



KEY CONTRIBUTIONS OF LEXICAL AVAILABILITY TO THE STUDY OF SEMANTIC PROTOTYPES IN FOREIGN LANGUAGE LEARNING

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ABSTRACT: Lexical availability is an approach to vocabulary acquisition and a crucial variable in learners' lexical and communicative competence (Jiménez Catalán, 2014). Although several studies have been conducted in this field regarding L1 and L2 Spanish and English vocabulary learning, little has been done concerning semantic prototypes in foreign language contexts through lexical availability. Semantic prototypes are considered the most central and representative exemplars within a category (Rosch, 1975; Kleiber, 1995); thus, their role in lexical competence enables us to understand how foreign language learners organize their mental lexicon and categorize in response to semantic categories. This article aims to explore how semantic prototypes have been analyzed through lexical availability in L2 Spanish and English language contexts and, consequently, the implications they might have for English foreign language (EFL) learners' vocabulary production.

KEYWORDS: Lexical availability, Semantic prototypes, EFL learners, Vocabulary learning, Mental lexicon.

APORTACIONES CLAVE DE LA DISPONIBILIDAD LÉXICA AL ESTUDIO DE LOS PROTOTIPOS SEMÁNTICOS EN EL APRENDIZAJE DE LENGUAS EXTRANJERAS

RESUMEN: La disponibilidad léxica es una aproximación a la adquisición de vocabulario y una variable crucial en la competencia léxica y comunicativa de los aprendices (Jiménez Catalán, 2014). Aunque se han realizado varios estudios en este campo en relación con el aprendizaje de vocabulario en L1 y L2 en español e inglés, poco se ha llevado a cabo en relación con los prototipos semánticos en contextos de lengua extranjera a través de la disponibilidad léxica. Los prototipos semánticos se consideran los ejemplares más centrales y representativos dentro de una categoría (Rosch, 1975; Kleiber, 1995); por lo tanto, su papel en la competencia léxica nos permite comprender cómo los aprendices de lenguas extranjeras organizan su léxico mental y categorizan en respuesta a categorías semánticas. El objetivo de

este artículo es explorar cómo se han analizado los prototipos semánticos a través de la disponibilidad léxica en contextos de lengua española e inglesa L2 y, en consecuencia, las implicaciones que podrían tener para la producción de vocabulario de los aprendices de inglés como lengua extranjera (ILE).

PALABRAS CLAVE: Disponibilidad léxica, Prototipos semánticos, Aprendientes de ILE, Aprendizaje de vocabulario, Léxico mental.

APPORTS CLÉS DE LA DISPONIBILITÉ LEXICALE À L'ÉTUDE DES PROTOTYPES SÉMANTIQUES DANS L'APPRENTISSAGE DES LANGUES ÉTRANGÈRES

RÉSUMÉ : La disponibilité lexicale est une approche de l'acquisition du vocabulaire et une variable fondamentale de la compétence lexicale et communicative des apprenants (Jiménez Catalán, 2014). Bien que plusieurs études aient été menées dans ce domaine concernant l'apprentissage du vocabulaire en L1 et L2 en espagnol et en anglais, peu de recherches se sont penchées sur les prototypes sémantiques dans des contextes de langue étrangère à travers la disponibilité lexicale. Les prototypes sémantiques sont considérés comme les exemples les plus centraux et représentatifs d'une catégorie (Rosch, 1975 ; Kleiber, 1995) ; par conséquent, leur rôle dans la compétence lexicale nous permet de comprendre comment les apprenants de langues étrangères organisent leur lexique mental et catégorisent en réponse à des catégories sémantiques. L'objectif de cet article est d'examiner la manière dont les prototypes sémantiques ont été analysés à travers la disponibilité lexicale dans des contextes de langue espagnole et anglaise en L2 et, en conséquence, les implications qu'ils pourraient avoir sur la production lexicale des apprenants d'anglais comme langue étrangère (ALE).

MOTS CLÉS : Disponibilité lexicale, prototypes sémantiques, apprenants ALE, apprentissage du vocabulaire, lexique mental.

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1. Introduction

Vocabulary instruction poses a significant challenge in foreign languages due to the lack of definitive guidelines on which vocabulary should be taught at each learning level. For decades, lexical availability (LA) has maintained a strong tradition in (L1) Spanish, and specific aspects of LA research can certainly be applied to foreign languages. In this context, LA serves as a complementary approach that enables researchers to gain insights into the most readily accessible words to speakers in a specific communicative context, rather than merely those words that are the most

frequently used. In the field of lexical production, LA has emerged as an alternative method for investigating the psycholinguistic aspects of learners' vocabulary knowledge. This includes the organization of learners' lexicon, the similarities and differences in response patterns, and the types of semantic associations that learners activate in response to semantic categories, alongside research on sociolinguistic and cultural aspects (Jiménez Catalán, 2014), as well as the study of the most accessible words obtained through lexical availability research as semantic prototypes (Šifrar, 2014a; Mora, 2024a). In this regard, analyzing prototypes in EFL learners' productive vocabulary might be feasible using lexical availability, given that few studies (Šifrar, 2014a; Mora, 2024a; Mora, 2024b; Mora and Šifrar, 2025; Mora, 2025b) have been conducted on this matter so far.

This article examines how lexical availability has contributed to exploring word prototypicality in the lexical availability output of EFL learners in formal settings. The paper is divided into four sections. First, it provides an overview of LA and its origins. Secondly, it describes the features of the lexical availability task, including measures and computational programs, as well as lexical availability in foreign languages. Subsequently, the third section explores the theory of the prototypes, alongside reviewing the main studies conducted on semantic prototypes through lexical availability. Finally, it discusses the key contributions of lexical availability to semantic prototype research in EFL learners.

2. Theoretical Foundations

2.1. *Conceptualization of Lexical Availability*

LA originates from the French project *L'élaboration du Français Fondamental* by Gougenheim et al. (1964). These scholars argued that the selection of words was based on frequency rates, reflecting how often a given word appeared in a text. However, as noted by Michéa (1953), some widely used French words became non-existent because they were not connected to the conversation topics the French group of researchers included in the investigations. Thus, the absence of everyday words emphasized the necessity of finding alternative criteria beyond word frequency for selecting the most commonly used vocabulary items in a given language. To this end, experts introduced a new concept known as vocabulary availability, which aims not only to determine word frequency but also to consider the rate of word usage as an innovative word-counting formula. The concept of available lexicon arises from these considerations, proposing that a word becomes available as long as it is always ready to be used and comes to people's minds immediately and naturally when needed (Michéa, 1953). In this respect, years later, Dimitrijevic (1969) claimed that in

distinguishing between available and unavailable words, the degree of availability would be introduced to researchers in this field. In other words, a word is 100% available if it is accessible to all informants participating in a test. For instance, the fewer informants who provide a word, the lower the degree of availability of that word for that specific population; conversely, the easier it is for a person or group of informants to recall a lexical item, the more available it becomes. More recent work highlights that the available lexicon consists of thematic words, which are often the most accessible and come to mind first in response to a particular stimulus (López Morales, 2012). In this respect, it is important to distinguish between available and frequent words. Available words in LA correspond to the thematic words learners possess in their mental lexicon in response to a specific category, while frequent words pertain to non-thematic words that occur in a text regardless of the given stimulus (Fernández, Sanchez-Saus Laserna, and Escoriza, 2012).

The studies conducted by Gougenheim et al. (1964) considered a methodology in which available vocabulary was extracted using stimulus-driven procedures. The stimuli reflected thematic areas, such as centers of interest, prompts, or semantic categories that include core vocabulary common across contexts. Some semantic categories included 16 thematic areas, including: *body parts, clothing, house, house furniture, food and drinks, objects placed on the table, the kitchen, school, heating and lighting, town, countryside, means of transportation, field and garden work, animals, games and entertainment, and professions*. However, recent work suggests that alternative semantic categories, such as *daily activities*, may be considered to broaden the significance of lexical availability in grammatical terms, given that the available lexicon primarily focuses on nouns rather than verbs (Šifrar, 2021; Mora and Šifrar, 2025).

2.2. The Lexical Availability Task (LAT)

The method of extraction of available lexicon consists of a lexical availability task (LAT). This LAT is a data collection instrument that is conducted using a paper-and-pencil questionnaire or computer-based online questionnaires. As previously mentioned, this task is presented to the informants with thematic areas or so-called *stimuli, semantic categories, prompts, or centers of interest*. Subsequently, participants are required to write down all words that come to their minds in response to the stimulus provided. The presentation of each category is provided on a separate page with numbered lines, and a two-minute time allotment is allocated for each prompt. Rules for accomplishing this task require that participants can only proceed to the next semantic category after a two-minute period has elapsed. Studies on LA have used the 16 traditional semantic categories proposed by Gougenheim et al.

(1964), as mentioned above. The use of a LAT has proved to cast light on data collected from learners differing in L1, target language, age, and learning contexts (Samper Hernández and Jiménez Catalán, 2014), as well as to shed light on how reliable the LAT is when researching L1 and L2 available lexicon (Canga Alonso, 2017).

2.2.1. Lexical Availability Measures

To determine the degree of availability of words in LA, a preliminary mathematical formula was developed to measure the index of frequency and position for each lexical unit in the word lists (Lorán and López Morales, 1983). This calculation consisted of relative frequencies, which are usually computed by dividing the absolute frequency by the number of subjects and then multiplying by 100. Improvements to the formula for measuring superior linguistic data were considered to demonstrate robust descriptive adequacy for both groups and individuals (López Chavez and Strassburger Frías, 1991). The validity and reliability of the formula for the lexical availability index (the availability value based on the position of a word in the lists to measure the number of participants who placed the word at those positions and the lowest position in which the word has been placed in any of the lists) lie in the analysis of a matrix of vectors and are represented as follows:

$$D(P_j) = \sum_{i=1}^n e^{-c((i-1)/(n-1))} ((f_{ji}/I_l)$$

Where:

n = max position reached by the word in the sample.

i = position of the word at the specific test explored.

j = target word index.

f_{ji} = absolute frequency of word j in position i .

I_l = number of informants in the sample.

c = dispersion coefficient (2,3).

$D(P_j)$ = target word's j availability.

Apart from the lexical availability index, the cohesion index (CI) measures the degree of coincidence in the words retrieved by informants for each semantic category

or center of interest (Echeverría, 1991). Hernández Muñoz (2010: 105) in her study on L1 Spanish lexical production also defines this concept as:

The cohesion index provides researchers with information about how compact or dispersed a semantic category is and, therefore, the degree of coincidence in the subjects' responses. It is obtained by dividing the average number of responses given by the informant by the number of different words. The maximum value is 1, indicating complete coincidence in responses, while the minimum value is 0, indicating no common responses.

2.2.2. Lexical Availability Software Applications

Various computational programs have been developed to calculate both the lexical availability index and the cohesion index. These software applications include *Lexidisp*, *Dispolex*, *Dispogen II*, *Dispografo*, *Lexpro*, and *DispoCen*. All these tools utilize the mathematical formula created by López Chávez and Strassburger Frías (1991). While all computer programs agree that the most significant value in their use is the index of lexical availability, they possess distinct characteristics. *Lexidisp*, a program developed by Moreno et al. (1995), enables researchers to calculate the lexical availability index for each word produced by learners. Additionally, this data processor, as stated by Samper Hernández and Jiménez Catalán, “calculates word occurrences, relative and cumulative frequencies for each of the lexical units and makes possible the comparison of sets of data” (2014: 199). *Dispolex*, on the other hand, collects information based on a virtual data bank to calculate the rate of lexical availability. This methodological tool, created by Bartol Hernández and Hernández Muñoz (2003) at the University of Salamanca, not only allows researchers to discover the average number of responses provided by informants and the lexical availability but also enables them to compare and store data from different investigations. *Dispogen II*, the program developed by Echeverría et al. (2005), computes the LA values according to the position a word occupies in a list in response to each semantic category. *Dispografo* (Echeverría et al., 2008) has been used to analyze the available lexicon and the associations generated among the lexical items in a category via graph analysis and network theory principles. This freely available tool displays the unseen semantic ties underlying the data through the use of *nodes* (lexical items) and *edges* (links between lexical items).

Furthermore, this software enables researchers to identify both strong and weak connections, providing the best representation of semantic relations between words within a category. *Lexpro* was released by the Universidad de Salamanca and the Universidad Miguel Hernández de Elche in 2023. This tool allows for the automatic

calculation of several measures, such as token types, mean values, cohesion index, and graph measures. This software also allows for the calculation of various statistical measures, including average degree, average path length, tokens, clustering coefficient, modularity, bigrams, and the availability index. Recently, another computational program has been created to measure lexical availability: *DispoCen* (Ávila Muñoz et al., 2021). This program is based on a library of *R* tools that enables researchers studying the lexicon to develop multiple applications and original models.

2.3. Lexical Availability in Foreign Language Learning

Lexical Availability has been employed in L1 and L2 Spanish to determine the available lexicon of Spanish speakers from various Spanish-speaking regions and countries. This approach was developed by López Morales (2012) in his conducted Pan-Hispanic project with the initial purpose of determining how social and cultural backgrounds influence vocabulary knowledge, identifying which elements of Spanish vocabulary individuals are able to activate, and determining the most common errors that are made (Sánchez-Saus Laserna, 2024, p. 7). In recent decades, studies of lexical availability have broadened their scope, and a fruitful line of research on lexical availability in second and foreign languages has emerged. This research is needed for understanding how language learning functions in educational contexts. In this sense, LA has focused on the analysis of aspects such as age (Jiménez Catalán et al., 2014), linguistic profiles (Jiménez Catalán and Fernández Fontecha, 2019), course and language level (Ferreira and Echeverría, 2014), gender (Jiménez Catalán and Ojeda Alba, 2009a), language exposure (Akbarian et al., 2020), word familiarity (Ferreira and Echeverría, 2010), structure of the mental lexicon (Agustín Llach, 2023b), and type of instruction (Geoghegan, 2022).

Concerning semantic prototypes, this cognitive aspect has become a promising line of research in LA in L2 Spanish and English to analyze how learners categorize and organize their mental lexicon based on the most central words in response to a semantic category (Šifrar, 2014a, 2014b, 2016; Mora and Jiménez Catalán, 2019; Mora, 2022, Mora, 2024a, Mora and Šifrar, 2025).

3. Lexical Availability in Research on Semantic Prototypes

Before examining the primary research on prototypes in foreign language contexts through lexical availability, this text offers conceptualizations of prototype theory to improve understanding of this field over the past few decades.

3.1. *The Theory of the Prototype*

The classical Aristotelian theory of categorization undergoes substantial reinterpretation in Rosch's (1975) prototype theory. Rosch proposes that a prototype represents the most typical, central, and representative instance within a category. Category members are organized according to their "goodness of example," meaning that items more similar to the prototype are perceived as more typical or better category members, while those that deviate are regarded as less typical (Murphy, 2002). Empirical studies (Rosch et al., 1976) illustrate this gradation; for example, within the category *fruit*, *apple* emerges as the prototypical exemplar, whereas *olive* is considered a peripheral member. From this perspective, the prototype functions as the most cognitively salient and readily recognized exemplar within a category. Dubois (1983) further emphasizes that prototypes are often identified through frequency of use rather than merely by centrality within a conceptual structure.

The concept of the prototype has since evolved, resulting in the formation of two distinct theoretical frameworks: the standard and extended versions of prototype theory. Both frameworks identify the prototype as the central instance within a category. The standard version proposes that prototypes exist within a hierarchical structure of categorization, comprising superordinate, basic, and subordinate levels. Among these, the basic level is the most cognitively salient, as it is the first learned in early language acquisition and the most easily recognized (Kleiber, 1995). Conversely, Lakoff's (1987) extended version contends that not all instances of categorization can be captured by prototypical structures. In this view, the prototype serves as an organizing principle within categories characterized by graded membership, aligning with Wittgenstein's (1953) concept of family resemblance. This perspective underscores that category members may share overlapping similarities without necessarily possessing a single common feature. Thus, the extended model supports a shift from a monosemic to a polysemic understanding of categorization, accommodating variability and contextual dependency. Both versions of prototype theory have been instrumental in advancing the study of linguistic and semantic categorization. Thus, in foreign language vocabulary learning, the central members or *prototypes* are not only the first to encompass the category as a whole, but they are also helpful in memory and learning, serving as the foundation on which human beings simplify certain situations (Mora and Šifrar, 2025).

3.2. *Research on Semantic Prototypes through Lexical Availability*

Table 1 summarizes the main studies that have investigated the relationship between lexical availability and semantic prototypes in L2 Spanish and English. To

ensure relevance, only peer-reviewed studies that explicitly examined prototypicality within lexical availability frameworks were selected. The following objectives of this article guided the selection criteria: (a) to identify how lexical availability has contributed to understanding prototype effects in foreign language contexts, and (b) to examine methodological consistency and innovation across studies.

Table 1. Main Studies on Semantic Prototypes in Foreign Language Contexts through Lexical Availability.

Language	Study	Sample	Focus	Semantic Category	Computational Program
Spanish	Šifrar (2014b)	100 Slovene school learners of L2 Spanish and 100 Slovene university learners of L2 Spanish.	Analysis of lexical availability and word prototypicality at different levels of L2 Spanish	<i>Parts of the body (Partes del cuerpo), Clothes (La ropa), House (La casa), Food and Drink (Comida y bebida), City (La ciudad), Countryside (El campo), Means of transport (Medios de transporte), Animals (Animales), Games and Entertainment (Juegos y Distracciones), Professions (Profesiones y oficios), Daily Activities (Accciones que se realizan todos los días).</i>	Dispolex
	Šifrar (2016)	400 native Spanish speakers and 956 learners of L2 Spanish	Analysis of lexical availability and the universality of semantic prototypes in L1 and L2 Spanish	<i>Parts of the body (Partes del cuerpo), Clothes (La ropa), House (La casa), Food and Drink (Comida y bebida), City (La ciudad), Countryside (El campo), Means of transport (Medios de transporte), Animals (Animales), Professions (Profesiones y oficios).</i>	Dispolex

Spanish and English	Šifrar (2014a)	40 Slovene learners of L2 English and Spanish at university levels.	Analysis of lexical availability and word prototypicali ty in L2 English and Spanish	<i>Parts of the body</i> (<i>Partes del cuerpo</i>), <i>House (La casa)</i> , <i>Food</i> <i>and Drink (Comida y</i> <i>bebida)</i> , <i>School (La</i> <i>escuela)</i> , <i>City (La</i> <i>ciudad)</i> , <i>Countryside</i> (<i>El campo</i>), <i>Animals</i> (<i>Animales</i>), <i>Games and</i> <i>Entertainment (Juegos y</i> <i>Distracciones)</i> .	Dispolex
	Mora and Jiménez Catalán (2019)	100 Slovene learners of L2 Spanish and 100 Spanish learners of L2 English	Analysis of lexical availability and word prototypicali ty in L2 English and Spanish	<i>Parts of the Body</i> (<i>Partes del cuerpo</i>) <i>Clothes (La ropa)</i>	Dispogen II
English	Mora (2022)	40 Spanish school learners of L2 English. 20 sixth graders and 20 twelfth graders.	Analysis of prototypical associations through lexical availability	<i>Hobbies</i>	Dispogen II
	Mora (2024a)	136 Spanish school learners of L2 English. 70 children and 66 adolescents.	Analysis of semantic prototypes through lexical availability	<i>Hobbies</i> <i>House</i> <i>Professions</i> <i>Clothes</i> <i>School</i>	Dispogen II Dispografo
	Mora and Šifrar (2025)	100 L2 and L3 high school EFL learners.	Analysis of lexical availability and word prototypicali ty in L2 and L3 English	<i>Daily Activities</i>	Lexpro

The reviewed studies were selected on the basis of their methodological rigor, explicit connection to prototype theory, and comparability across linguistic contexts (Spanish and English). They represent a coherent body of work that collectively illustrates the evolution of this research line—from early descriptive analyses (Šifrar,

2014a, 2014b, 2016) to more recent, graph-based and network-oriented approaches (Mora, 2024a, Mora and Šifrar, 2025).

Quantitatively, most studies employed LAT to elicit responses across common semantic categories (e.g., *Animals*, *Clothes*, *Professions*), enabling the identification of word prototypicality based on frequency and position indices. Qualitatively, the studies reveal developmental trends: beginners tend to produce high-frequency, concrete words, while advanced learners show more abstract or contextually appropriate responses. These findings align with cognitive models of graded category membership proposed by Rosch (1975) and Kleiber (1995).

Šifrar's study (2014b) on semantic prototypes in L2 Spanish examines lexical availability among Slovene learners at different proficiency levels (B1 secondary students and B2+ university students) using a lexico-statistical approach across eleven semantic categories. The research found that quantitative differences were more evident in total word production than in lexical diversity, with higher-level learners generating a greater number of responses. Findings showed that among the 11 prompts, evidence indicated that compact categories elicited more shared responses, whereas open categories exhibited greater variation. Qualitative analysis revealed that lower-level learners relied on basic vocabulary, whereas more advanced learners provided more semantically appropriate terms. Despite these differences between the groups of learners, a consistent representation of core semantic prototypes was observed across proficiency levels. The findings highlight both developmental trends and commonalities in lexical associations among L2 learners.

In her 2016 study, Šifrar aimed to identify and compare the most readily available lexical units in Spanish as a mother tongue and as a foreign language, using a LAT to collect information regarding word frequency and the order of activation. The study focused on the lexical items that are most quickly and easily retrieved by speakers, analyzing responses from multicultural native and non-native Spanish speakers across nine semantic categories. While variables such as age, sex, and Spanish proficiency were not considered, the findings revealed a notable similarity in prototypical words across both native and non-native speakers, regardless of their cultural or linguistic backgrounds (Spanish, Slovenian, Finnish, Turkish, and Chinese). The study highlights that basic, prototypical words tend to dominate lexical availability tasks, demonstrating that both native and non-native speakers commonly access similar core vocabulary within semantic categories. This supports the view that cognitive lexical availability research provides meaningful insights into how speakers conceptualize and organize lexical information across languages. The consistent presence of highly available and semantically cohesive words across diverse linguistic

and cultural backgrounds contributes to the argument for a certain degree of universality in language representation.

Referring to L2 Spanish and English studies on semantic prototypes, we found the research conducted by Šifrar (2014a) and Mora and Jiménez Catalán (2019) particularly relevant. Šifrar's (2014a) study examined lexical availability in English and Spanish among Slovene university students, divided into English learners (first and second year) and Spanish learners (final year), all of whom had knowledge of other foreign languages. The study focused on eight semantic categories in which overlapping words were found in both languages. These lexical units showed similarly indexed cohesion and frequency, indicating evidence of word prototypicality. Overall, advanced learners demonstrated higher lexical productivity, which can be attributed to increased exposure. The results support the idea that semantic prototypes reflect universal cognitive structures based on human experience, as suggested by Aitchison (1994) and Kleiber (1995), regardless of the specific foreign language being learned.

Mora and Jiménez Catalán (2019) compared two groups of adolescent learners from Slovenia and Spain. The first group consisted of Slovene learners of L2 Spanish in secondary education, while the second comprised Spanish learners of L2 English. The research samples were collected from prior studies by Šifrar (2016) on lexical availability and semantic prototypes with Slovenian students. This study examined prototypes in two foreign languages involving informants from different countries and addressed prototypical associations within a global framework. The primary objective of this research was to determine whether divergences or convergences existed in prototypes, both in English and Spanish, focusing on two semantic categories. Results showed that, despite differences in language and culture, there were similarities in prototypical associations and lexical production between the two groups of informants, indicating the universality of prototypes across cultures. Moreover, the study revealed that, in response to one of the selected semantic categories, there were language-specific cultural characteristics. In addition, regarding the lexical production differences between both groups of learners, the Slovenian informants revealed better results in the two semantic categories under examination. This finding suggests that other variables, such as vocabulary input from textbooks, the methodological approach, and the intensive versus extensive instructional program, may have influenced the results. Mora and Jiménez Catalán (2019) suggested that further studies on prototypical associations and idiosyncrasies in English and Spanish are necessary by employing more semantic categories.

Lexical availability studies on semantic prototypes in L2 English have mainly focused on school learners, including those in primary and secondary education. In Mora's study (2022), the main goal was to identify similarities and differences in how

semantic prototypes are represented when responding to a single semantic category, involving two groups of learners differing in age and course level. Results from this study showed evidence of prototypical responses, mostly associated with the basic level of categorization. It was also found that lower-level learners retrieved fewer words than higher-level learners. The findings further indicated a universality of prototypes concerning the chosen semantic category, despite differences in age and course level, which might be related to similar mental categorization among both groups of EFL learners. Mora (2022) states that lexical availability tasks are valuable tools for advancing research on prototypes and vocabulary in psycholinguistics, and additional studies in this area are necessary. The author also recommends that prototypes should be explored not only within psycholinguistics but also from a cultural perspective, as some of the findings in her research seem to support this approach.

More recently, Mora (2024a) explored semantic prototypes with EFL children and adolescent learners through a LAT, focusing on five semantic categories. The results showed that older learners retrieved a greater number of words than younger learners. However, significant differences were found in responses to two of the five selected prompts. Additionally, analyses of shared and non-shared words, lexical sophistication, and word classes were conducted to determine the types of words produced by the learners. Subsequently, an examination of word prototypicality was conducted to assess learners' responses, regardless of age and course level differences, confirming the universality of mental processing when categorizing in response to a LAT. Mora's research also broadened the scope, given that an exploration of types of word associations and semantic networks was included in order to collect in-depth features of semantic prototypes in the production of words by the two groups of EFL learners.

The latest research, to our knowledge, has been conducted by Mora and Šifrar (2025). This study analyzed the lexical production of L2 and L3 learners through a LAT in response to a non-traditional semantic category (Table 1). It examined the learners' lexical production, prototypical representation among the responses, and semantic networks based on word associations. The findings showed evidence of prototypicality, as the most representative words were linked to basic needs. Unlike previous studies on lexical availability, Mora and Šifrar's (2025) study found that verbs outperformed nouns in the responses. It also revealed that, based on the provided prototype, L2 and L3 learners primarily organize their mental lexicons according to personal experience, followed by syntagmatic and paradigmatic associations, as demonstrated in the analysis via graph theory.

Previous studies on semantic prototypes have demonstrated that lexical availability is crucial in understanding language learning in formal educational contexts. The following section describes and expands on the main contributions that LA might make to exploring this field.

4. Key Contributions of Lexical Availability to the Growing Field of Semantic Prototype Research

The notable contributions of lexical availability to the expanding field of semantic prototype research can be attributed to various factors, including word availability and the index of lexical availability, levels of categorization, the universality of the prototypes principle, word associations through graphs and semantic networks, and the analysis of ELT textbooks.

4.1. Word Availability and the Index of Lexical Availability

In the field of lexical availability, the degree of availability is determined by the words that come to mind first in response to a specific stimulus, known as the most readily available words. This word availability, as suggested by Rosch (1975), relates to the best examples people provide when responding to a category, and these typical items likely serve as cognitive reference points. In this regard, Hernández Muñoz et al. (2014) state that typicality promotes the availability of words. Therefore, this factor provides the most readily available words and represents the highest word prototypicality across semantic categories through a LAT. When analyzing semantic prototypes in EFL learners' available lexicon, the lexical availability index is a key component, given that it provides data on the most available (typical) and least available words (atypical). Studies on word prototypicality, such as those conducted by Šifrar (2014a) and Mora (2024a); Mora and Šifrar (2025), concluded that the most available words become the most prototypical lexical units since they have the highest lexical availability index and are more likely to appear first in the lists of responses of the group data. In comparison, words ranking further away from the first positions of the lists are those least prototypical lexical items that do not come first to the learners' memory, showing individual results rather than collective results.

Examining prototypes in vocabulary production in foreign language contexts has demonstrated that, in response to a LAT, the lexical availability index is a determining factor in exploring the most central members of a category. This echoes findings by Ávila Muñoz and Sánchez Sáez (2014), suggesting that the more available a word is, the greater and quicker its accessibility will be. Thus, the most available

words within the lexical structure of a shared field of experience correspond to prototypes.

4.2. Levels of Categorization

Rosch et al. (1976) and Kleiber (1995) highlight that human beings categorize according to the three-level categorization principles (superordinate, basic, and subordinate). In this regard, lexical hierarchical organization is a crucial advantage in vocabulary production, particularly in the semantics of prototypes. Recent studies on lexical availability have demonstrated that when learners retrieve words across semantic categories, those levels become evident in their responses (Mora, 2024a). Nevertheless, among all three levels of categorization, the most significant refers to basic responses, as the basic level is where adults and young children spontaneously name objects (Rosch et al., 1976; Anglin, 1977). Regarding the representation of the superordinate and subordinate levels, Kleiber (1995) states that a mental image in language learning cannot represent abstract elements such as superordinate words. Similarly, Murphy (2002) observes that, although the subordinate level provides more specific information about the category and derives from the basic level, it is not evoked to a greater extent. In line with Mora (2024a), the underrepresentation of superordinate and subordinate responses is attributed to the informants' retrieval of words, which may be influenced by the type of task employed for data collection (LAT), as well as the categories selected to elicit prototypical levels of categorization.

4.3. The Universality of the Prototype

The analysis of EFL learners' lexical production suggests that universal processes are similar when it comes to second language acquisition and the organization of the mental lexicon (Carcedo, 1998). For instance, research on lexical availability has revealed that people from diverse linguistic backgrounds tend to produce similar prototypical words when prompted with the same category (e.g., *Animals, Clothes, Professions*). Therefore, *dog, t-shirt, and teacher* have been considered universal cognitive prototypes since they are linked to and rooted in basic human experience (Šifrar, 2014a, 2016; Mora and Jiménez Catalán, 2019; Mora, 2022, 2024a; Mora and Šifrar, 2025). Nevertheless, this universality is remarkably evident when examining taxonomic or natural categories, which in vocabulary research not only serve as a tool to illustrate the input informants may have in their lexicon but also as the first conditioning factor to achieve the availability indexes of the words (Hernández Muñoz, 2006). In addition, more recent investigations have also demonstrated that when examining the effect of first language background on lexical

availability in foreign languages, some lexical prototypes may be universal, while others are shaped by the learners' native language (Akbarian et al., 2024).

4.4. *Word Associations through Graphs and Semantic Networks*

Another fruitful line of investigation regarding lexical availability in foreign language learning involves the types of word associations elicited when analyzing learners' vocabulary production. Based on the prototype generated in a semantic network, word associations in lexical availability studies (Mora, 2024a; Mora and Šifrar, 2025) have been examined through the classification proposed by Fitzpatrick (2006) — *meaning-based associations*, *form associations*, *position-based associations*, and *experiential associations* — to determine whether the foreign language (FL) learners' word associations relate to categorial membership, metaphors, synonyms, antonyms, derivation, similarity, collocations, or experience. These associations allow researchers to identify both strong and weak connections, using the principles of graph analysis to explore the category structure of the FL informants. In this sense, the role the prototype plays in vocabulary learning is to determine how the learners' mental lexicon is organized. This is based on the most readily available word that comes to mind in a LAT, where dense connections suggest that community structures possess robust links well-established in semantic memory. In contrast, unsubstantial connections indicate that they were poorly integrated into semantic memory (Collins and Loftus, 1975).

4.5. *ELT Textbooks*

Lexical availability has not been explored in language textbooks, as the LAT focuses on collecting data from productive vocabulary rather than the input of vocabulary contained in language materials. Although research on semantic prototypes in ELT textbooks has been conducted regarding cultural vocabulary with multilingual learners (Mora and Cifone, 2021a; Cifone and Mora, 2021b; Mora 2024b), to the best of our knowledge, only two studies have compared EFL learners' lexical output with the vocabulary included in ELT textbooks (Mora, 2024a; Mora, 2025). The researchers found that the main contributions of this kind of analysis stem from the fact that while some prototypical words in textbooks matched the most frequent words among learners, many high-frequency learner responses were absent from the textbooks. This suggests that textbooks may not fully align with the natural lexical retrieval patterns of EFL learners. Therefore, the importance of linguistic input in vocabulary acquisition indicates that textbook design should better integrate the prototypical words that learners naturally retrieve.

Furthermore, new lines of investigation are now available, as analyzing word prototypicality in English materials necessitates the development of prototypical content word lists. This helps clearly identify the types of words included and considered by publishing designers, ultimately facilitating a general understanding of the language (Alsaif and Milton, 2012).

5. Conclusions

This article has examined how the intersection of LA and prototype theory provides a robust framework for understanding vocabulary acquisition, lexical organization, and cognitive categorization in foreign language learning. The synthesis of prior studies reveals both empirical and theoretical advances that contribute to this interdisciplinary field.

Empirical evidence from lexical availability research demonstrates that lexical availability indexes effectively identify the most accessible and cognitively salient lexical items in learners' mental lexicons. Studies consistently show that the most available words correspond to central category members, confirming the predictive value of availability measures for identifying prototypes (Rosch, 1975; Šifrar, 2014a; Mora, 2024a; Mora and Šifrar, 2025). Furthermore, research on levels of categorization has shown that learner responses primarily reflect the basic level, the most cognitively efficient and frequently retrieved level across age groups (Rosch et al., 1976; Kleiber, 1995). Evidence for cross-linguistic universality also suggests that certain prototypes—such as *dog*, *teacher*, and *house*—recur among speakers of diverse linguistic backgrounds, pointing to shared cognitive patterns despite differences in language and culture (Šifrar, 2016; Mora and Jiménez Catalán, 2019; Mora, 2022). At the same time, variability across contexts indicates that first-language influence, cultural experience, and instructional input play an essential role in shaping learners' lexical availability profiles. Computational approaches using graph-based analysis have expanded this empirical scope by visualizing semantic density and associative strength in learners' lexical networks, revealing how strongly and weakly connected areas of vocabulary emerge during foreign language learning (Mora, 2024a; Mora and Šifrar, 2025).

From a theoretical perspective, the integration of LA and prototype theory supports a cognitive-semantic view of vocabulary acquisition. LA provides a measurable index of prototypicality, while prototype theory explains the graded and dynamic structure of lexical categories. This alignment reinforces the notion that vocabulary learning is not merely quantitative but conceptual, involving the organization of meanings around cognitively central exemplars. The convergence of

both approaches also bridges psycholinguistic and applied linguistic perspectives, providing an empirical foundation for studying conceptual salience in L2 lexicons.

The findings derived from lexical availability research have practical implications for language pedagogy. First, curriculum and material design should incorporate prototypical vocabulary—the most cognitively salient and frequently retrieved words—into early teaching stages, ensuring that learners develop a solid lexical core. Second, instructional sequencing can benefit from the notion of graded category membership, presenting words from basic to peripheral levels to facilitate semantic expansion. Moreover, textbook development should align vocabulary input with learners' natural lexical retrieval patterns, as studies reveal mismatches between available lexicons and textbook frequency lists (Mora, 2024a; Mora, 2025b). Finally, graph-based approaches to analyzing lexical networks can inform diagnostic assessment tools, helping teachers identify gaps in lexical cohesion and conceptual mapping.

In sum, lexical availability not only quantifies what words learners can produce most readily but also reveals how they conceptually organize meaning. By integrating quantitative measures with cognitive modeling, future research can better account for how learners construct and reorganize their lexical systems over time. These insights hold strong potential to inform more cognitively grounded and empirically supported approaches to foreign language vocabulary instruction.

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