate the predominant conceptual structure (WMS), we used a test<sup>9</sup> constructed by Toomela following the instructions of Luria (1990). In the test, three additional measures of conceptual structure identification are used: the task of the third redundant (trios of words); the detection of similarity (similarity between pairs of words); and the definition of concepts.

In the third redundant practice, six trios of words were offered to participants, one at a time. The indicated task is to choose two of the three words, and declare the criteria used for selecting these two words. In the detection of similarity step, six pairs of words were provided. Pairs vary in relation to the transparency of their similarity - with words that belong to the same category, such as *cat* and *dog* - and words that refer to objects with complementary relationship, such as *hat* and *head*. The task is to ask the participant to indicate the most important similarity between words. Finally, in the third stage of the test, which includes the definition of concepts, six were explored: two concepts with which people normally deal (E.g.: *What is a hospital?* / *What is a school?*) And four abstract (E.g.: *What is democracy?* / *What is social reform?*).

Altogether there are 18 questions, six in each of the three parts. The responses were coded into two categories, with the designation of the code "0" for the everyday conceptual type and code "1" for the scientific conceptual type (or "hierarchical"). The criteria for analysis and coding of responses also follow Luria's (1990) and Toomela's indications. The answer should be coded as the everyday concept type (EC) when the definition, description of the similarity or the definition of the criterion of commonality provided by the participant was based on the following aspects: 1) sensory attributes of objects (E.g.: "The *axe* and the *hammer*

have handholds”); 2) observation of external everyday activities (E.g.: “The *Hospital* is the place that takes care of the sick”); 3) observation of everyday situations and objects connections to everyday situations (E.g.: “The *carrot* is put in the soup”); 4) description of the function of objects (E.g.: “It is the *wheel* that pulls the car”); 5) description of common parts (E.g.: “*Cat* and *dog* have four legs”); 6) no response is provided.

The lack of response was coded as EC because some test items are not conducive to response when the conceptual structure of the participant lacks a hierarchy, or scientific conceptualization. For example, responses to questions about abstract concepts such as democracy and social reform, are not codified as everyday because both require a hierarchical, scientific response. So when we posed questions of this nature to a participant whose predominant conceptual structure was the everyday, it seemed that nothing occurs to them to say. It is important to note that all research participants responded to at least two items from each of the three parts of the test, indicating that, following the guidelines of Toomela (2003b), the possible shortage of responses cannot be attributed to lack of motivation.

The criteria for coding and analysis of the responses as scientific (or hierarchical) type (SC) are: 1) the relationship between words is defined hierarchically (E.g.: “*Cat* and *dog* are mammals”); 2) a word is related to a concept of higher hierarchical level (E.g.: “*Democracy* is a form of legitimation of power from a class or layer of society on the others, historically and specifically”). The test responses were analyzed and coded by two participants of the research group, with concurrent discussion in cases of disagreement. In circumstances where a consensus was not possible, a third person participated in the discussion. Two other situations also occurred: in one, the tests were coded by a participant who then shared and discussed his interpretation in the research group; in the other, the tests were coded in the group, by reading the responses and sharing the coding process. These different modes of correction ensured that each test was examined by at least two reviewers.

### **3.2. Procedure**

All research participants were aged over 18 years. Concerning the age limit, the requirements varied for the two subgroups. To compose the group of literate participants, we invited students who have completed graduate education or higher, people with more than ten years of formal schooling. For illiterate participants, we invited persons who fulfilled the condition of being non-literate or semi-literate. In this case, once the invitation is made to the potential participant, and after acceptance, the following protocol was performed to verify the possibility of the participant being considered



non-literate or semi-literate:, one by one, were presented ten written words, and the participant was asked to try to read some of them. The words (or phrases) were as follows: 1) “acarajé”, 2) “Bonfim”, 3) “hair”, 4) “cypress”, 5) “extravagant”, 6) “book”, 7) “nefelibata”, 8) “researcher”, 9) “transport”, and 10) “twenty reals.” As a rule, only the participants that read less than seven of these words (which corresponds to a success rate below 70%) were considered adequate for the subgroup of illiterate participants.

We adopt this criterion because we consider that by living in societies where written information is circulated, people can recognize some letters and identify the format of words probably more common in their daily lives, as is the case of words (or expressions): "acarajé", "Bonfim" and "twenty reals" ["10 dollars"], naming respectively a typical local food; the name of a neighborhood in the city of Salvador (BA), named from a saint of the Catholic Church and also a church located in the city of Salvador (BA); and, finally, a small amount of currency. On the other hand, the word "nefelibata" fits the criteria to be unfamiliar, although easy to read, if the participant recognizes the letters that compose it.

As the first point of application of the instruments, some socio-demographic information of the participants was collected such as age, marital status, religion, occupation and schooling. The second part consisted of the remainder of the application of the instruments, which comprised two phases: the response to the test on identifying the word meaning structure, and the response to the tests of cognitive skills. In the case of illiterate participants, instruments were applied in two individual sessions, with the presence of the applicator that read the 18 questions and wrote down the orally formulated answers, while fully respecting the elaborations of the participants. For the subgroup of literate participants, the presence of the applicator was required only at the time of the application of the battery of cognitive tests.

The information collected through the application of instruments passed through two types of treatment: first, the coding that followed the procedure described in section 3.1.1; and second, the answers to the test on word meaning structure (WMS) were fully typed in the word processing *software Word for Windows*, in order to provide a more detailed analysis of their levels of generalization and abstraction. The socio-demographic data of the participants were entered into a database assembled with the *software SPSS for Windows*. Then, reports were generated for the purpose of obtaining a descriptive statistical analysis. Next, in order to characterize the set of participants, we will present some socio-demographic information: gender, education, age and occupation.

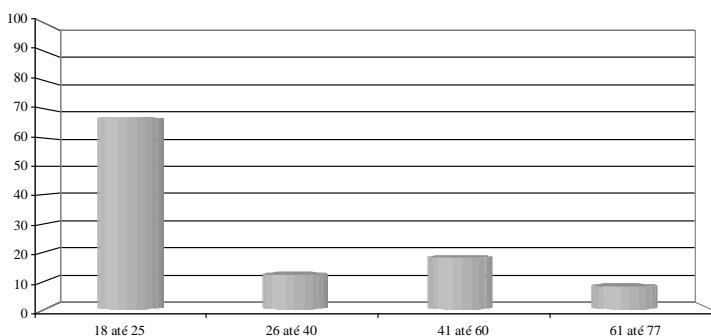
In Table 1, below, we can follow this study of 109 participants of both sexes: 73 females and 36 males. Regarding education, school was attended by 40 illiterate and 69 literate. The group of illiterate participants (36.7%) is composed of adults who did not attend school or who, despite having attended, remain non-literate (22) or semi-literate (18). For the literate group (63.3%), one participant was a high school student; 59 were bachelor's degree students; eight had completed the bachelor's degree and one was a master's degree student.

**Table 1**  
Socio-demographic characteristics of participants (n = 109)

Profile	Category	Percentage
Gender	Female	67% (73)
	Male	33% (36)
Schooling	Non-literate	20,2% (22)
	Semi-literate	16,5% (18)
	High school student	0,9% (1)
	Bachelor's student	54,1% (59)
	Bachelor's degree concluded	7,3% (8)
	Master's degree student	0,9% (1)

The age distribution of all participants is shown in Figure 1, below, a concentration of participants aged between 18 and 25 is evident, corresponding to 63.8% of the total. Ages ranged from 18 to 77 years, and the medium age was 31.5 years (SD = 15.9) and the median, 23 years.

**Figure 1**  
Distribution at intervals of ages of participants (n = 105)



Having presented the general characteristics of the participants, we move to the presentation and discussion of results. At the end, the main conclusions of the study will be indicated.

#### **4. Results and Discussion**

Following the theoretical parameters adopted in this work, we establish a criterion for the organization of participants and number of answers to the test of the word meaning structure (WMS), evaluated as having a scientific type of organization. Thus, those participants, in both subgroups, who formulated the most scientific concepts (SC), according to the rule specified below, will participate in the later stage of analysis. This choice is justified because, as we are researching effects attributed to the process of schooling, we understand that such effects are expressed more clearly between those who exhibited the most characteristically schooled mode of thinking.

According to the model used by Salomão and Toomela (2010), we divided the participants into three groups, based on their scientific answers. The division was as follows: predominantly everyday (none to two answers with the scientific conceptual type), mixed (three to nine answers with the scientific conceptual type) and predominantly scientific (ten or more answers with the scientific conceptual type). As explained above, in the instrument for the evaluation of WMS, three additional measures were used, each containing six questions. Thus, in total, 18 answers were requested from each participant: six for indication of the third redundant; six for detecting similarity; and six for defining concepts. Therefore, each participant could elaborate from none to 18 answers with scientific structure.

The distribution of the results categorized as the scientific type lies below in Table 2. As we can see, none of the 109 survey participants formulated all 18 concepts with scientific conceptual structure. The minimum and maximum limits of conceptualization were, respectively, no SC, a result obtained for 18 participants, all illiterate; and 15 SC, a result obtained by one literate participant.

**Table 2**

Distribution of scientific concepts in the task of the word meaning structure's dominant type (n = 109)

Scientific concepts	Participants		Total by concepts
	Illiterate	Literate	
0	18	0	18
1	9	0	9
2	8	0	8
3	2	0	2
4	2	0	2
5	0	0	0
6	0	3	3
7	0	4	4
8	1	7	8
9	0	15	15
10	0	13	13
11	0	18	18
12	0	5	5
13	0	1	1
14	0	2	2
15	0	1	1
<b>Total by groups</b>	<b>40</b>	<b>69</b>	<b>109</b>

In terms of subgroups, we can see in the table above, that all but one illiterate gave four or less scientific-concept- type answers, whereas all formally educated persons provided at minimum six.

With these results, we found that five illiterate participants exhibited a mixed conceptual structure. In the subgroup of literate participants, 29 (42%) were also classified as mixed structure. The rest of these participants (58%) displayed a predominantly scientific conceptual structure. Another significant aspect is that from the 69 literate participants, only nine have formulated more than two thirds of the answers having an organization identified with the scientific conceptual structure. Thus, 87% of these participants did not exhibit the more hierarchical conceptual structure, characteristic of schooled education.

Having presented the overall results of the participants in relation to the number of concepts, in the following sections, we move to a more detailed analysis, in which we are interested in examining: the uses of words; possible ways participants connected symbols; and the criteria underlying this organization. In the first two tasks of the instrument (Third redundant and Detection of similarity), the stimuli supplied to the resolution of the test were isolated words; in the third and last task we requested definitions of concepts. The guidance therefore passed from word to concept.

In the first block of discussion, subtopic 4.1, are described and analyzed the answers prepared by the subgroup of illiterate participants in the test for the identification of the word meaning structure (WMS); in the second, subtopic 4.2, the analysis turns to the answers with scientific structure type to this same test, provided by the literate participants of the research.

#### **4.1. Analysis of literate orality evidences from the way the word meaning structure is presented in the concepts formulated by the illiterate participants**

This section was constructed to identify whether there is evidence of literate orality among illiterate participants from the way the word meaning structure is presented in the orally expressed concepts. To facilitate this discussion, we operationalize a construct which consists in considering that a concept of scientific type provided orally by a illiterate participant reveals evidence of literacy in the talks produced. Therefore, whenever the illiterate participant's oral answer involves the use of the word meaning evaluated as scientific conceptual type, we consider it to exhibit such evidence.

In Table 3, below, are summarized the demographic data of the five illiterate participants who exhibited a conceptual structure classified as mixed.

**Table 3**  
Socio-demographic characteristics of illiterate participants with mixed conceptual structure

Participant	Gender	Instruction	Scientific concepts	Age
<b>A201BA</b>	<b>F</b>	<b>non-literate</b>	<b>3</b>	<b>51</b>
A228BA	F	non-literate	3	33
<b>F234BA</b>	<b>F</b>	<b>semi-literate</b>	<b>4</b>	<b>35</b>
F241BA	F	semi-literate	4	41
<b>F246BA</b>	<b>F</b>	<b>semi-literate</b>	<b>8</b>	<b>21</b>

Regarding the level of education and concepts formulated with scientific structure, the two non-literate participants elaborated three of these concepts; among the three semi-literate participants, two developed four scientific concepts, and the last, eight of these concepts. The general criterion for selecting illiterate participants of the research has already been described: the participant had to have successfully read less than seven among the ten presented words. By showing that performance on the reading test, we can surmise that these five participants did not pass through systematic training in theoretical operations offered to those who

go through the process of schooling. We therefore have two types of mixed illiterate participants: a) two non-literate; and b) three semi-literate.

For the analysis, we adopt the model used by Luria in his original research, which follows from theoretical assumptions, of presenting integrated analyses for the two groups of participants. We chose to present three of the five cases above (highlighted in bold in Table 3). We consider that these participants satisfactorily exemplify the models for the discussion that we are developing: we chose a non-literate participant and two semi-literate participants. Initially, for each of the three cases we will present tables with the answers and analyses by a mixture of evaluated dimensions: third redundant, detection of similarity and definition of concepts.

#### 4.1.2. Results and Discussion for the task of the third redundant

For this task, were provided trios<sup>6</sup> of words for objects that can be grouped according to two principles: 1) by making reference to a taxonomy, thus justifying the union of two words with the choice of a third to represent the pair, in this case, showing the concept structure at a greater hierarchical level; or 2) explaining the maintenance of the two words by the inclusion of both in a practical situation. (Luria, 1990; Salomão and Toomela, 2010). The instruction in the task proceeded as follows: “In the items below, from three words, two are intertwined and the third word is redundant. Please connect with a circle the words that are related and give an explanation of why these two words are related.”

In Table 4, below, are contained all the answers of the first illiterate participant. The words chosen as related are underlined. We can see that the answer provided to the second trio of words was evaluated as having a conceptual structure of the scientific type.

**Table 4**

Answers provided by the participant A201BA to the third question redundant

Why are these two words related?	Answer	WMS <sup>7</sup>
1. <u>wheel</u> – <u>car</u> – bicycle	<i>Because the car has more wheels than the bicycle.</i>	Everyday
2. <u>carrot</u> – soup – <u>potato</u>	<b><i>Because both are vegetables.</i></b>	<b>Scientific</b>
3. <u>pool</u> – scissors – <u>jump</u>	<i>With the jump one falls in the pool.</i>	Everyday
4. <u>ornament</u> – party – sea	<i>The ornament is used in the party.</i>	Everyday
5. <u>window</u> – <u>door</u> – key	<i>Because the key opens the door.</i>	Everyday
6. <u>direction</u> – strawberry – <u>ticket</u>	<i>Because with the ticket we take the bus, which has direction.</i>	Everyday

The participant deleted one of the words in the trio, *soup*, per the test instructions, and performed a synthesis operation by choosing the word *vegetables* to represent the other two, *carrot* and *potato*. Even being non-literate, the participant worked on a theoretical level, in which she abstracted the differences between a potato and a carrot and chose one word to unify them. This is abstract classification, since she selected an item and included it in a taxonomic category.

Continuing the analysis, we present the results for the subgroup of the two semi-literate participants. In Table 5, below, we see that two of the participant's answers were categorized as having scientific conceptual structure.

**Table 5**

Answers provided by the participant F234BA to the third question redundant

Why these two words are related?	Answer	WMS
1. <u>wheel</u> – car – <u>bicycle</u>	<i>Bicycle depends on the wheel to run.</i>	Everyday
2. carrot – <u>soup</u> – <u>potato</u>	<i>To make soup one must have vegetables and potato is vegetable.</i>	Everyday
3. <u>pool</u> – scissors – <u>jump</u>	<b><i>Sportsman uses the pool to make jumps.</i></b>	<b>Scientific</b>
4. ornament – <u>party</u> – <u>sea</u>	<i>In the sea one can make a luau which is a party.</i>	Everyday
5. window – <u>door</u> – <u>key</u>	<b><i>Door is the protection of our house and the key completes this protection.</i></b>	<b>Scientific</b>
6. <u>direction</u> – strawberry – <u>ticket</u>	<i>Bus pass, passage of time, the two are non-related.</i>	Everyday

With respect to these concepts, we highlight initially which we name here as a transitional position. By how she built her answers, it seems that the participant deals with the words in a more hierarchical manner than the previous participant. By “it seems,” we mean that we disagree that the two concepts highlighted in bold and classified as scientific are indeed such. In our understanding, the participant justified her choice by bringing together the two words in practical situations. Thus, in the sentence – *Sportsman uses the pool to make jumps*, even though the word *sportsman* seems to unify *pool* and *jump*, the participant performed a practical task, not a theoretical one, to indicate that the pool is used for performing jumps, given that it is a description of external, visual activity.

The same type of reasoning seems to have guided the following answer, in which the word *protection*, mentioned twice in the sentence – *Door is the protection of our house and the key completes this protection* –, seems

to fulfill the role of taxonomic categorization. In this particular case, though we do not disregard that the term *protection* may have an abstract connotation, more hierarchical in its use, the way the word was used seems to suggest strictly physical, concrete protection, since a house with complete protection is one whose door is locked by the key. For these considerations, we believe that we are facing a moment of greater sophistication in the use of words related to the format of the sentence, not its contents. We took the classification indicated by the research group as a reinforcement to this suspicion.

As the final part, in Table 6 we present the answers of the illiterate participant, who formulated the greatest number of concepts classified as scientific.

**Table 6**

Answers provided by the participant F246BA to the third redundant question

Why these two words are related?	Answer	WMS
1. wheel – <u>car</u> – <u>bicycle</u>	<i>Because both need wheels.</i>	Everyday
2. <u>carrot</u> – soup – <u>potato</u>	<i>Because they are vegetables and both go into the soup.</i>	Everyday
3. <u>pool</u> – scissors – <u>jump</u>	<i>It's all involving height.</i>	Everyday
4. <u>ornament</u> – party – <u>sea</u>	<b><i>It's all about paying attention.</i></b>	<b>Scientific</b>
5. <u>window</u> – <u>door</u> – key	<i>They open up.</i>	Everyday
6. <u>direction</u> – strawberry – <u>ticket</u>	<i>Because without ticket there isn't direction.</i>	Everyday

For this task, only one concept was evaluated as having scientific structure. In the second trio of words, the participant chose *carrot* and *potato* and said the two are related because they “*go into the soup.*” Once again, as she did for the first trio of words, the participant reintroduced the third word, without sticking to the task at hand, which involved removing the third as redundant. However, although the criterion of unification for the words *carrot* and *potato* has been their going together into the *soup*, a practical situation, we considered that when choosing the word *vegetables* the participant categorized based on a word, just as the first participant had. Therefore, ‘both are vegetables’ makes it a scientific concept (if higher order term is used, the lower order extension does not take it away; so it is a scientific concept). The same happened in the third trio of words offered, in which the word *height* was chosen. It is a graphical-functional unification criterion, but there was an operation of synthesis, of the type *pool + jump = height*. ‘Height’, here, is just a perceptual characteristic; thus it is an everyday concept. The following answer was classified as scientific: *attention* relates *ornament* and *sea*.



#### 4.1.4. Results and Discussion for the similarity detection task

For this task we provided to the participants pairs of words chosen for the purpose of ascertaining how participants performed the comparison and generalization operations. Selecting a basis for comparison involves abstracting noticeable differences between objects. Luria (1990) emphasizes that “To discern how two contrasting objects differ, it is necessary only to describe their physical attributes” (p. 108). However, when the similarity between objects cannot be seen, the activities of comparison and generalization inevitably involve some linguistic and logical distinction.

We chose two types of words: 1) those naming clearly distinct objects; and 2) names of objects difficult to unite in practical situations. (Luria, 1990; Salomão and Toomela, 2010). The instruction for the task was: “Please answer the following questions. Cite only one similarity, the most important.”.

In Table 7, below, are contained all the answers of the first illiterate participant. We can see that all the replies were classified as having an everyday conceptual structure type. Genetically, the ability to identify differences comes before the possibility of selecting a common basis of comparison between distinct objects and indicating a similarity (Luria, 1990).

With regard to the answer concerning the similarity between *biker* and *bike*, we considered it as the everyday type because it involves the sharing of parts.

**Table 7**

Answers provided by the participant A201BA for the task of choosing similarity

In which aspect...	Answer	WMS
1. are a cat and a dog similar?	<i>Because they have four paws.</i>	Everyday
2. are a typewriter and a pen similar?	<i>Because they allow to write.</i>	Everyday
3. are a biker and a bike similar?	<b><i>The name “bike” and the name “biker” recall one another.</i></b>	<b>Everyday</b>
4. are an axe and a hammer similar?	<i>The two have a handle.</i>	Everyday
5. are the moon and the sun similar?	<i>Both illuminate.</i>	Everyday
6. are a head and a hat similar?	<i>A hat has the shaping of the head.</i>	Everyday

From this point on we begin the analysis of the production of the two semi-literate participants. In Table 8, below, are the answers of the first of these

participants, for which we highlight the one evaluated as being of the scientific type.

**Table 8**

Answers provided by the participant F234BA for the task of choosing similarity

In which aspect...	Answer	WMS
1. are a cat and a dog similar?	<i>Aside from they have life and are animals, they have nothing else in common.</i>	Scientific
2. are a typewriter and a pen similar?	<i>Both write.</i>	Everyday
3. are a biker and a bike similar?	<i>One needs the other to ride.</i>	Everyday
4. are an ax and a hammer similar?	<i>One hacks and the other nails.</i>	Everyday
5. are the moon and the sun similar?	<i>Both illuminate the world, one by day and the other by night.</i>	Everyday
6. are a head and a hat similar?	<i>In order to put a hat one must have a head.</i>	Everyday

The participant said that *Apart* from the fact that *cat* and *dog* have *life*, and that they are *animals*, they have nothing else in common. The participant does not recognize as a criterion of commonality the externally perceivable visual aspects, having hair and having four legs, for example, features quite often cited by all participants, including those schooled. Therefore, we located a transition in word meaning of this first participant. The other criteria for selecting similarities were all supported by visual similarity, function, and inclusion in practical situations of everyday life.

Finally, in Table 9 are contained answers from the second participant's in this subgroup. Two answers were evaluated as having scientific conceptual structure type. The analysis found that participant's answers fit in the explanations already provided.

**Table 9**

Answers provided by the participant F246BA for the task of choosing similarity

In which aspect...	Answer	WMS
1. are a cat and a dog similar?	<i>They are living beings.</i>	Scientific
2. are a typewriter and a pen similar?	<i>It is a way of communicating and transmitting information.</i>	Scientific
3. are a biker and a bike similar?	<i>The two need fuel: bike needs gas and the biker needs using water.</i>	Everyday
4. are an axe and a hammer similar?	<i>In the handle.</i>	Everyday
5. are the moon and the	<i>They illuminate the world, the sun by day</i>	Everyday

sun similar?	<i>and the moon by night.</i>	
6. are a head and a hat similar?	<i>They have the same shape.</i>	Everyday

#### 4.1.5. Results and Discussion for the definition of concepts task

As a final point of this analysis, we discuss the set of answers of the three illiterate participants to the task of defining concepts. Under the terms proposed here, defining a concept involves including an object in an under-ordinated category, to which the contained elements were abstracted from unique attributes: “A person who defines an apple tree as a tree, and a goat as an animal, disregards the peculiar attributes of the apple tree and of the goat and isolates some essential quality of each one of them belonging to a generic category” Luria (1990, p.113-114).

For this task, as explained earlier, participants were asked to define two types of concepts: 1) those most common in their everyday lives, such as *hospital*; 2) those more abstract, such as *social reform*. The instruction provided for this task was: “Please answer the questions below.”

Below in Table 10 are the answers of the first illiterate participant. Although people routinely deal with situations involving *hospital* and *school*, we can see that the participant provided a definition evaluated as scientific to *hospital*, saying that it is health, rather than describing operations that normally take place in these environments, a fact that happened with most of the answers to this concept provided by subsequent participants.

Therefore, in this case, the participant conceptualized in theoretic, not practical, terms. In this sense, we consider that when defining *democracy*, the participant formulated a practical definition, with a prescriptive feature, which leads the authors to disagree that it is a concept with scientific structure, which was the group's analysis.

**Table 10**

Answers provided by participants A201BA to the task of defining concepts

What is...	Answer	WMS
1. a hospital?	<b><i>Healthcaring proper area.</i></b>	<b>Scientific</b>
2. environmental protection?	<i>Caring well, cleaning well. If it's among children it is knowing to give affection, knowing to talk with.</i>	Everyday
3. a democracy?	<b><i>Duties that the politician should do, according with that what he promised.</i></b>	<b>Scientific</b>
4. drug addiction?	<i>Using drugs and not wanting to stop, continuously, increasing it in each new day.</i>	Everyday
5. a school?	<i>It is the most important thing for literacy and</i>	Everyday

	<i>education.</i>	
6. social reform?	<i>When the politics want to change something, to reform something, such as hospitals, public health lines.</i>	Everyday

In Table 11 below, are the answers to the first semi-literate participant. In this case, on the concept of *school*, the authors believe that ‘a way’ might be very general scientific concept; undeveloped yet still hierarchically organized.

**Table 11**

Answers provided by participant F234BA to the task of defining concepts

What is...	Answer	WMS
1. a hospital?	<i>Problem (missing).</i>	Everyday
2. environmental protection?	<i>People to care for both animals and nature.</i>	Everyday
3. a democracy?	<i>We must have more responsible politicians that think about the people instead of only in themselves.</i>	Everyday
4. drug addiction?	<i>Young people destroying themselves with chemical products.</i>	Everyday
5. a school?	<b><i>A way for education, learning a profession.</i></b>	<b>Scientific</b>
6. social reform?	<i>Good health insurance for the poor people, better schooling.</i>	Everyday

Finally, the answers of the subgroup’s last participant, detailed in Table 12. We can see that of their conceptualizations, most classified as having scientific structure, revealing that this participant deals with the words in a more hierarchical way, with emphasis on the answers provided for *school* and *social reform*. The first answer coded ‘scientific’ might be considered doubtful; ‘for maintaining’ seems to refer to activity and through this it is not a hierarchically organized concept – while the other answers represent very general hierarchically organized concepts.

**Table 12**

Answers provided by participant F246BA to the task of defining concepts

What is...	Answer	WMS
1. a hospital?	<i>To whom goes there it must be bad. For one seeing how is her health and to treat it.</i>	Everyday
2. environmental protection?	<b><i>It is for maintaining the balance in the world.</i></b>	<b>Scientific</b>
3. a democracy?	<b><i>It is the rights of the people.</i></b>	<b>Scientific</b>
4. drug addiction?	<i>It is the mental unbalance. The</i>	Scientific

	<i>person doesn't have self-control.</i>	
5. a school?	<b><i>The basis of everything.</i></b>	<b>Scientific</b>
6. social reform?	<b><i>It is evolution.</i></b>	<b>Scientific</b>

When starting the present section, we state the terms under which we organize the proposal to seek evidence of literacy in the orality of illiterate adults. Once we analyzed the concepts expressed orally for three participants with the mixed word meaning structure, we believe we have found such evidence. We can discern, from the way the participants solved the tasks proposed, that some of the utterances exhibited, in rare cases, the characteristics of scientific conceptual thought.

Oliveira (1992) wrote that illiterates in a literate society are persons who live in cities that are characterized by being schooled and industrialized, without completely mastering the symbolic writing system. We agree here with the authors from the perspective of literacy, by defending the idea that we should consider “degrees of illiteracy,” or that there is no zero degree of literacy in literate societies, since these adults, by living in these societies, are progressively “(...) contaminated by this world’s information and accumulate knowledge about its operating rules and about the writing system itself” (p. 1). This idea, in fact, had already been introduced by Vygotsky. He suggested that human thought is developmentally heterogeneous, being in some areas more advanced than in the others. For that reason – and only in respect to the forms of thinking with no value attached to the idea – some cultures can be more advanced than others. Also, different persons from the same culture may rely on more or less advanced forms of thinking, and finally, in each individual some mental processes rely on developmentally more advanced forms of thinking than others (Vygotsky, 1934, 1935, 1956, 1984; Vygotsky and Luria, 1994; Vygotsky and Luria, 1930).

In the description we just presented, we could to determinate that, even though the privileged environment to deal with objects in terms of under-ordinated taxonomic categories is the school, one can display, at least on some level, development that emulates the standard promoted by the school. Nevertheless, we continue the analysis to verify, in the next section, when we analyze the concepts provided by the research’s literate participants, the extent to which this difference is expressed, and thus, to complement the intended discussion.

## 4.2. Analysis of word meaning structure (WMS) in the concepts formulated by literate participants

This section was created to analyze how the level of abstraction in the scientific concepts formulated by the group of literate participants differs from that presented by the group of illiterate participants.

Earlier in the fourth section we indicated that nine, out of the 69 literate participants, provided two thirds of the answers classified as having scientific conceptual organization. When we examined all the scientific concepts formulated by these nine participants, we found that there was a saturation in the range, indicated by certain uniformity in the hierarchical manner in which the concepts were built. We decided to select, among those, two participants whose concepts were analyzed. We chose to present, in Table 13 below, the analysis of two cases: a participant who at the time of testing was a university student; and another who had already completed a bachelor's degree.

**Table 13**

Socio-demographic characteristics of two of the nine literate participants with more hierarchical conceptual structure

Participant	Gender	Instruction	Scientific Concepts	Age
E101BA	M	Bachelor's degree student	14	24
L126BA	M	Bachelor's degree concluded	12	30

Just as in the previous section, we divide the analysis, and the discussion will be presented below in three blocks, by the task groups evaluated<sup>8</sup>.

### 4.2.1. Results and Discussion for the task of the third redundant

Below, in Table 14, the answers of the first schooled participant, in which we see that the majority was considered as having word meaning structure of the scientific type.

**Table 14**

Answers provided by the participant E101BA to the third question redundant

Why are these two words related?	Answer	WMS
1. wheel – <u>car</u> – <u>bicycle</u>	<i>They are means of locomotion.</i>	Scientific
2. <u>carrot</u> – soup – <u>potato</u>	<i>They are roots.</i>	Scientific
3. pool – <u>scissors</u> –	<i>They are personal tools.</i>	Scientific

<u>heel</u>		
4. <u>ornament</u> – <u>party</u> – sea	<i>Because a person wears ornaments to go to a party.</i>	Everyday
5. <u>window</u> – <u>door</u> – <u>key</u>	<b><i>Because they are forms of opening to another reality.</i></b>	<b>Scientific</b>
6. <u>direction</u> – <u>strawberry</u> – <u>ticket</u>	<i>Because who gets the ticket always has a direction.</i>	Everyday

We consider it relevant to comment on the answer provided to the fifth trio of words because the participant was one of five people, of which four were schooled, who provided an answer defined as scientific for that question. Two participants did not answer, and all others (94%), dealt with these words in a practical way, including the participant whose data is contained in the following frame. Also the second of the triplets is worthy of attention. Here we see how superficially small differences in wording suggest qualitative differences in the organization of thought. We see in the table that for this person carrot and potato ‘go together’ because “They are roots.” He synthesizes both vegetables hierarchically, under the more general category (roots). Yet if the answer had been, “They have roots”, we would have a case of everyday concept. The seemingly small difference in wording reveals very different kinds of thought.

Of the second participant’s answers (Table 15, below), the first point to emphasize is the fact that most of were evaluated as the everyday type. This aspect illustrates a theoretical postulate, one indicating that although we can use the language in a hierarchical way, we do not abandon other forms of relationship with the word meaning structure. All schooled participants formulated concepts in both everyday and scientific terms.

The last case, though, cannot be thought actually ‘scientific’ – he uses abstract words but refers to the very everyday idea that *direction* and *ticket* – ‘being related to movement’ is just listing some aspects of everyday movement in town; it is another example of everyday concept.

**Table 15**  
Answers provided by the participant L126BA to the third redundant question

Why are these two words related?	Answer	WMS
1. <u>wheel</u> – <u>car</u> – bicycle	<i>The wheel is the fundamental part without which there cannot be a car.</i>	Everyday
2. carrot – <u>soup</u> – <u>potato</u>	<i>A soup normally has vegetables among its ingredients, and the potato is a vegetable.</i>	Everyday
3. pool – <u>scissors</u> – <u>heel</u>	<b><i>Scissors and heel are objects commonly related to the universe assigned to women.</i></b>	<b>Scientific</b>
4. <u>ornament</u> – <u>party</u> – sea	<i>A party generally has ornaments, and they always indicate a modification in the</i>	Everyday

	<i>environment indicating a celebration.</i>	
5. window – <u>door</u> – <u>key</u>	<i>A key is intended to be used in a lock, which doors normally have.</i>	Everyday
6. <u>direction</u> – strawberry – <u>ticket</u>	<b><i>They are related to movement and locomotion.</i></b>	<b>Scientific</b>

The second point to highlight is how the above participant dealt with the task proposed in the third trio of words considered to belong to the word meaning structure of the scientific type. Just as for the trio of words *window*, *door*, and *key*, mentioned before, there was a significant tendency for the participants in this study to solve the task set in three and six trios replacing a theoretical task for a practical one, providing an answer that relates the words in everyday terms, of visually perceptible functional relationships. In contrast, participants who exhibited a more hierarchical word meaning structure tended to handle all tasks in theoretical terms.

#### 4.2.2. Results and Discussion for the detection of similarity task

In Table 16, below, are the bachelor's answers for the task, in which we see the criteria dominance of selecting a taxonomy intended to resemble the elements. Specifically in the answer about *biker* and *bike*, he cited molecules and atoms. These are, in both cases, explanatory models of unseen aspects: information about the “world beyond our senses”. This ability to think in purely theoretical terms, without a direct connection to sensory attributes of the objects, is one of the developments attributed to passing through the schooling process (Vygotsky, 2009; Toomela, 2003b).

**Table 16**

Answers provided by the participant E101BA for the task of choosing similarity

In which aspect are...	Answer	WMS
1. a cat and a dog similar?	<b><i>Domestic Animals.</i></b>	<b>Scientific</b>
2. a typewriter and a pen similar?	<i>They are means of expressing ideas and thoughts.</i>	Scientific
3. a biker and a bike similar?	<b><i>They are composed of molecules and atoms.</i></b>	<b>Scientific</b>
4. an axe and a hammer similar?	They are tools for mechanical work.	Scientific
5. the moon and the sun similar?	<i>They are the two spheres that compose the day (one during day, the other during night).</i>	Everyday
6. a head and a hat similar?	<b><i>In no aspect.</i></b>	<b>Everyday</b>



We also highlight in the frame above, the answer to the similarity between *head* and *hat*, which the participant does not recognize. The same happens with the second schooled participant (Table 17, below), who denies a similarity between *biker* and *bike*.

**Table 17**

Answers provided by the participant L126BA for the task of choosing similarity

In which aspect are...	Answer	WMS
1. a cat and a dog similar?	<i>They are animals tamed by man.</i>	Scientific
2. a typewriter and a pen similar?	<i>They are means of human expression in written form.</i>	Scientific
<b>3. a biker and a bike similar?</b>	<b><i>There isn't relation of similarity, but of utilization of one by the other. The biker is the subject and the bike his tool.</i></b>	<b>Everyday</b>
4. an axe and a hammer similar?	<i>Both are tools handled by a handle and describe semi-circular descending movements when used.</i>	Scientific
5. the moon and the sun similar?	<i>They are the two stars more visible with bare eyes in the sky.</i>	Scientific
<b>6. a head and a hat similar?</b>	<b><i>They resemble in no way. The function of the hat is to cover the head, but this makes them in no way similar.</i></b>	<b>Everyday</b>

### 4.2.3. Results and Discussion for the definition of concepts task

Especially in this task did the subset of schooled participants exhibit the mode of thinking most characteristic of the schooling process. The vast majority of the concepts provided in this set of questions was formulated with the word meaning structure of the scientific type, unlike with the illiterate subgroup, who formulated few of them proportionally, considering the tasks of third redundant and similarity detection.

In Table 18, below, we see that all the answers of the first schooled participant correspond to the scientific conceptual structure type.

**Table 18**

Answers provided by participant E101BA to the task of defining concepts

What is...	Answer	WMS
1. a hospital?	<i>Physical complex where human pathologies are studied in their various degrees of development.</i>	Scientific
2. environmental protection?	<i>It is a legal, political and social way that man finds to protect the different means by which he</i>	Scientific

	<i>lives.</i>	
3. a democracy?	<i>It is a state in which lies a regimen or a government that is based on the people's manifestation and decision as the main column of its functioning.</i>	Scientific
4. drug addiction?	<i>Physical-psychic dependency that an individual has on a chemical substance.</i>	Scientific
5. a school?	<i>It is a way that society uses to delimit forms of behavior and thinking by means of an ideology.</i>	Scientific
6. social reform?	<i>It is the changing of a paradigm through the dialectics of the cycles.</i>	Scientific

The same pattern can be found in the performance of the second schooled participant, shown below in Table 19. For both sets of answers, we can see that the participants deal with words in purely abstract logical-verbal terms, without making reference to the practical aspects of everyday life.

**Table 19**

Answers provided by the participant L126BA to the task of defining concepts

What is...	Answer	WMS
1. a hospital?	<i>A place where people affected by diseases and illnesses are treated, ruled by a relatively obscure group of knowledge.</i>	Scientific
2. environmental protection?	<i>The set of habits and measures aiming to avoid deprecations and damages to the environment to the natural ecosystem.</i>	Scientific
3. a democracy?	<i>An historical and specific way of legitimating the power of a ruling class or tier of society above the others.</i>	Scientific
4. drug addiction?	<i>Physical, mental and social state which is variably tolerated by society, and many times shows itself as necessary to preservation of the social logic.</i>	Scientific
5. a school?	<i>It is the locale where knowledge and social, moral, and other values necessary for ingress in the social structure are inscribed in individuals in formation, to make them apt to participate in social processes, be it to preserve them or to transform them.</i>	Scientific
6. social reform?	<i>They are ideas and measures intended to realize changes in the social order that allow the easing of imbalances and to avoid drastic ruptures, and have an essentially conservative character.</i>	Scientific

#### **4.2.4. Comparative summary for the three task groups from the results shown by the two subgroups of participants**

For the task of appointment of the third redundant, in the subgroup of illiterate participants the grouping principle based on a practical situation predominated. We collected examples of everyday observations from most of the answers: United operation of the tasks objects were described; personal, idiosyncratic preferences were used to justify the answers provided. For the schooled participants a way of grouping based on abstract category prevailed.

Regarding the detection of similarity task, many illiterate participants denied that there was a similarity, or pointed it out based on sensory criteria; others indicated differences, unlike what the task requested. Among the schooled participants, there was a mainstream tendency to choose an abstract category as a criterion of similarity.

In case of the defining concepts task, generally illiterate participants demonstrated difficulty formulating abstract concepts, such as the question “What is social reform?” In some cases they provided moral judgments, such as in the question about “drug addiction” (e.g. *It's wrong, it's bad*). For the most common concepts in everyday life, such as hospital, there was a tendency to conceptualize in terms of a description of the functioning of the institution.

For the two modes of language use, the word meaning structure of the everyday type was predominantly found in greater number in the illiterate participants' answers, contrary to those of the schooled subgroup, in which the scientific conceptual structure type held sway.

To formulate their concepts, the illiterate participants relied primarily on immediate impressions of everyday life. Their productions were closely linked to their own experiences, which produced an extreme variety of concepts, almost singular ones. This result is consistent with the findings of other studies of this nature (Luria, 1990). In the other hand, schooled participants' answers exhibited much less diversity, always based on rational criteria, logical-verbal and abstract (Salomão and Toomela, 2010).

The authors from the perspective of literacy, emphasize the importance of pragmatic knowledge on the functioning of literate discourse, and suggest that this area may be an alternative in the sense that, in literate societies, various knowledge systems compete with those acquired through formal schooling.

Through the answers of these participants, we observed that schooling promotes a standardized mode of conceptualization. By normalizing the conceptualization, it creates a pattern of mass development, an important factor for the construction of mass societies. Scientific concepts are

organized into formal systems. Their taxonomy is hierarchical. The mode of operation proposed by formal, schooled education, puts people in touch with an organizational structure that enables the conceptual leap in verbal thought, which leads us to be aware of the thought, of the rules of operation of thought (structure of syllogism, meta-cognition).

In this regard, Oliveira (1992) discusses mastering the logic of the literate world. Toomela writes about metalinguistic consciousness, in the sense of developing the ability to think about thinking. It is at this point that we place our disagreement with the authors from the literacy perspective (Kleiman, 2001, 2002, 2007; Tfouni, 2006), who argue that an alternative way could be mastery of the pragmatics of the function of discourse, displayed when the illiterate who lives in literate society emulates literate discourse. We understand that the issue is not *whether* the discourse is used, but *how*, in the sense that applying the rule is different from knowing the rule. In this study, we consider that the mode of connection between words, mostly everyday or scientific, is related to different mental operations. To discuss these relationships, we discussed in an integrated manner, in the original research, questions regarding the impact of semiotic development on solving tasks of contour recognition and of mental rotation.

## **5. Final considerations**

The question about the possibility of developing a literate standard in the orality of illiterate adults has been approached from two angles: a) first, we analyzed the extent to which engaging in everyday activities, without completing the formal cycles of schooling, allowed the study's illiterate participants to develop a standard that we assumed as literate in its orality; b) then, we analyzed how the level of abstraction in the concepts with scientific structure formulated by illiterate participants differed from that presented by literate participants.

To better organize the discussion, we make clear two central directions: first, we want to reflect on the role of formal schooling in promoting the development of the word meaning in its more hierarchical levels: abstract and logical-formal; and second, to consider the heterogeneity in the personal ways schooled adults deal with their respective educational processes, exemplified by the uneven results displayed by this group.

We were able to monitor, by analyzing the boundary condition represented by the responses with mixed conceptual structure, both in the illiterate and the schooled, the display of different degrees of use of hierarchical, more abstract thinking. This leads us to reflect on the

boundaries that demarcate the space of conceptual development, given that schooling does not seem to be, in this case, the dividing line bounding this development. The participants with mixed conceptual structure (be they literate or illiterate) occupy what Marsico (2013) describes as a Border Zone. It would be conceptualized as an “intermediate space” between two regions (or social settings, or socio-cultural phenomena) whose boundaries are not fixed entities located at exact points. In fact, they are something larger and more dynamic, fluid and ambiguous than we often believe (Marsico, Cabell, Valsiner and Kharlamov, 2013). The main characteristic of a Border Zone, as well as a Border in itself, is its inherent ambiguity (dividing while unifying) and its open-ended nature, which makes it possible the transfer from one side to another, from one state to another. This boundary condition is exactly where both the illiterate and literate participants are symbolically located when they show a mixed cognitive structure. Even if, apparently, this “space in between” seems ambiguous and somehow problematic, it is what allows us to look at the microgeneses of the cognitive process in their emergence and negotiation. For this reason, this boundary condition (concerning the way in which different people use concepts) is heuristically relevant, and could help us in taking our understating further.

Finally, we consider it important to note that although five out of forty illiterate participants exhibited a mixed conceptual structure, only the literate participants exhibited a conceptual structure at the more hierarchical levels of abstraction. Thus, we are entitled to conclude that, by means of the present institutionalization, in school, of the training in theoretical operations, this context appears to be the privileged way of enabling this kind of development.

## NOTES

1. Master’s thesis of the first author: “Formação de conceitos em adultos iletrados: em busca de indícios de oralidade letrada.” Advisors: Dr. Ana Cecília Bastos and Dr. Aaro Toomela. The authors thank CAPES for their financial support.

2. Set of tools used: 1) Personality test (IPIP: *International Personality Item Pool*, 60 items); 2) Test for the identification of the dominant type of the word meaning structure (everyday concept; scientific concept; 18 items); 3) Measurement test of cognitive skills (*Estonian Cognitive Ability Scale*, 36 items), with verbal, logical, arithmetic and spatial skills measurements; 4) Design tasks; 5) Reading tests; and 6) additional measurements of attitudes towards alcohol and psychoactive substances, collectivism and level of satisfaction with life.

3. The term literacy identifies a studying field. The concept of literacy began to be used in Brazil in the 1980s, and author Mary Kato is indicated as the first to use

it in a national publication. Kleiman (2001) reports that “In English-speaking countries, there is talk of New Literacy Studies (Street, 2001), just to differentiate this perspective from the works that consider the learning of writing as the learning, usually in the school context, of a set of supposedly neutral skills, independent of social issues. In Brazil, the difference between the two approaches is lexically marked by the use of the terms schooling and literacy (cf. Kleiman, 1995; Soares, 1998, p. 269).” In this paper, we sometimes use the term. We make it clear, however, that we do not agree with all of the ideas defended in these studies.

4. Luria systematically studied the process of symbolization present in writing, beginning with the experiences of children who had not yet learned to write: “It is easy to see that at this point, the written signs are first-order symbols, denoting objects or actions directly and that the child has yet to develop into the symbolism of the second order, which includes the creation of written signs representing the spoken symbols of words. For this the child needs to make a basic finding - that one can draw, beyond things, also the speech.” (Vygotsky, 1998, p. 153).

5. Resolutions No. 011/97 and 016/2000, which provide for conducting psychological research with humans.

6. The word *salto*, belonging to the third trio of words, generated many doubts among the participants, who asked if it was a verb (which translates to *jump*) or a noun (which translates to *heel*).

7. For the sake of simplicity, in the frames we refer to the word meaning structure through the acronym WMS.

8. To avoid repetition, the characteristics of the tasks will not be restated.

9. The instrument was translated into Portuguese in Brazil, by the research group organized for this task, in close collaboration with Toomela.

### **Acknowledgments**

The writing of this paper was facilitated by funding from the Brazilian Ministry of Education (CAPES/PVE), for a research visit to Salvador, Bahia, by the last author.

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## APPENDIX

Please answer the following questions and write the answer on a dotted line:

1. What is a hospital?
2. What is environmental protection?
3. What is a democracy?
4. What is drug addiction?
5. What is a school?
6. What is social reform?



Please answer the following questions. *Name only one, the most important similarity.*

1. In which respect are similar a cat and a dog?
2. In which respect are similar a typewriter and a pen?
3. In which respect are similar a biker and a bike?
4. In which respect are similar an axe and a hammer?
5. In which respect are similar a moon and a sun?
6. In which respect are similar a hat and a head?

Two words out of the three go together. A third word is redundant. Please connect with a circle words that go together and give an explanation why these two words go together.

- |              |            |         |
|--------------|------------|---------|
| 1. Wheel     | Car        | Bicycle |
| 2. Carrot    | Soup       | Potato  |
| 3. Pool      | Scissors   | Jumping |
| 4. Ornament  | Party      | Sea     |
| 5. Window    | Door       | Key     |
| 6. Direction | Strawberry | Ticket  |

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