Л.Н. Гумилев атындағы Еуразия ұлттық университетінің ХАБАРШЫСЫ.
ISSN (Print) 2616-678X. ISSN (Online) 2663-1288

ЛИНГВИСТИКА / LINGUISTICS / ЛИНГВИСТИКА

IRSTI 16.21.07
Research article

https://doi.org/10.32523/2616-678X-2025-152-3-53-61

The functional role of mental lexicon in language learning

D.K. Bergibayeva[1]*, S.A. Kenzhegaliev[2]

Karaganda Buketov University, Karaganda, Kazakhstan

(E-mail: [1]kaldybekkyzy@mail.ru, [2]sayan582@mail.ru)

Abstract. The mental lexicon plays a pivotal role in language acquisition, serving as the internal system where words are stored, accessed and connected. Strengthening lexical networks through techniques such as semantic mapping, learning in context, and repetition can significantly improve retrieval efficiency and overall language proficiency. This paper investigates how the mental lexicon is structured in native Kazakh speakers, examines its role in the language learning process, and proposes strategies to enhance vocabulary acquisition. Drawing upon research from cognitive linguistics, psycholinguistics, and neurolinguistics, we examine how mental lexical organization develops with increasing language competence and explore the challenges learners face during word retrieval. An experimental study involving native Kazakh speakers was conducted to observe how words are associated and retrieved in their mental lexicon. The results offer new insights into the mechanisms of language processing and provide practical recommendations for improving vocabulary teaching. By analyzing associative responses, we aim to uncover the internal structuring of the Kazakh mental lexicon, contributing to psycholinguistic theory and revealing the cognitive patterns underpinning language use in the Kazakh-speaking context.

Keywords: mental lexicon, contextual learning, vocabulary acquisition, word association, language processing, cognitive linguistics.

Introduction

Language learning involves complex cognitive mechanisms, at the core of which lies the mental lexicon – an internal database where word meanings, forms, and relationships are

Received: 25.07.2025; Revised: 30.07.2025; Accepted: 18.09.2025; Available online: 25.09.2025

***corresponding author**

stored. As defined by Miozzo (2008), "the mental lexicon differs from a traditional dictionary in that it is not organized alphabetically but rather dynamically, linking words based on semantic, phonological, syntactic, and frequency-based relationships". Understanding the internal structure and retrieval mechanisms of the mental lexicon is essential for improving second language (L2) learning strategies.

This study specifically focuses on how the mental lexicon operates among native Kazakh speakers and seeks to answer the following research questions:

- How is the mental lexicon structured and internally organized?
- In what ways does lexical retrieval function during language processing?
- How do mental lexicons differ between first language (L1) and second language (L2) speakers?
- What methods can be used to enhance vocabulary acquisition?

While substantial research has explored the mental lexicon in Indo-European languages, studies on Turkic languages, particularly Kazakh, remain scarce. Given the unique morphological features of Kazakh, this research contributes to understanding how agglutinative language systems influence lexical organization.

Materials and methods

The mental lexicon refers to the mental system where vocabulary knowledge is stored and accessed. Kovacs et al. emphasize that, unlike a printed dictionary, the mental lexicon is a fluid, interconnected network where links are based on meaning, sound, usage frequency, and grammar (Kovacs, 2021). Insights into its functioning are critical for:

- Understanding how L1 speakers retrieve words efficiently.
- Identifying challenges L2 learners face when recalling vocabulary.
- Developing effective vocabulary teaching strategies.

The Kazakh language, characterized by its agglutinative morphology, forms complex word structures through extensive use of suffixation. This linguistic trait influences how vocabulary is mentally stored and accessed. Artykbayeva et al., in their analysis of associative dictionaries, identified culturally significant lexico-semantic groupings in Kazakh, revealing how cultural context shapes lexical associations (Artykbayeva et al., 2024). Likewise, Kenzhegaliev et al. (2024) underlined the distinct nature of the mental lexicon compared to general vocabulary lists, emphasizing its layered organization.

Kovacs et al. (2021) further elaborates that the mental lexicon comprises networks of semantically, phonologically, and morphologically related words. Words that are synonymous or commonly used together (collocations) form strong links, allowing smoother retrieval during communication. Research by Wei (2006) adds that for multilingual individuals, lexical items in different languages are connected, with L2 vocabulary often referencing L1 meanings. Depending on the similarities between the languages involved, this connection may help or hinder language acquisition.

Miozzo & Caramazza (1997) note, «Lexical retrieval is fundamental to both understanding and producing language. When a speaker prepares to use a word, their mind activates its phonological and semantic components stored in the mental lexicon». For L2 learners, word retrieval is often slower and more error-prone due to weaker lexical networks. However,

repeated exposure, contextual learning, and usage in conversations can help reinforce these networks, leading to improved fluency (Leach & Samuel, 2007).

Associative networks within the mental lexicon typically include:

• Paradigmatic associations (e.g., synonyms, antonyms)
• Syntagmatic associations (e.g., collocations)
• Phonological associations (e.g., sound-based similarity)

Kenzhegaliev et al. (2024) and colleagues found that semantic links dominate word associations among Kazakh L1 speakers, while phonological links are more typical in L2 learners. Wei (2006) supports this, noting that L1 users form deeper semantic and syntactic associations, whereas L2 users often rely on surface-level phonological similarities.

Recent research – particularly A. Collins and E. Loftus Spreading Activation Theory – conceptualizes the mental lexicon as a system of interconnected nodes activated through semantic proximity (Collins & Loftus, 2005). This model explains how accessing one word facilitates access to related concepts. In bilinguals, however, the Revised Hierarchical Model (RHM) suggests that L2 words are initially retrieved via their L1 counterparts, delaying processing and increasing cognitive load (Kroll & Stewart, 1994). This dynamic is especially relevant for Kazakh-Russian bilinguals.

For agglutinative languages like Kazakh and Turkish, the mental lexicon is affected by morphological complexity, which benefits L1 organization but poses difficulties for L2 acquisition (Aydin, 2021).

Participants:

• Total: 50 native Kazakh speakers
• Age: 18–35 years
• Education: minimum of secondary education
• Languages: fluent in Kazakh; varying proficiency in Russian and English

The study employed a Word Association Test (WAT) to evaluate lexical organization. Participants were shown 30 Kazakh stimulus words (spanning nouns, verbs, and adjectives) and instructed to quickly write the first word that came to mind within five seconds. Their responses were categorized into:

• Paradigmatic (e.g., synonym-based)
• Syntagmatic (e.g., context-based)
• Phonological (e.g., similar-sounding)
• Unrelated (non-associated)

Most participants produced responses within two seconds (60%), while 30% required 3–5 seconds, and 10% took longer. A pie chart was used to visualize response times, confirming varied retrieval efficiency.

Cross-linguistic interference was also examined. Although 85% responded accurately in Kazakh, 12% initially retrieved Russian words before self-correcting, and 3% failed to respond, highlighting minor bilingual interference.

Results and Discussion

The distribution of responses is shown in Figure: Word Association Patterns in Native Kazakh Speakers

Association Type	Percentage
semantic associations	52%
syntagmatic associations	35%
phonological associations	10%
unrelated	3%

During the experiment, participants exhibited different response patterns. Below is a summary of their reaction times and accuracy. The pie diagram below illustrates the distribution of reaction times among participants. Most participants (60%) responded quickly within 2 seconds, while 30% required more processing time (3-5 seconds). Only 10% struggled with word retrieval, needing over 5 seconds to respond.

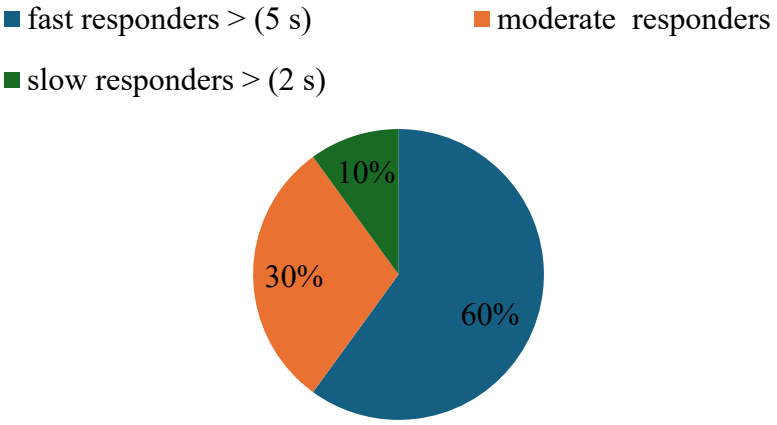

Diagram 1: Reaction time in the word association test

• Fast Responders – 60%: The majority quickly retrieved words with minimal hesitation.
• Moderate Responders – 30%: Some participants needed a bit more processing time.
• Slow Responders – 10%: A small group struggled with retrieval, showing longer hesitation.

The diagram below shows the influence of bilingualism. While 85% of participants correctly responded in Kazakh, 12% initially retrieved a Russian word before self-correcting. This suggests some level of cross-linguistic interference.

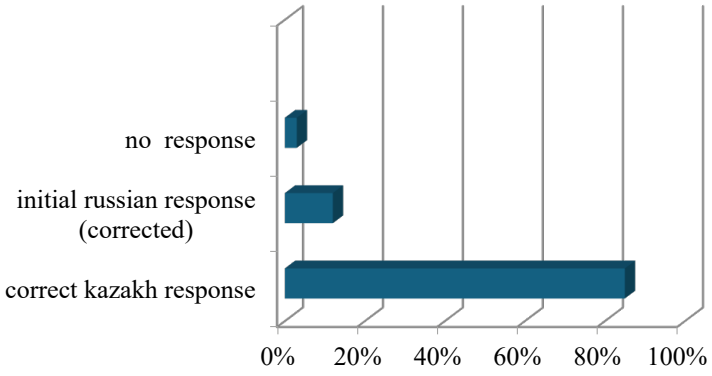

Diagram 2: Bilingual influence in Word Retrieval

This horizontal bar chart shows the influence of bilingualism on word retrieval:

• 85% of participants responded correctly in Kazakh on the first attempt.

•12% initially responded in Russian, then corrected themselves to Kazakh.

• 3% did not respond, indicating difficulty retrieving an association.

This suggests that cross-linguistic interference occurs but is not dominant in native Kazakh speakers.

Key Findings:

• Semantic associations were the most common (52%), indicating a strong conceptual organization.

• Syntagmatic associations (35%) highlight the role of collocations and context in word retrieval.

• Phonological associations (10%) were less common, showing that Kazakh speakers rely more on meaning than sound in lexical retrieval.

To supplement the word association test, we conducted a simplified lexical recognition task adapted for school or university environments without specialized equipment. Participants were given a printed list containing 40 lexical items: 20 real Kazakh words and 20 invented pseudowords. Their task was to indicate, for each item, whether they believed it to be a real Kazakh word or not. We observed participants as they completed the task and used a stopwatch to estimate response times, classifying them into three general categories: fast (under 2 seconds per item), moderate (3-5 seconds), and slow (more than 5 seconds).

This method allowed us to assess lexical familiarity and recognition accuracy in a naturalistic setting without relying on digital tools. Although precise reaction times were not recorded, observed patterns still revealed differences in processing speed and confidence levels, especially between participants with strong and weak vocabulary knowledge.

The WAT results confirm that native Kazakh speakers rely primarily on semantic and syntagmatic associations, supporting the theory that mental lexicons are semantically organized. The use of collocational (syntagmatic) responses further implies that language processing is heavily contextual.

Findings also illustrate how bilingualism subtly affects lexical retrieval. The 12% of participants who defaulted to Russian responses before correcting themselves illustrate the RHM's assertion of interlinked L1 and L2 systems. Such competition between languages, even among fluent L1 speakers, underscores the cognitive complexity of multilingual processing.

Kazakh's agglutinative nature likely strengthens semantic organization, as affixation patterns require conceptual clarity. This is consistent with observations in Turkish and Finnish mental lexicons.

Practical implications:

• Semantic mapping enhances associative strength;

• Contextual learning improves syntagmatic links;

• Phonological training benefits pronunciation and recall.

These strategies collectively aid vocabulary retention and should be incorporated into L2 teaching frameworks.

Conclusion

This study sheds light on how the mental lexicon is structured in native Kazakh speakers. It confirms that semantic and syntagmatic associations dominate lexical retrieval, reflecting the contextual and morphological nature of the Kazakh language. Experimental findings from both the WAT and LDT indicate that strong associative links enhance retrieval speed and accuracy. Recommendations for pedagogy:

- train L2 learners in synonym/antonym recognition to reinforce semantic networks;
- encourage usage of collocations to deepen syntagmatic associations;
- integrate phonological exercises to support correct pronunciation and retrieval.

Understanding how words are stored and retrieved in the Kazakh mental lexicon contributes to broader psycholinguistic research and informs more effective language instruction strategies. The insights gained here serve both theoretical and practical goals, offering pathways for improved fluency among L2 learners and a deeper understanding of cognitive language processing in Turkic languages.

Conflict of interests, acknowledgements and funding information

The research paper contains no conflicts of interest.

Contribution of the authors. D.K. Bergibayeva: data collection, article concept development, preparation of the introduction and main concepts of the article, systematization and compilation of research materials. **S.A. Kenzhegaliev:** participation in the discussion of research results, critical analysis of the literature.

References

Artykbayeva, F., Spatay, A., & Taiteliyeva, M. (2024). Value characteristics of the core of the mental lexicon of native speakers of language and culture in the light of intercultural communication. Journal of Psycholinguistic Research, 32. https://doi.org/10.1007/s10936-024-10074-9

Aydin, M. (2021). The role of morphological complexity in lexical retrieval: A comparison of Turkish and Kazakh speakers. Turkic Linguistics Journal, 85–102.

Collins, A.M., & Loftus, E.F. (1975). A spreading-activation theory of semantic processing. Psychological Review, 82(6), 407–428. https://doi.org/10.1037/h0077025

Kenzhegaliev, S., Bergibayeva, D., & Zhartybaev, A. (2024). Features of the mental lexicon in language learning. Bulletin of the Karaganda University. Philology Series, 29(3), 65–73. https://doi.org/10.31489/2024ph3/65-73 (in Kazakh)

Kovacs, L. (2021). Networks in the mind – what communities reveal about the structure of the lexicon. Open Linguistics, 7(1), 102–115. https://doi.org/10.1515/opli-2021-0146

Kovacs, L., Orosz, K., & Pollner, P. (2021). Networks in the mental lexicon – contributions from Hungarian. Glottotheory, 11(1), 11–15. https://doi.org/10.1515/glot-2021-0002

Kroll, J., & Stewart, E. (1994). Category interference in translation and picture naming: Evidence for asymmetric connections in bilingual memory. Journal of Memory and Language, 33(2), 149–174. https://doi.org/10.1006/jmla.1994.1008

Leach, L., & Samuel, A. (2007). Lexical configuration and engagement in word learning. Cognitive Psychology, 55(4), 306–353. https://doi.org/10.1016/j.cogpsych.2007.01.001

Miozzo, M. (2008). The mental lexicon: An introduction. Cognitive Neuropsychology, 25(4), 459–462. https://doi.org/10.1080/02643290802038113

Miozzo, M., & Caramazza, A. (1997). On knowing the auxiliary of a verb that cannot be named: Evidence for the independence of grammatical and phonological aspects of lexical knowledge. Journal of Cognitive Neuroscience, 9(1), 160–166. https://doi.org/10.1162/jocn.1997.9.1.160

Ornaghi, V., Brockmeier, J., & Gavazzi, I. (2011). The role of language games in children's understanding of mental states. Journal of Cognition and Development, 12(1), 239–259. https://doi.org/10.1080/15248372.2011.563487

Wei, L. (2006). The multilingual mental lexicon and lemma transfer in third language learning. International Journal of Multilingualism, 3(2), 88–104. https://doi.org/10.1080/14790710608668385

Wei, L. (2007). Activation of lemmas in the multilingual mental lexicon and transfer in third language learning. In J. Cenoz, B. Hufeisen, & U. Jessner (Eds.), The multilingual lexicon (pp. 57–70). Dordrecht: Springer. https://doi.org/10.1007/978-1-4020-4549-4_4

Д.Қ. Бергібаева, С.А. Кенжегалиев

Академик Е.А. Бөкетов атындағы Қарағанды университеті, Қарағанды, Қазақстан

Тілді меңгерудегі менталдық лексиконның функционалдық рөлі

Аңдатпа. Менталдық лексикон тіл меңгеруде шешуші рөл атқарады, ол сөздер сақталатын, қолданылатын және өзара байланысатын ішкі жүйе болып табылады. Семантикалық картография, контекстегі оқыту және қайталау сияқты әдістер арқылы лексикалық желілерді нығайту сөзді тез табу тиімділігін және жалпы тілдік құзыреттілікті едәуір арттыра алады. Бұл мақалада қазақ тілінің ана тілі иелерінің менталдық лексиконының құрылымы зерттеледі, оның тіл үйрену процесіндегі рөлі қарастырылады және сөздік қорды меңгеруді жетілдіру стратегиялары ұсынылады. Когнитивтік лингвистика, психолингвистика және нейролингвистика салаларындағы зерттеулерге сүйене отырып, біз менталдық лексиконның ұйымдасуы тілдік құзыреттілік артқан сайын қалай дамитынын талдаймыз және оқушылардың сөзді іздеу кезінде кездесетін қиындықтарын айқындаймыз. Қазақ тілінің ана тілі иелері қатысқан эксперименттік зерттеу жүргізіліп, олардың менталдық лексиконында сөздердің қалай ассоциацияланып, еске түсірілетіні бақыланды. Нәтижелер тілдік өңдеу тетіктері туралы жаңа түсініктер береді және лексиканы оқытуды жетілдіруге арналған практикалық ұсыныстар ұсынады. Ассоциативтік жауаптарды талдай отырып, біз қазақ менталдық лексиконының ішкі құрылымын ашуға, психолингвистикалық теорияға үлес қосуға және қазақтілді контексте тіл қолданудың когнитивтік үлгілерін айқындауға ұмтыламыз.

Түйін сөздер: менталдық лексикон, контекстік оқыту, сөздік қорды меңгеру, сөз ассоциациясы, тілдік өңдеу, когнитивтік лингвистика.

Д.Қ. Бергибаева, С.А. Кенжегалиев
Карагандинский университет имени академика Е.А. Букетова

Функциональная роль ментального лексикона в изучении языка

Аннотация. Ментальный лексикон играет ключевую роль в овладении языком, являясь внутренней системой, в которой слова хранятся, извлекаются и соединяются. Укрепление лексических сетей с помощью таких методов, как семантическое картирование, обучение в контексте и повторение, может значительно повысить эффективность извлечения слов и общий уровень владения языком. В данной статье исследуется структура ментального лексикона у носителей казахского языка, рассматривается его роль в процессе изучения языка и предлагаются стратегии для улучшения усвоения словарного запаса. Опираясь на исследования в области когнитивной лингвистики, психолингвистики и нейролингвистики, мы анализируем, как развивается организация ментального лексикона по мере роста языковой компетенции, и выявляем трудности, с которыми сталкиваются учащиеся при поиске слов. Было проведено экспериментальное исследование с участием носителей казахского языка для наблюдения за тем, как слова ассоциируются и извлекаются в их ментальном лексиконе. Полученные результаты дают новые представления о механизмах языковой обработки и содержат практические рекомендации по совершенствованию преподавания лексики. Анализируя ассоциативные реакции, мы стремимся выявить внутреннюю структуру казахского ментального лексикона, внести вклад в психолингвистическую теорию и раскрыть когнитивные модели, лежащие в основе использования языка в казахскоязычном контексте.

Ключевые слова: ментальный лексикон, контекстное обучение, усвоение словарного запаса, ассоциация слов, языковая обработка, когнитивная лингвистика.

References

Artykbayeva, F., Spatay, A., & Taiteliyeva, M. (2024). Value characteristics of the core of the mental lexicon of native speakers of language and culture in the light of intercultural communication. Journal of Psycholinguistic Research, 32. https://doi.org/10.1007/s10936-024-10074-9

Aydin, M. (2021). The role of morphological complexity in lexical retrieval: A comparison of Turkish and Kazakh speakers. Turkic Linguistics Journal, 85–102.

Collins, A.M., & Loftus, E.F. (1975). A spreading-activation theory of semantic processing. Psychological Review, 82(6), 407–428. https://doi.org/10.1037/h0077025

Kenzhegaliev, S., Bergibayeva, D., & Zhartybaev, A. (2024). Features of the mental lexicon in language learning. Bulletin of the Karaganda University. Philology Series, 29(3), 65–73. https://doi.org/10.31489/2024ph3/65-73 (in Kazakh)

Kovacs, L. (2021). Networks in the mind – what communities reveal about the structure of the lexicon. Open Linguistics, 7(1), 102–115. https://doi.org/10.1515/opli-2021-0146

Kovacs, L., Orosz, K., & Pollner, P. (2021). Networks in the mental lexicon – contributions from Hungarian. Glottotheory, 11(1), 11–15. https://doi.org/10.1515/glot-2021-0002

Kroll, J., & Stewart, E. (1994). Category interference in translation and picture naming: Evidence for asymmetric connections in bilingual memory. Journal of Memory and Language, 33(2), 149–174. https://doi.org/10.1006/jmla.1994.1008

Leach, L., & Samuel, A. (2007). Lexical configuration and engagement in word learning. Cognitive Psychology, 55(4), 306–353. https://doi.org/10.1016/j.cogpsych.2007.01.001

Miozzo, M. (2008). The mental lexicon: An introduction. Cognitive Neuropsychology, 25(4), 459–462. https://doi.org/10.1080/02643290802038113

Miozzo, M., & Caramazza, A. (1997). On knowing the auxiliary of a verb that cannot be named: Evidence for the independence of grammatical and phonological aspects of lexical knowledge. Journal of Cognitive Neuroscience, 9(1), 160–166. https://doi.org/10.1162/jocn.1997.9.1.160

Ornaghi, V., Brockmeier, J., & Gavazzi, I. (2011). The role of language games in children's understanding of mental states. Journal of Cognition and Development, 12(1), 239–259. https://doi.org/10.1080/15248372.2011.563487

Wei, L. (2006). The multilingual mental lexicon and lemma transfer in third language learning. International Journal of Multilingualism, 3(2), 88–104. https://doi.org/10.1080/14790710608668385

Wei, L. (2007). Activation of lemmas in the multilingual mental lexicon and transfer in third language learning. In J. Cenoz, B. Hufeisen, & U. Jessner (Eds.), The multilingual lexicon (pp. 57–70). Dordrecht: Springer. https://doi.org/10.1007/978-1-4020-4549-4_4

Information about the authors:

***Bergibaeva Dinara Kaldybekkyzy* –** corresponding author, PhD student, Karaganda Buketov University, Karaganda, Kazakhstan. E-mail: kaldybekkyzy@mail.ru, ORCID: https://orcid.org/0009-0009-4917-7767

***Kenzhegalyev Sayan Akylzhanovich* –** Candidate of Philology, Professor, Karaganda Buketov University, Karaganda, Kazakhstan. E-mail: sayan582@mail.ru, ORCID: https://orcid.org/0000-0001-8412-6716

***Бергібаева Динара Қалдыбекқызы* –** хат-хабар үшін автор, PhD докторант, Академик Е.А. Бөкетов атындағы Қарағанды университеті, Қарағанды, Қазақстан. E-mail: kaldybekkyzy@mail.ru, ORCID: https://orcid.org/0009-0009-4917-7767

***Кенжегалиев Саян Акылжанович* –** филология ғылымдарының кандидаты, профессор, Академик Е.А. Бөкетов атындағы Қарағанды университеті, Қарағанды, Қазақстан. E-mail: sayan582@mail.ru, ORCID: https://orcid.org/0000-0001-8412-6716

Бергибаева Динара Калдыбековна – автор для корреспонденции, PhD докторант, Карагандинский университет имени академика Е.А. Букетова, Караганда, Казахстан. E-mail: kaldybekkyzy@mail.ru, ORCID: https://orcid.org/0009-0009-4917-7767

***Кенжегалиев Саян Акылжанович* –** кандидат филологических наук, профессор, Карагандинский университет имени академика Е.А. Букетова, Караганда, Казахстан. E-mail: sayan582@mail.ru, ORCID: https://orcid.org/0000-0001-8412-6716