ALTRALANG Journal
e-ISSN: 2710-8619 p-ISSN: 2710-7922
Volume 7 Issue 1 / June 2025 pp. 462-470
DOI: https://doi.org/10.52919/altralang.v7i1.554

Semantic Memory in Arabic-Speaking Children with Language Delays

MAAROUF Fakht[1*]
[1]*University of Mostaganem Abdelhamid Ben Badis, Algeria*
fakht.maarouf@univ-mosta.dz

HAOULA Mohammed [2]
[2]*University of Mostaganem Abdelhamid Ben Badis, Algeria*
mohamed.haoula@univ-mosta.dz

Received: 31/03/2024, **Accepted:** 16/05/2025, **Published:** 01/06/2025

ABSTRACT: *This study involves a linguistic-cognitive approach to language delay (LD) by revealing the process of semantic memory (SM) in the Arabic-speaking child according to the specificity of the Arabic language. The study aimed to answer a fundamental question about the contribution of the correlation between SM and LD in Arabic-speaking children. A sample of 32 children with LD was based on an experimental approach, including language, SM, and mental abilities tests. The results of the study found that understanding the nature of LD comes from understanding its relation to SM. We explain language impairment as a disorder in the SM processes that appear in both semantic organization and retrieval, with an advantage for retrieval. The specificity of the Arabic language in its derivation, richness, and morphological structure contributed to increasing the level of lexical access and thus the richness of the mental lexicon, and from it, the processing of language knowledge at the level of SM varies according to the features of the language.*

KEYWORDS: Arabic Language, Language Acquisition, Language Delay, Language Disorders, Semantic Memory.

* Corresponding author

Introduction

The pioneers of the cognitive approach focused on the role of the child's cognitive development and the essential role of memory in the process of language acquisition at all stages. Many studies have shown the correlation between SM and language disorders in general and LD in particular. Some research (Boukhari 2002. Hamdash 2002. Nouani 2012. Iaatidal 2012) has investigated the relationship between memory and language in the context of language disorders. The conclusions showed that there is a significant relationship between language disorders and memory disorders, and it was also concluded that the phonological loop has a crucial role. (Gasmi 2002) confirms her hypothesis that children with mild language disorders have poor memory retrieval compared to normal children. At the same time, there was no difference between the two groups in the functioning of the visuospatial sketchpad. concluded that long-term memory intervenes in language, especially in organizing vocabulary and understanding narrated stories. He confirmed that there is a significant relationship between language and memory to the extent that it is difficult to determine the cause of any language disorder is it related to language proficiency or is it an inevitable result of memory disorder (Nouani 2012). As it is, there is a reciprocal relationship between language and memory in the normal case of the acquisition, development, and functioning of language and non-language communication. It is more important for this relationship to exist in a state of disorder. These studies show the importance of the relationship between the cognitive and Language components. Language acquisition and development require typical SM, through which linguistic knowledge of concepts and words is acquired in addition to their specific meanings. Typical SM and its normal development provide us with a clear idea about the nature of the acquisition of Language knowledge. (Tulving 1983) explained that semantics is concerned with analyzing the meanings of words and their relationships, and acquiring new words requires storing the semantic properties of things and linking them with nearby items (forming semantic relationships). Unclear and incompatible semantic representations can cause a delay in the mental lexicon at the level of reception and production, such that if children do not understand the differences that distinguish between two concepts, they will not understand the necessity of different names for them. Accordingly, children's ability to understand the rules of semantics and function according to their various acquisitions allows them to organize the information and everything they receive from their environment in a semantic manner that allows them to organize their SM. The normal child in the stage of linguistic acquisition develops SM naturally according to his social-linguistic environment in a way that is consistent with his environment. This linguistic acquisition is affected by biological, organic, psychological, cognitive, and social factors; this causes a delay in acquiring it compared to his peers, and this requires psychological and speech therapy intervention. The speech therapist should consider this disorder not only as a defect at the language level but rather as a disintegration at the psychological-linguistic and cognitive level, taking into account cognitive processes as an integrated and interconnected whole similar to memory. Mazeau believes that language and memory are one linked system, such that it is sometimes difficult to distinguish between a disorder related to linguistic proficiency and a linguistic disorder resulting from an impairment in memory (Mazeau 1999 cite in Nouani 2012) .

Those interested in studying the Arabic language explained that it has a style and characteristics that are distinguished by the abundance and diversity of the language in terms of richness and adposition, postposition, omission, affirmation, separation, and conjunction, which rhetoricians call adverbial (Al-Baqouri, 1987). Arabic is also unique in its characteristics of syntactic synonymy, expansion, and methods of derivation. It is characterized by antonyms and homonyms, in addition to the suitability of its letters to their meanings, meaning that it has timbre and rhythm. It is also characterized by close and high vowel such as the sād, ḍād, tā', and dha'. According to Haj Saleh Abdel Rahman, the Arabic language accepts mathematical logic, which makes it a fusion language, unlike the agglutinative languages. Because it includes the concepts of the root and patterns, which are considered two mathematical components on which the Arabic language is based, where the root represents the basic structure of the word and the pattern

represents its general structure. The pattern distributes the vowels to the various letters of the word. It also distributes the morphemes that are added to the components of the root for the purpose of generating words. These morphemes are represented by prefixes, suffixes, and roots. As for vowels, their distribution is regulated by matching algorithms between the pattern and the word produced. This is why we find that the Arabic reader is able to read words without vowels on them because reading is achieved by meters and not by vowels (Haj Saleh 2007). Given that the level of lexical access is considered a basic criterion for examining the process of SM, those interested in the Arabic language believe that it has a specificity that gives the mind more flexibility in processing the language. Taking into account the division of memory into explicit and procedural, these latter two work synergistically in the Arabic language, unlike other languages. At the level of acquiring lexical units, what distinguishes Arabic is the ability to apply the rules of morphological structure, which allows deriving vocabulary from its roots and inferring its meaning. This characteristic is considered a contributing factor in quickly enriching the mental lexicon. (Zaghbouch 2013).

Our paper aims to study the SM of a child with language delay by investigating the process of cognitive functioning to organize linguistic knowledge in his SM.

Search questions:

Based on the fundamental role of semantic memory in language use and the unique characteristics of Arabic, including its vast and diverse vocabulary, multiple meanings, and rich linguistic usage, we attempt to investigate the relationship between semantic memory and language delay in Arabic-speaking children by comparing the results of the study sample in the pre- and post-tests of the semantic memory test and the language test.

Study objectives:

This study was based on clarifying the relationship between memory and language through the most important cognitive activities, namely semantic memory. It also explored the possible and available means of developing semantic memory in Arabic-speaking children with language delays, given the specific nature of the latter.

The context/background of the study:

This study falls within the field of multidisciplinary research with psycholinguistic and cognitive dimensions, through which we aim to investigate the semantic memory of the language-delayed child who speaks Arabic, based on the fact that linguistic delay is not only related to the purely linguistic level, but rather is a linguistic and cognitive disorder, and that the cognitive processes involved in linguistic behavior operate in an integrated manner, including memory.

The study sample:

Consisted of 32 cases with language delay. 26 males and 6 females, their ages ranged between 4 years and 6 months and 6 years and 3 months, most of them taking speech therapy.

This sample was intentionally selected from a community of 47 cases of language delay, from various centers, nurseries, and hospitals affiliated with the Health, Neighborhood Health, and Social Affairs Directorates in Mostaganem (Algeria). They were selected based on several criteria, including:

- Confirmation of the presence of language delay symptoms, represented by weak vocabulary, articulation disorders, and syntactic errors, through diagnosis based on a language test (see Table 3).
- Reliance on medical records, which demonstrate the health status of the language areas of the brain.
- The cases were free of common disorders.

Sex		Chronological age in months				duration of speech therapy			
Male	Female	Average	minimum	Maximum	SD	Average	minimum	Maximum	SD
26	6	63.38	54	75	6.5	1.5	0.70	0	3

Table 1. shows the characteristics of the study sample

Materials:

Naglieri's nonverbal mental aptitude test: The test was administered to control the variable of language delay and to ensure that there were no common disorders among the cases. The test is valid and reliable statistically, cross-cultural, and non-linguistic.

IQ test results:

The results of the intelligence test on the study sample produced percentages that ranged between 45% and 66%, and these percentages are considered acceptable if we take into account chronological age and language delay on the one hand. On the other hand, the content of this test includes concepts that are usually distorted in this type of disorder, so we find items related to basic concepts such as spatial and temporal dimensions, direction, and laterality. Therefore, the percentages shown in table (01) represent the sample members whose degree of intelligence is acceptable within the limits of this disorder.

	Raw point	IQ	test point	tabular point
Number of cases	32	32	32	32
The average	20.4063	57.4688	102.8125	540.5313
SD	3.1710	6.2475	2.3615	17.4633
Minimum value	15.00	45.00	98.00	494.00
Maximum value	26.00	66.00	106.00	565.00

Table 2. IQ test results

Language test: We designed a test to be compatible with the linguistic and cultural specificity of the study sample, relying on the ideas of the battery of oral and written language, memory, and attention by (Chevrie Muller 1997) and the battery of language comprehension and production tests by (Jomaa Sayed 2002). The test is valid and reliable statistically

Test items	the basic Concepts	Naming pictures	Sequential story telling	Image recognition	Understanding the situations
Number of cases	32	32	32	32	32
Average	5.7	11.8	3.0	8.8	16.8
standard deviation	4.8	1.8	.90	2.4	5.1
Lowest score	2	8	2	5	9
highest score	7	14	5	14	25
Total score	10	25	18	25	40

Table 3. Shows the results of the language test

From Table No. (03), the cases who were administered the language test suffered from a language deficit, such that the average of the basic concepts item was only 16.8 out of 40, with a standard deviation of 5.1, which expresses the dispersion of the subjects' scores. The mean of cases in the picture naming item was 8.8 out of 25, with a standard deviation of 2.4. In the story telling item, 3 out of 18, with a standard deviation of 0.9. While with regard to the two items of oral linguistic understanding, represented by the item Recognizing pictures and understanding situations, the results were somewhat different and expressive. We find that in the first item (Identifying Pictures), the average was estimated at 11.8 out of 25, with a standard deviation of 1.8, and in the second item (Understanding Situations).) Understanding and in the image recognition item, the mean was estimated at 5.7 out of 10, with a standard deviation of 4.8. The thing that is consistent with the nature of the disorder that the cases suffer from

SM test: The design of this test was based on the SM model of Warrington (Warrington 1975), the semantic battery of (Merck. Charnallet. Auriacombe. Belliard. Hahn-Barma. Kremin. Siegwart. 2011) and the battery of oral and written language, memory and attention by (Chevrie Muller. 1997)**.**

Results:

The correlation between SM and LD in the Arabic-speaking child:

To investigate the correlation between SM and LD, the mean, standard deviation, and Pearson coefficient were used to study the correlation between the results of both language and SM on a sample of LD children. The results were as follows:

LD children	Sample	M	Total score	SD	Correlation coefficient
SM	32	45.09	110	11.87	0.24
language	32	46.25	118	7.84	

Table 4. Results of LD children in both the language and SM tests

Table No. (04) shows the value of the correlation coefficient between the results of the two tests (0.24) which is a small value that expresses the weakness of this correlation, but the convergence of the means for linguistically delayed children in both the language and SM test (45.09 out of 110 and 46.25 out of 118) shows otherwise. Then the values of the large standard deviation Reflect that (11.87, 7.84)

The explanation for this can be primarily due to the sample size (32), which is considered small in order to study this correlation statistically. Statistically, we can say that the hypothesis is not valid because of the weak correlation. However, if we notice the other statistical data (the closeness and similarity of the means, the large value of the standard deviation), and especially the theoretical data and previous studies in this field (Mazzeo 1999, Nouani 2012, Gasmi 2002, Zegboush 2013) that say that there is a relationship between language and memory on the one hand and the influence of SM among LD people on the other hand, then we can accept this hypothesis.

Differences in the SM of the LD child speaks Arabic:

To investigate significant differences in the results of the SM test on the sample before and after speech therapy, we used the means, standard deviation, and the "t" test to study these differences, and the results were as follows:

	LD	Sample	Mean	SD	Calculated T	tabulated t	Sig
SM	Pre test	16	44.8750	12.3498	-9.734	2.04	0.01
	Post test	16	79.2500	6.8557			

Table 5. comparing the results of the pre- and post-test of the SM test

It is clear from Table No. (05) that there is a significant difference between the calculated T (9.73), which is larger than the tabulated T value (2.04), and the difference between the means of the pre-test (44.87) and the post-application (79.25). Then, the standard deviation in the pre-test was large (12.34). The value of the SD in the post-test decreased by half (6.85). This indicates that the children in this sample improved their performance in the various items of the SM test. Therefore, we can say that this hypothesis has been valid, meaning that there are statistically significant differences between the pre- and post-tests of the SM test on LD children. These results show the cognitive deficiency of children with LD, where their cognitive abilities are affected in addition to their linguistic abilities, and here we mean SM, which is not an exception to this. At the level of semantic organization, children with LD suffer from lexico-semantic deficiency, classification difficulties, and the inability to functionally construct sentences. Semantic organization disorder causes a retrieval disorder that appears through difficulties in remembering and naming because the linguistically delayed child organizes his linguistic knowledge and processes it cognitively first before he is able to recall it.

Discussion:

Many studies in the field of cognitive psychology and cognitive sciences have shown the integration of cognitive abilities, including linguistic ability. This is due to the importance and role of language in most cognitive activities. It is considered a means of processing information and carrying out various operations. More than this, we find that memory also depends on language to store data and information (phonological, semantic, and lexical encoding), and according to Melius, language acquisition and learning does not take place without the intervention of memory (Piaget 1976. Bruner1993.Nouani, 2012. Vygotsky 1997) all pointed to the integrated development of the child in its cognitive aspects, and researchers in the field of language acquisition in children focused on the necessity of memory intervention for this linguistic development to take place clearly at all its stages. Tulving (Tulving 1983) also focuses on the basic role of SM in language use. Research in the field of cognitive theories about memory (Baddeley 1993. Zaghbouch 2008. Nouani 2012) has proven that acquiring the lexicon, like all educational activities, requires the activity of remembering, as memory does not only play a special role in storing linguistic meanings, nor even in storing knowledge in general, but rather it is used by all individuals to create concepts about the world. Remembering means the ability to retrieve previously recognized words and retain them in a given situation. This is done through the work of memory, which creates a system in the form of networks composed of concepts linked by relationships, which makes the individual able to produce, receive and understand words. On the other hand, the level that is determined in the process of remembering carried out by the child when he is in an educational situation requires him to repeat the information and vocabulary he has stored through repetition and Orthographic Establishing, which is considered one of the basic tasks in the process of remembering and recalling. Based on the above, this mutual relationship between language and memory necessitates the existence of a relationship in the case of disorder. It has become clear that SM is disturbed in the abyssinian, the hearing-impaired, and the mentally retarded. In view of the previous considerations and in view of the closeness of the means of the sample of linguistically delayed children and the large value of their standard deviation in both tests, we say so. (Gasmi 2002) also found that children who suffer from a mild language disorder have poor memory retrieval compared to normal people, while there was no difference between the two groups with regard to good use of the visual space. In a comparison made by (Drivel 2007) regarding the features of SM in both children with Down syndrome and normal children, the results highlighted that SM in children with Down syndrome is characterized by a lack of organization of linguistic knowledge that expresses things. They also appeared to have deficiencies and weaknesses in building semantic representations in SM. In addition, the concept of classification, generalization, and distinction is not acquired by the cases, which negatively affects their acquisition of concepts and words with their meanings and the relationships and links that link various linguistic

knowledge to each other. Children with Down syndrome also showed difficulties at the level of intentional retrieval, which in turn was affected by poor organization of linguistic knowledge within SM. (Mazeau 1999) concluded that long-term memory clearly intervenes in language, especially in organizing vocabulary and in understanding narrated stories. He mentioned in one of his articles that there is a significant relationship between language and memory to the point that it is difficult for any linguistic disorder to know whether it is related to linguistic proficiency or whether it is a result of the inevitable result of memory deficit (Nouani 2012). Some studies have paid attention to the relationship of long-term memory to language, but it should be noted that with the emergence of working memory as a memory that intervenes in the processing of information, researchers have been interested in its role in the acquisition of oral as well as written language. Research has also confirmed the importance of studying language and memory together, as well as the importance of evaluating them in the event of a language disorder, as a result of the overlap and integration between these two cognitive processes. On the other hand, we can say that the effectiveness of language and the richness of its content indicate the richness of thinking or the processes carried out by thought, such as effectiveness in the fields of storage, classification, alertness, influence, response to various stimuli, visualization, abstraction, and retrieval. The process of storing linguistic vocabulary and the extent of flexibility in searching for them in memory and in response to stimuli that call them up or bring them to mind, as well as the extent of the ability to link them with appropriate ideas and concepts, are all things that indicate the rate of growth and speed of thinking.

Conclusion:

The results of our research confirmed that LD disorder can be understood from the cognitive abilities represented here by SM, and this is consistent with various studies and literature. The results confirm the assumption that there is a link between SM and LD, and this demonstrates the importance and role of language in cognitive processes by being a means of processing information and carrying out its various operations, including the existence of a mutual relationship in the pathological condition. That is, the language disorder in our research sample is not only explained by a disorder at one of the language levels, but rather it extends to a disorder in the SM processes related to semantic organization and retrieval, which in turn are affected by the poor organization of linguistic knowledge within SM. The results highlighted a difference between the language items related to semantic organization and the retrieval items, indicating that the main problem associated with semantic memory in the linguistically delayed child lies mainly in semantic organization rather than retrieval. LD children have difficulties in classification, such as classifying colors and shapes, in semantic and logical order and sequence, in verbal fluidity, and semantic segmentation. It has become clear through this research that the linguistically delayed child's semantic memory is affected as a result of his linguistic disorder and as a result of the integration between language ability and memory, as indicated by many researchers in this field (Baddeley 1993 and 1994. Nouani 2012. Zogboush 2008 and 2013). Thus, language therapy becomes viewed not as a disorder in the production and understanding of language from the phonetic, lexical, semantic, grammatical, and pragmatic aspects but rather as a cognitive syndrome in which the problem may be based on the level of language, attention, perception, or memory. The disorder in access to the mental lexicon in the LD has been revealed through difficulties in storing information in their mental lexicon, such that their lexical balance is weakened and their organization is disturbed. The process of accessing semantic memory requires the child to rely on self-repetition, in which he uses all the strategies necessary to retain lexical information, and this is the specialty of the primary subsystem, which Baddeley calls the phonological loop (Baddeley 1993). In view of the close relationship between lexical ability and SM, we tried in this study to know the lexical ability of the children in the sample based on the mental lexicon that determines the speaker's linguistic ability, which is divided into two parts, an active lexicon and an inactive lexicon, and it differs from one child to another according to the difference in the linguistic and socio-cultural environment. Given that the children of our research sample are Arabic speakers, this has contributed to increasing their level of lexical access, so that

those interested in the Arabic language consider that it possesses a specificity that gives the mind more flexibility in perceiving and processing it. Given the division of memory into explicit and procedural, these two latter work in synergy in the Arabic language, unlike other languages. (Zagboush, 2013). At the level of acquiring lexical units, what distinguishes Arabic is the ability to apply the rules of the morphological pattern, which allows deriving vocabulary from its roots and inferring its meaning. This characteristic is considered a factor that helps quickly enrich the mental lexicon. Therefore, the processing of linguistic knowledge at the level of semantic memory varies depending on the features of the Arabic language. Hence, taking into account the specificity of the language of the linguistically delayed child in every cognitive endeavor aimed at developing lexical semantic memory becomes an urgent necessity.

References

- Al-Baqouri, A, H (1987) .L'impact du Saint Coran sur la langue arabe. Dar Al-Maaref, 4e édition.
- Baddeley, A (1993). human memory, theory and practice, trans., under the direction of Solange Hollard, Presses universitaire de Grenoble.
- Baddeley A, D(1994): human memory, in research review, special issue 267, 1994, PP 730 735.
- Boukhari, S. (2002). Semantic memory in people with dysgraphia in an Algerian clinical environment, a cognitive-linguistic approach. these. University of Algeria.
- Bruner, J, S. (1993). Child development: knowing how to do, knowing how to say. Ed, Phew, Paris. 4th edition.
- Chevrie-Muller, Claude. Simon, A, M. Fournier, S. (1997). Oral and written language battery, memory, attention (L2MA). ECPA. Paris.
- Drivel, Y. (2007). A study of semantic memory in people with Down syndrome. These. University of Algeria.
- Jomaa, S, Y.(2002). Language Comprehension and Production Test Battery, Anglo-Egyptian Library.Cairo.
- Haj Saleh, A, R. (2007). New Khalilian theory. Brochures from the Scientific and Technical Research Center for the Development of the Arabic Language in Algeria. Fourth issue, Dar Homa, Algeria.
- Hamdash, M (2002). Semantic memory in a person with Broca's aphasia. These. University of Algeria.
- Iaatidal, A (2012).Study of semantic memory and verbal linguistic ability in mentally disabled children. A case of Down Syndrome. These. University of Algeria.
- Gasmi, A. (2002). Working memory and its relationship with vocabulary acquisition: a comparative study between normal children and children suffering from a mild linguistic disorder. These. University of Algeria.
- Mazeau, M. (1999). Les troubles mnésiques : Implication en langage oral et langage écrit. In bulletin d'audiophonologie, Vol XV, N°2, 1999, pp 201-222.
- Naglieri, J, A. (1998). NNAT Naglieri Non-Verbal Aptitude Test, Ecpa. France.
- Nouani, H. (2012). Language disorders and associated cognitive activities, "example of working memory". Cognitive Research Journal: University of Fez, Morocco.
- Piaget, J (1976). Language and thought in children. Ed. Delachaux and Niestlé 9th edition. Paris.
- Tulving, E (1983). Elements of episodic memory. Oxford University Press. New York.
- Vygotsky, L. (1997). Thought and language. Ed, ADAGP, 3rd edition, Paris.

- Warrington, E. (1975). The selective impairment of semantic memory. Quarterly Journal of Experimental Psychology, 27, 635-657.
- Zegboush, B. (2008). Memory and language: a cognitive psychology approach to lexical memory and its pedagogical extensions. Modern Book World.1st Ed .Amman.
- Zegboush, B. (2013).The effect of the specificity of the Arabic language on access to lexical memory, Journal of psychological and educational studies, number 10, Department of psychology, educational sciences and speech therapy. University of Algiers.

Authors' biographies

Dr. Fakhet MAAROUF: Lecturer in the Department of Speech Therapy at Abdelhamid Ibn Badis University of Mostaganem, specializing in cognitive psychology, psycholinguistics, and speech-language pathology. She is also the Head of the Master's Program in Language and Communication Pathology. From 2002 to 2012, she worked as a speech therapist. Since 2012, she has taught courses including Introduction to Speech Therapy, Phonetics, Phonology, Oral and Written Language Disorders, Cognitive Psychology, and Psycholinguistics at both the University of Oran and the University of Mostaganem. Dr. Maarouf has contributed to numerous research projects within her areas of specialization and has supervised many bachelor's, master's, and doctoral theses. She has delivered lectures at national and international scientific conferences and has published several scientific articles on psycholinguistics, cognitive psychology, and speech and language disorders.

Prof. Mohamed HAOULA is a full professor in higher education, specializing in cognitive psychology, psycholinguistics, and speech-language pathology. He is the head of the Speech Therapy Department at Abdelhamid Ibn Badis University in Mostaganem, Algeria. He has worked as a speech and language therapist in both the public and private sectors for over ten years. He has lectured on various subjects related to cognitive psychology, psycholinguistics, and speech-language pathology for over twenty years at the universities of Oran and Mostaganem. He has supervised numerous master's and doctoral theses. He has also overseen several research projects in laboratories and research centers (CRASC), served as a member of several national and international scientific bodies, and is an expert on the committees responsible for establishing speech therapy programs. He is an expert on the University Qualification Committee and University Research Formation Projects. The researcher has published several books and articles in his field of specialization in Arabic, French, and English. He has also participated in many national and international scientific activities.