DIAGNOSIS AND PREVENTION WITH OR WITHOUT SENTENCE CONTEXT LEXICAL DEFINITIONS IN YOUNG PEOPLE AGED BETWEEN 8 AND 12

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ABSTRACT

Our hypothesis foresees the presence of the following lexical abilities: synonyms, antonyms, categories, word function with or without sentence context. 215 girls and 257 boys in third grade, 240 girls and 255 boys in fourth grade, 245 girls and 276 boys in fifth grade (for a total of 1488) participated in this research project. The experiment was divided into 2 phases. In the first phase, 100 boys and girls, divided by age were asked to define words with high image value and dominant meaning and frequency of use in a list. The words were taken from short readings of elementary school literature. The passages used were those reflecting a popularity rating above 80%. The Flesch index of readability (with a value between 64 and 73, higher than mean value of 50) was applied to the readings. In the first phase we recorded the answers the children gave to questions such as "What does word X mean?" or "How would you define word X?". The children were asked to provide the best written definition according to them. They were with no problems in reading and writing processes. We then proceeded to elaborate the test with four multiple choice questions. In the second phase, using the definitions provided by the children, we used trials subject to item analysis using calculations based on: index of difficulty, ability to distinguish, reliability factor (using the Kuder-Richardson formula). The definitive test was divided into eight parts including: synonyms, antonyms, categories, contextual and non contextual functions (PAV or Analytical Vocabulary Test, Florence, O.S., 1991).The results showed by means of factorial analysis times principle components (varimax method, N = 1488) the presence of two principal factors: Factor 1, contextual and Factor 2, non contextual. This data would seem to confirm that subjects when working out the definition of words, need two types of information: the context of the sentence in which the word is used (Factor 1, contextual) and the definition of the word without referring to the sentence (Factor 2, non contextual).

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Keywords**:** lexical abilities, lexical definitions, with or without sentence context, young people aged between 8 and 12, diagnosis and prevention

INTRODUCTION

Relatively recently, especially from the 1970s onwards, scholars have focused specifically on lexical development and its evolutionary characteristics, providing contributions of empirical research.

Lexical skills, it has been observed, develop according to multi-dimensional processes including synonyms, antonyms, categories and functions. While the issue of how these lexical processes are influenced by the phrasal context in which they are to be processed compared to the non-contextual condition has been relatively neglected, that is little attention has been paid especially from an evolutionary point of view; on the contrary it is a topic that is central to this research (Al-Issa, 1969; Anglin, 1970, 1977, 1985; McNeill, 1970; Ehri & Richardson, 1972; Litowitz, 1977; Bartlett, 1978; Hermann, 1978; Nelson, 1978; Clark, 1979; Arcaini, 1982; Arcuri & Girotto, 1986; Kuczaj & Barrett, 1986; Powell, 1986; Miller & Gildea, 1987; Girotti, Antonietti & Marchetti, 1990; Bloom, 2000; Clark, 2009).

As regards synonymic processes, for example, a wide-ranging critical review was carried out by Herrmann (1978). In his review, Hermann does not discuss the other processes, i.e. antonyms, categories and functions, nor does he study the interrelationships that exist between them in lexical development, focusing exclusively on synonymic processes, however, without examining the effects of phrasal context vs. non-context. There are confirmations on the definition of synonymy according to the theory of partial synonymy levels and levels of interchangeability. According to these theories, two or more terms are synonymous if they are replaceable in all relevant phrases. No confirmation was obtained instead on the assumption of the referential basis of synonymy. Two words that have the same referent cannot be said to be the synonyms of each other. For example, "President" and "swimmer" may indicate the same referent, but are not necessarily synonymous, as in "X crossed the swimming pool of the White House". In summary, the hypothesis that has been reached is that synonymy varies along a continuum of similarity in meaning. In the investigation of synonyms three procedures are used: give two synonyms, produce a synonym with respect to a given word, and recognise a synonym from a list of words. Individuals are invited to assess the meanings of words along a continuum ranging from those that are unrelated to those that are identical. Their responses are then classified using set criteria of similarity in meaning. The amount of synonymic production, in response to a stimulus, tends to correspond to estimates of familiarity of the word. The more familiar a word is, the greater the number of synonyms produced is. The review by Herrmann (1978), however, does not dwell on the effects that the phrasal context has on the synonymic processes, that is if synonymy is more favoured by phrasal contexts in which they are found, or whether on the contrary they are facilitated by the absence of phrasal context or by the request not to make use of the synonymic processes required, as we proceeded in this research.

It seems in general that individuals learn synonyms in two ways: by observing the words in context (either experiential or linguistic narrative); or through instructions, for example they learn that the word x has the same meaning as the word y. But in these two ways, contextual vs non-contextual, specific and detailed investigations have not been carried out, specifying the evolutionary characteristics detected or the influences that the two situations, contextual vs. non-contextual phrasal in particular, have on synonymic processes.

In research into processes of synonyms "polysemy" has also been studied, i.e. words that have multiple meanings, such as "the *radius* of a circle, the *rays* of the sun, the *spokes* of a wheel" (all "*raggi*" in Italian; but also in a large number of languages there are polysemic words, for example in

English, e.g. homonyms, which are also homographs and homophones, like "address" as "*direction*", and/or "*manner of speaking to another*", and/or "*a location in computer memory*", but homonyms in general in English, see "List of true homonyms" https://en.wikipedia.org/wiki/List_of_true_homonyms), as was the incidence of phrasal context in resolving semantic ambiguities. Only in these investigations, in part, has the effect of phrasal context in generating synonymic processes been investigated. The goal was to understand in general, thus going beyond synonymic processes and also considering antonymy, categories and functions, the processes through which enrichment of vocabulary occurs, at 5-6 years of age, was calculated to have an average growth rate of 10 to 13 words a day, while at the end of high school it can reach 40,000 words, up to 80,000 and even 100,000 in subjects with education at the university and post-graduate level (Chall, 1987; Nagy & Herman, 1987; Sternberg, 1987; Miller & Gildea, 1987). In this regard, studies on the phrasal context for understanding a word have stood out for two different reasons. One is that of research on the use of phrasal context to understand new or unknown words. The other is that of investigations in which one examines the role of phrasal context in the definition of the "known" but ambiguous or polysemic words. The ability to define the meaning of a dummy or nonsense word, with the help of the contextual phrasal relations that it presents, has been studied in children between 8 and 13 years (Werner & Kaplan, 1950; Petter, 1955). These studies show that the use of phrasal context for understanding the meaning of unknown words is also achieved at the level of childhood, but suggestions that the phrasal context to stimulate the development of lexicon are especially active at the age of middle school. As for the other line of research that focuses on the importance of the phrasal context to identify alternative meanings of known words, it used adult participants and modern "on line" procedures (the mental activity and behaviour of the subject are recorded through various pieces of equipment while he/she is performing a given task) which allowed the researchers to follow the unfolding of the processes at the real time of their occurrence (Swinney, 1979; Simpson, 1981; Tabossi & Johnson-Laird, 1980; Tabossi, Colombo, & Job, 1987). The results of these studies are consistent with the results of trials by Werner and Kaplan (1950, 1952) and Petter (1955) to the effect that children are active in the use of phrasal context, but they often do so inappropriately and in any case not before the developmental period corresponding to middle school, thus over 12-13 years of age, contrary to what was empirically found in this study between the third and fifth class of primary school.

A further cognitive linguistic form through which vocabulary develops is made up of antonymy. In this regard, it was noted that while synonymy relationships between words is based on their similarity of meanings, oppositional connections prove to be extremely complex (Nelson, 1985). According to Lyons (1977), binary opposition is one of the fundamental principles governing the structure of many languages. Based on Lyons' linguistic semantic investigations, Powell (1986) shows the existence of a large number of antonyms in the vocabulary that seems to spring from a general trend, present in Western cultures, to polarise experiences and judgments in order to think in opposites. The number of antonyms is certainly lower than other semantic relations. This seems to depend on the fact that antonymy, which by definition reduces the number of possible choices, is not present between many words. The expression "antonym", coined in 1867, is used to indicate a word whose meaning is opposed to that of another. According to Nelson (1973), opposites can be classified as "gradable" and "ungradable". The former always include a relationship, while the others divide the universe of discourse into two complementary subsets. We have for instance "male" and "female" that are considered opposites of the second type, in that a person is not more or less male or female: either he/she is or he/she is not. Instead "feminine" and "masculine" are terms of the first kind, in that a person can be more or less masculine or more or less feminine. Powell (1986) reports three main types of opposition between words. The first includes "contradictory" (comple-

mentary) terms: such as "bachelor" – "married". The second includes the "contrary" terms: for example, "ascend" (go up) – "descend" (go down), words that admit a certain gradualness. The third indicates words that reverse or nullify the meaning of others: for example, "buy" – "sell". As regards the effectiveness of antonyms in relation to the precision of learning processes, Grossman & Eagle (1970) found that antonyms produce a more limited number of false recognitions compared to synonyms and other types of associations. Niemi, Vauras & von Wright (1980) found that the production of antonyms facilitates subsequent production of synonyms, while the opposite does not occur. Through comparative research of different modes of response (synonyms, words spelled similarly, words related at the semantic level), it emerged that antonyms produce fewer wrong answers. While these authors did not focus on the effect that the contextual and non-contextual phrasal processes have in the generation of antonymic processes in phases of understanding and/or production.

Categorical organisation is another of the cognitive linguistic forms by means of which vocabulary grows and develops during the course of the life cycle. The investigations that have focused on this aspect have proposed the thesis of the formal perceptive nucleus as the dominant factor driving the evolution of vocabulary skills. It is a theory that originated from the investigation of Jerome S. Bruner on the processes of categorisation and that sees Eve V. Clark as one of the leading figures (1973, 1978, 1979 and 2009). According to this view, the mind is a system oriented to the acquisition of verbal symbols. These verbal symbols in their basic elements are "lexical units". A lexical unit is not necessarily a word belonging to the language code of which the child is a part. They may be sequences of sounds completely made up: for example, "wawa" for "dog", "tee" for "cat", "deda" for "grandfather", etc. (see Clark, 1973, pp. 79-81). The bottom line though is that these lexical units - belonging or not to the language code - have meaning and refer to objects very different from one another. In this sense, semantic development consists of a selection process carried out between very heterogeneous objects, to delimit, for better clarification of the limits further on from and beyond which one finds such things in adult language. The development consists of successive stages of categorisation that lead the child to develop more and more selected categories, until becoming similar to those of adults. These processes are based on the formal characteristics of perception of things. Research by Clark or those that are inspired by this theoretical assumption, however, is not focused on the effects of contextual vs. non-contextual phrases in the process of categorisation.

Alongside this view of the formal nucleus of perception, there is also a proposal, again stemming from the work of Bruner, of the "functional core" fully elaborated by Katherine Nelson (1974, 1978, 1985, 1986 and 2007). According to this perspective, the mind - world relationship is the fundamental basis for development. The essential idea about conceptual development and semantic memory is that the mind is a system that "acts" on the world. In recent years the thesis of the functional nucleus proposed by Katherine Nelson has undergone numerous theoretical and empirical verifications. These investigations have emphasised situational and contextual factors. The various practical situations and conditions under which the child is as an actor, or spectator, or both of these possibilities, generate "representations of events", as kinds of scripts. In this framework, the social components - with whom, where and how the child speaks, lives, etc., - take on considerable importance. Such investigations, however, do not dwell specifically on the effects of contextual vs. non-contextual phrases in the process of functionalisation.

RESEARCH OBJECTIVES

The purpose of this study is therefore to highlight how the contextual vs. non-contextual phrase influences the synonymic, antonymic, categorical and functional processes, with particular reference to the evolutionary period between the third and fifth years of primary school, between 8 and 11-12

years. Our hypothesis requires the presence in the mind of the subjects of processes that require, for their preparation, of information taken from the phrasal context in which the words are found to be able to find the correct meaning of the term, as well as data that do not require use of information from the phrasal context to identify the correct meaning of words.

METHOD
Participants

215 girls and 257 boys of the third year of primary school took part in the research (mean age = 8.04, SD = 0.88, range from 7 to 8.8), 240 girls and 255 boys of the fourth year (mean age = 8.09, SD = 0.90, range from 8.8 to 10), 245 girls and 276 boys of the fifth year (mean age = 10.8, SD = 0.78, range from 9.8 to 11.6) (total 1488) in the second phase of the experimental design, belonging to middle-class social, economic and cultural strata of the population. While in the first phase, which was necessary to acquire children's ideas on the words to build proposals to create the tests, there were 100 participants (with average age, standard deviations and ranges similar to those indicated for the third, fourth and fifth year primary participants on the second phase of the research) and who were not part of the groups of this second phase of the research, were always girls and boys in almost equal numbers, belonging to the middle-classes of the population socially, economically and culturally speaking. The words proposed, in both phases of the research, were of average frequency and image value for the age groups considered (we took this basic information primarily from "De Mauro's dictionary of the Italian language", 2000, for which each word has the "*marca d'uso*" (usage) reported with specification of detailed multiple "usages"). The subjects of both phases of the research had an average performance in the school curriculum and showed no problems either in the early stages of reading or writing.

Materials and procedure

The experimental design was divided into two phases. In the first, 100 male and female children in each age group, from the third to the fifth class of primary school, were asked to define a list of words from short reading passages selected from primary school textbooks These excerpts were chosen in relation to indices (synthetic and relative to 8 specific dimensions, regarding comprehensibility, adequacy of the excerpt from the emotional affective point of view, that of interest and the moral, social, linguistic, aesthetic and scientific training of the pupils) provided by a sample of primary school teachers, with their opinions to be expressed on a scale of 0 to 10, about the validity of the excerpt in general (synthetic index) and about the 8 dimensions specified above. Excerpts that had an approval rating of over 80% were used. These excerpts also had their Flesch Readability Index applied (DuBay, 2004), the values of which turned out to be from 64 to 73, for which, taking into account that the average value of this index of difficulty is equal to 50 , the pieces chosen seemed appropriate to the age level considered. In this first phase, we examined the responses produced by the children to questions such as: "What does an x mean (words taken from the excerpt)?" or "What is an x (words from the excerpt)?" The words chosen had an average frequency, as well as an average image value, so suitable to the subjects to which they were proposed (see De Mauro, 2000). Subjects were asked to provide the answers they thought most appropriate. The children, who did not have any difficulty in reading and writing, with average abilities, taken from their school performance, in these processes, moreover, were given all the time that was necessary for them to produce their answers, after independently reading the passages and questions, in writing. To have, however, the possibility of verifying the scope and consistency of each of the forms observed in more stringent ways, we proceeded to develop the tests with four multiple choice answers, including less advanced forms of the manifested vocabulary skills among the wrong alternatives. In this

second phase of the experimental design, starting from the definitions produced by the children, we then proceeded to elaborate the test with four multiple choice questions. We used trials subject to item analysis using calculations based on: index of difficulty, ability to distinguish, reliability factor (using the Kuder Richardson formula). In this way, it was possible to make an accurate, metrologically valid, selection of items with which to diagnose and measure the vocabulary skills of children. The definitive test came to be composed of 8 tests: Test 1, non-contextual synonyms; Test 2, contextual synonyms; Test 3, non-contextual antonyms; Test 4, contextual antonyms; Test 5, non-contextual categories; Test 6, contextual categories; Test 7, non-contextual functions; Test 8, contextual functions ("PAV or Analytical Vocabulary Test" by Boschi, Aprile, & Scibetta, 1991 OS, Florence, now available in Aprile, 2012).

However, to enable readers to assess more directly the operational tools of the test, which again has undergone all the metrological checks envisaged in specialist literature in these cases and we have just mentioned above (calculation of "difficulty index", "ability to distinguish", "reliability", using the Kuder Richardson formula), we give an example for each of the eight processes.

Non-contextual synonyms (phrasal context not salient):
Excerpt: A thirsty crow
"(...) Full of joy it flew towards her (...)"
Q. "joy" may mean:
boredom
confidence
guile
contentment
Correct answer d. contentment.
Contextual synonyms (phrasal context salient):
Excerpt: A thirsty crow
"(**...**). **Full** of joy it flew towards her (...)"
Q. "Full" (line 1) means:
satiated
fed up
(full) to the brim
complete
Correct answer c. (full) to the brim.

Non-contextual antonyms (phrasal context not salient):
Excerpt: The donkey in the river
"Once a donkey was travelling loaded with two large sacks of salt (...)"
Q. The contrary of "large" is:
enormous
minute
low
gross
Correct answer b. minute.
Contextual antonyms (phrasal context salient):
Excerpt: The donkey in the river
"(...) While it **was trying** to stand up (...)"
Q. The contrary of "was trying" (line 1) is:
was making an effort

was tracking down
was splashing
was quitting
Correct answer d. was quitting.
Non-contextual categorical (phrasal context not salient)
Excerpt: Napoleon
"Napoleon Bonaparte, a great general, was short in height (...)"
Q. "Napoleon" indicates:
a giant
a Neapolitan
a person
a defeat
Correct answer c. a person.
Contextual categorical (phrasal context salient)
Excerpt: Napoleon
"Napoleon Bonaparte, a **great** general, was short in height (...)"
Q. "great" (line 1) refers to a set of people who are:
intelligent
very tall
famous
elegant
Correct answer c. famous.
Non-contextual functional (phrasal context not salient)
Excerpt: A shepherd boy
"A shepherd boy had led his goats into a wood of oak trees.(...)"
Q. To call a goat, a "shepherd boy" can use a:
chocolate
shout
cart
wood
Correct answer b. shout.
Contextual functional (phrasal context salient)
Excerpt: A shepherd boy
 "A shepherd boy had led his goats into a **wood** of oak trees.(...)"
Q. The goats need the "wood" (line 1) especially to:
walk
live
eat
breathe
Correct answer c. eat.

RESULTS

The results obtained are those indicated in Table 1 for what concerns the means and standard deviations from the third to the fifth year of primary school in non-contextual phrasal processes and in Table 2 the means and standard deviations from the third to the fifth year of primary school in contextual phrasal processes.

Table 1 – Means and Standard of the third and fifth year of primary school in non-contextual processes.

Class	Lexical Processes	Means	Standard Deviations
III	Non-contextual synonyms	4.99	3.04
	Non-contextual antonyms	4.28	3.12
	Non-contextual categories	5.76	2.86
	Non-contextual functions	5.57	2.84
IV	Non-contextual synonyms	6.67	2.87
	Non-contextual antonyms	5.81	2.97
	Non-contextual categories	7.05	2.53
	Non-contextual functions	6.97	2.65
V	Non-contextual synonyms	7.27	2.84
	Non-contextual antonyms	6.62	2.93
	Non-contextual categories	7.83	2.48
	Non-contextual functions	7.66	2.46

22

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Table 2 – Means and Standard of the third and fifth year of primary school in contextual processes.

Class	Lexical Processes	Means	Standard Deviations
III	Contextual synonyms	2.75	2.56
	Contextual antonyms	3.51	2.58
	Contextual categories	2.70	2.63
	Contextual functions	3.35	2.70
IV	Contextual synonyms	4.32	3.07
	Contextual antonyms	4.64	2.84
	Contextual categories	3.95	2.67
	Contextual functions	4.55	2.82
V	Contextual synonyms	5.81	2.84
	Contextual antonyms	5.55	2.88
	Contextual categories	5.58	2.82
	Contextual functions	5.51	2.85

The results obtained from the factorial analysis are the following with reference to:
    1) the indices relative to the auto-values of the saturation matrix of the 8 variables;
    2) the percentage of variance explained;
    3) the accumulated percentage.
As results from Table 3.

Table 3 – Auto-values, % of variance explained and accumulated % of the 8 variables.

Variables	Auto-values	%Var.	Accum. %
1	4.75	59.4	59.4
2	.63	7.8	67.3
3	.55	6.8	74.1
4	.53	6.6	80.7
5	.45	5.6	86.3
6	.39	4.8	91.1
7	.37	4.6	95.7
8	.34	4.3	100.0

The saturation matrix of each variable in two rotating factors is shown in Table 4.

Table 4 – Saturation matrix of each variable in two rotating factors with the varimax method.

Variables	Factors	
	1	2
1 Non-contextual synonyms	.38567	.73732
2 Contextual synonyms	.73163	.36267
3 Non-contextual antonyms	.56417	.56474
4 Contextual antonyms	.78170	.23679
5 Non-contextual categories	.31556	.80751
6 Contextual categories	.72979	.34565
7 Non-contextual functions	.31016	.80239
8 Contextual functions	.65105	.38659

DISCUSSION

The results show, first and foremost, a clear difference between the processes in the condition of non-salient phrasal context from the third to the fifth class of primary school, compared to those generated when the phrasal context is essential to find the correct answers to the items proposed. This occurs for all the processes considered: synonyms, antonyms, categorisation and functionalisation. Compared to the studies cited in the theoretical premise (introduction), this result seems a novelty, since, as we said, the influence of contextual condition vs. non-contextual phrasal does not seem to have been at the centre of research on all these processes (synonyms, antonyms, categories, functions) in relation to such contextual vs. non-contextual phrasal conditions. This seems to point out that the subjects, when required to elaborate lexical processes, adopt different mental processes when it is important to consider the phrasal context in which the target word is found in order to find the correct solution, than when this is not necessary, since the subjects are in a condition to find the exact solution not taking into account the meaning that has the target word has in that specific phrasal context.

Thus the contextual vs. non-contextual phrasal conditions seems to work, in a "transverse" way compared to lexical processes, influencing them all without distinction. The lexical processes that are performed when the phrasal context is not essential have greater evolution in subjects in all three age levels considered, from the third to fifth class of primary school. This might mean that when subjects have to take account of the phrasal context to identify the correct meaning (synonymic, antonymic, categorical, functional) they must perform more elaborate and complex mental lexical processes than when they do not need to take into account the phrasal context, such as in the non-contextual situation.

The findings also highlight another aspect that we did not keep under observation in this research centred on comparing lexical processes in the contextual vs. non-contextual phrases, i.e. the trend of evolution of individual lexical processes is rather diverse in the third, less in the fourth, reaching levels substantially similar in the fifth class of primary school. It is therefore important to understand, in future investigations, what happens between the various processes during development, specifically between the third and fifth classes of primary school.

Factor analysis shows clear differences between these lexical processes in the salient phrasal context compared to the condition where the phrasal context of the word is essential to grasp its synonymic, antonymic, categorical, functional, correct, accurate, more relevant meaning.

Therefore saturations of the variables in the situation of phrasal context relevant to the processes of elaboration required for the purpose of identifying the correct meaning of the target words as in factor 1 turn out to be higher and more saturated in factor 2 when the phrasal context is not essential in the processes of elaboration that lead the subjects to identify the correct meanings of the target words.

CONCLUSIONS

These data seem to confirm that the subjects, in the processing of the meanings of words (i.e. synonymic, antonymic, categorical and functional processes), seem to have the need to use two sources of information: the meanings of the words referred to the phrasal context in which the words are located (factor 1, contextual) and the meanings of words processed without referring to that context (factor 2, non-contextual). It seems therefore that vocabulary skills have to be diagnosed, measured and enhanced with reference to these two factors: variables of synonyms, antonyms, categorical and functional in a situation of phrasal context relevant to deduce the correct meaning of words and activation of all these processes without the need to take account of the phrasal context to deduce the correct meaning of words.

So it seems that the model of development of vocabulary skills is multidimensional, on the one hand, implying the presence of synonymic, antonymic, categorical and functional variables. Proper diagnosis therefore requires an evaluation and measurement of these variables.

Alongside these elaboration processes it is necessary, however, as is clear from the results of this research, to take into account in a significant way the factors that we found and that refer to the processes of elaboration required when it is necessary to take into account the phrasal context in which a word is located to come to identify the correct meaning of that word, such as in factor 1, as well as processes in which the use of the phrasal context of the word is not necessary to process the correct meanings of a word, as in the factor 2.

The prevention of possible difficulties therefore requires the need to stimulate the process of elaboration of the meanings of words (synonyms, antonyms, categorical, functional) in the two factors that emerged from the research, factor 1 (contextual phrasal elaboration processes) and factor 2 (non- contextual phrasal elaboration processes).

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