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ANALYZING ENGLISH FOREIGN LANGUAGE LEARNERS' LEXICAL INPUT AND OUTPUT THROUGH WORD PROTOTYPICALITY

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ABSTRACT. Research on the relationship between input and output among English learners has been extensive, as both are crucial for language acquisition. However, our understanding of this relationship in an English as a Foreign Language (EFL) setting remains limited. To address this gap, this study employs semantic prototypes to examine the prototypical word associations retrieved by two groups of EFL learners who differ in age (children and adolescents) and course level (6th year of Primary Education and 2nd year of Baccalaureate) and analyzes the prototypical words found in the learners' EFL textbooks. Specifically, we investigate whether the prototypicality of words in the learners' lexical output reflects that found in the vocabulary input of their EFL textbooks, focusing on the 50 most frequent words. We utilized a semantic fluency task and lexical computational programs to measure participants' lexical availability across five semantic categories and to analyze the frequency of words in the textbooks. The findings revealed evidence of word prototypicality in the EFL participants' vocabulary production and their EFL materials, as well as discrepancies between the prototypical words found in their lexical output and the input of their textbooks. This study offers new insights into comparing output and input in EFL contexts, with implications for curriculum design and language teaching, particularly regarding the role of word prototypicality in vocabulary learning.

Keywords: Semantic prototypes, Lexical availability output, Vocabulary input, EFL textbooks, EFL learners.

ANÁLISIS DEL INPUT Y EL OUTPUT LÉXICO DE LOS ESTUDIANTES DE INGLÉS COMO LENGUA EXTRANJERA A TRAVÉS DE LA PROTOTIPICIDAD LÉXICA

RESUMEN. La investigación sobre la relación entre input y output en los estudiantes de inglés ha sido extensa, ya que ambos aspectos son cruciales para la adquisición de esta lengua. Sin embargo, nuestra comprensión de esta relación en contextos de inglés como lengua extranjera (ILE) sigue siendo limitada. Para abordar esta laguna, este estudio emplea prototipos semánticos para examinar las asociaciones de palabras prototípicas evocadas por dos grupos de estudiantes de ILE que difieren en edad (niños y adolescentes) y nivel de curso (sexto de primaria y segundo de bachillerato) y así mismo, analizar las palabras prototípicas encontradas en los libros de texto de ILE de estos informantes. En concreto, centrándonos en las cincuenta palabras más frecuentes, investigamos si el carácter prototípico de las palabras en la producción léxica de los alumnos refleja el que se encuentra en el input de vocabulario de sus libros de texto de ILE. Para ello, se empleó una prueba de fluidez semántica y programas de cálculo léxico para medir la disponibilidad léxica de los participantes en cinco categorías semánticas y para analizar la frecuencia de las palabras en los manuales escolares. Los resultados revelaron evidencias de prototipicidad léxica en la producción de vocabulario de los participantes y en sus materiales de ILE. Además, los resultados sugieren que los prototipos semánticos representados en la producción de los estudiantes difieren de los encontrados en el vocabulario de los materiales escolares. Este estudio ofrece nuevas perspectivas sobre la comparación del output y el input en contextos de ILE, con implicaciones para el diseño curricular y la enseñanza de lenguas extranjeras, en particular en lo que se refiere al papel de la prototipicidad léxica en el aprendizaje de vocabulario en inglés.

Palabras clave: prototipos semánticos, producción léxica disponible, input del vocabulario, libros de texto de inglés como lengua extranjera, alumnos de inglés como lengua extranjera.

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1. INTRODUCTION

Research on the relationship between input-output vocabulary learning and semantic prototypes in EFL learners is crucial for enhancing our understanding of how language acquisition occurs (Mora 132). The relationship between input (the words learners are exposed to) and output (the lexicon learners produce and use in communication) is fundamental in the process of acquiring vocabulary. This dynamic interaction affects learners' language comprehension and production, influencing their overall language proficiency. In this sense, semantic prototypes play a key role in EFL learners' vocabulary learning, as they are central members of a category that allows us to explore how words based on shared meanings and features are organized in the mind. Although research on semantic prototypes in L2 English exists, there has been limited exploration of word prototypicality through a lexical availability task (LAT) comparing learners of different ages and course levels.

This study seeks to gain insights into how the lexicon available to EFL learners reflects the vocabulary input contained in their EFL textbooks through the representation of prototypical patterns. To achieve this objective, we utilized a LAT to examine the learners' lexical availability output in response to five semantic categories: 'Hobbies', 'House', 'Professions', 'Clothes', and 'School'. We employed computer tools such as Dispogen II (Echeverría et al. 81-91) and WordSmith Tools (version 7.0) (Scott) to analyze the learners' word production, the most available words, and the EFL textbook corpora. The study comprises four sections. The first section reviews previous studies on lexical availability output, the input in EFL textbooks, and semantic prototypes in EFL contexts. The second section describes the sample and method. The third section presents the results, followed by a discussion of our findings. Finally, we present some conclusions and implications for future research on the EFL vocabulary input-output relationship, utilizing prototypes in formal settings.

2. LITERATURE REVIEW

2.1. Lexical Availability Output in EFL Contexts

The concept of lexical availability (LA) originated from the French project *L'élaboration du Français Fondamental* by Gougenheim et al. (45) and proposes that a word becomes available when it is ready to be used and can be recalled immediately. Dimitrijevic introduced the idea of the "degree of availability", suggesting that a word has 100% availability if it is retrieved by all informants, with availability decreasing as fewer informants evoke the word (56). The ease of recalling a word correlates with its degree of availability. López Morales emphasized that, as proposed by Michéa (338), the available lexicon consists of "thematic" words, which are the most readily available and come to mind first in response to a stimulus (102). He distinguished between available words (thematic) and frequent words (non-thematic), with the former linked to a specific category and the latter appearing in a text regardless of context (Michéa 338; Fernández, Sánchez-Saus and Escoriza 36). A mathematical formula was developed by Lorán and López Morales to measure the degree of availability, calculating the index of frequency and position of words in the lists (67). This formula calculates relative frequencies by dividing the absolute frequency by the number of subjects and multiplying by 100. Later improvements by López Chávez and Strassburger Frías refined the formula to enhance its accuracy for group and individual analyses (78). Lexical Availability has been used to study the lexicon of Spanish speakers in various regions, as demonstrated in López Morales' Pan-Hispanic Project (103). While initially applied in L1 research, LA has also been utilized in second language acquisition (SLA), particularly for L2 English and Spanish. In EFL contexts, specifically, LA research has shown notable qualitative and quantitative differences. For instance, data from LA output studies have significantly focused on quantitative differences concerning the production of tokens (total words), types (distinct words), *M* (mean values), and *SD* (standard deviation) between younger and older EFL learners, showing that the latter

participants outperform the former to a greater extent (Jiménez Catalán et al. 42; Agustín Llach and Jiménez Catalán 40; Mora 267). LA research has also examined the effect of gender, finding that gender differences in the number of responses are consistent across grades, and that male and female learners coincide in the semantic fields for which they produce most and least cued responses (Jiménez Catalán and Ojeda Alba 66; Agustín Llach and Fernández-Fontecha 74). Regarding word familiarity, results have shown that the learners' availability of words in L2 depends on their similarity to L1 words (Hernández Muñoz 56). In terms of the structure of the mental lexicon, LA findings have indicated whether meaning connections are produced equally and unequally in L1 and L2 languages (Ferreira and Echevarría 132). Referring to language exposure, LA outcomes have boosted word production, with greater exposure resulting in more words produced (Jiménez Catalán and Agustín Llach 76; Akbarian et al. 25). As for lexical frequency, LA findings have revealed that when receiving more hours of instruction and exposure to a language, the frequency profile mainly increases in the K1 band and the Off-list (infrequent words) band (Jiménez Catalán and Fitzpatrick 89). When analyzing semantic networks, LA results suggest that the words connected and stored in the mind provide evidence of the learners' mental lexicon organization (Agustín Llach 207, Mora 84), and finally LA outcomes on semantic prototypes suggest that the most available lexical units represent the most prototypical words across languages and cultures, as stated in the principle of universality (Šifrar 125, 162; Mora 80, Mora and Jiménez Catalán 74). Nevertheless, to our knowledge, LA research has scarcely explored the relationship between EFL learners' output and input. Accordingly, this study aims to investigate this research gap and expand the scope of EFL learners' LA output and vocabulary input in their textbooks.

2.2. ELT Textbooks as Containers of Input

Textbooks are essential in language education, offering lesson ideas, structured input, and classroom activities (Richards 15). They support learning through readings, explanations, and practice while serving as a reference for grammar, vocabulary, and pronunciation (Cunningsworth 24; Tomlinson 143).

In the area of L2 vocabulary learning, learners must be exposed to a substantial amount of input (Webb and Nation 67). Therefore, in EFL contexts, textbooks are often the primary source for vocabulary learning (Alsaif and Milton 21; Jordan and Gray 438) and serve as repositories of lexical items and sources of words (Thornbury 56). Thus, since textbooks are invaluable resources for language learning and teaching, analyzing them could enhance EFL education (Jiménez and Mancebo 147).

In studies addressing Primary and Secondary Education EFL textbooks, the scopes of investigation have focused on word frequency (Alcaraz Mármol 9; Norberg and Nordlund 463; Guerra Álvarez and Jiménez Catalán 264), word repetition (Jiménez Catalán and Mancebo 147; Nordlund 47), cultural vocabulary (Canga and Cifone 90; Cifone 65), and vocabulary input-output (Donzelli 133; Alsaif and Milton 21; Syairofi et al. 12), with the latter being our primary focus. In his study with Italian

learners, Donzelli found that teachers introduce significantly more vocabulary than coursebooks, although this may depend on the teacher's proficiency (134). In the case of Saudi Arabian learners from 6th to 12th grade, Alsaif and Milton emphasized the need for textbooks to include the most frequent 2,000–5,000 words for better comprehension, noting that Saudi textbooks lack sufficient vocabulary (22). In their investigation of vocabulary output from input in an EFL textbook used with Indonesian learners, Syairofi et al. stressed the importance of classroom interaction in reinforcing textbook input, advocating for the use of a framework to enhance SLA (1). Given that studies on the input-output relationship in EFL contexts have been relatively scarce, this study aims to delve deeper into this field by utilizing semantic prototypes for that purpose.

2.3. Semantic Prototypes in EFL Contexts

A semantic prototype is recognized as the most representative and central member of a category (Rosch, 192). Specifically, *apple* is considered the most prototypical example within the category 'fruit', as it is the most quickly categorized element and a key point of reference. In contrast, items like *olives* are less prototypical due to varying degrees of similarity and centrality. In other words, category members are arranged in order of goodness, where items similar to the prototype are classified as very typical or good members, while dissimilar items are regarded as less typical or less good members (Murphy 207). Prototypes have also been described as individual variations (Nunberg 44; Dubois 468), shared knowledge (Langacker 230), membership gradience (Lakoff 12), and family resemblance (Wittgenstein 143; Murphy 42-43). In the lexical field, a prototype is viewed as the central case upon which the lexical meaning of a word is based (Kleiber 47). According to Rosch et al. (382-439) and Kleiber (80-84), the centrality of a word depends on a hierarchical lexical organization structured around three levels of classification: superordinate, basic, and subordinate. Kleiber (80) indicates that superordinates refer to abstract elements that cannot be represented by a mental image (e.g., furniture, food). Basic objects are associated with perception (the quickest identification of a category through a mental image), function (they align with the general motor program of the categories), and communication (these are often the first, shortest, and most common words learned by children and the first to enter the lexicon). For example, *chair* is the basic word in the category 'Furniture'. Thus, the subordinate derived from *chair* would be *folding chair*, as this level provides further and more specific information about the basic object. Since they have not been explored extensively, this study aims to integrate prototypes with vocabulary learning concerning EFL learners' lexical output and EFL textbooks' input in formal English settings. Some studies on prototypes in EFL contexts have examined LA output, indicating the universality of prototypes across the most available words retrieved (Šifrar 134; Mora and Jiménez Catalán 78; Mora 145). In addition, research on vocabulary input in textbooks suggests that most prototypes referred to target language words while overlooking those connected to the learners'

cultural identity, and that prototypical content word lists might be helpful to analyze the textbooks' corpora (Mora and Cifone 203; Cifone and Mora 73; Mora 367).

According to the literature, no studies have been conducted concerning the vocabulary input-output relationship in learners' lexical production and EFL textbooks through semantic prototypes; therefore, this study aims to be the first to address this research gap. The research questions are as follows:

RQ1: Is there evidence of prototypical association patterns in the 50 most frequent words retrieved by children and adolescents in response to a LAT?

RQ2: Is there evidence of prototypical words within the 50 most frequent words in the learners' EFL textbooks?

RQ3: To what extent do the prototypical word associations observed in children and adolescent EFL learners' English LA output mirror the prototypical words in their EFL textbooks?

3. RESEARCH DESIGN AND METHODOLOGY

This study employs cross-sectional quantitative analyses to compare LA among students of various ages and course levels. By examining semantic prototypical patterns, it evaluates whether the learners' productive vocabulary aligns with the vocabulary presented in their EFL textbooks.

3.1. Sample

3.1.1. EFL Informants

The participant sample comprised two age groups distributed among 136 Spanish students from two public schools in Logroño (La Rioja), a city in the north of Spain. The first group consisted of 70 children (12–13 years old) in sixth grade, the final year of Spanish primary education, with an A2 proficiency level according to the *Common European Framework of Reference* (CEFR) (Council of Europe 23). This group included multicultural learners from Romania, Pakistan, Colombia, El Salvador, Ukraine, and Spain, with Spanish students representing the majority. The second group included 66 adolescents (17–18 years old) in 12th grade (2nd Baccalaureate), the final year of non-compulsory Spanish secondary education before university entrance, with a B2 proficiency level. Most of these learners were from Spanish-speaking countries, such as Ecuador, Venezuela, and Argentina, with a small number from Serbia and Pakistan.

3.1.2. EFL Textbooks

The sample of textbooks included one for primary education (*New Tiger 6)* and one for secondary education (*Key to Bachillerato 2,* first edition*)*. Table 1 provides a detailed description of the selected EFL materials.

Table 1. Description of the EFL textbooks.

Course Level	Textbook	Authors	Publishing House	Year of Publication	Number of Units	CEFR Level
6th grade	*New Tiger 6*	Carol Read Mark Ormerod	MacMillan	2018	7	A1-A2
12th grade	*Key to Bachillerato 2*	Ben Wetz	Oxford	2014	6	B2

These two EFL textbooks were chosen as they were used by participants during data collection and are widely studied in research projects in La Rioja, Spain. Approved by educational authorities, these UK-published books are used internationally, making their analysis valuable for teachers and researchers.

3.2. Data Collection Instruments

A background questionnaire was used to gather personal information about the learners, including their age, gender, nationality, and language experience. It also collected data on their mother tongue (L1), L2 exposure, potential L3, language program involvement, proficiency levels, and participation in extracurricular language activities.

A LAT was employed to evaluate learners' existing lexicon, specifically the words that come to their minds easily and quickly in response to a semantic category (Jiménez Catalán 5). Five semantic categories ('Hobbies', 'House', 'Professions', 'Clothes', and 'School') were selected from 16 traditional categories examined in prior LA studies. The choice of these categories is due to the fact that categories such as 'House', 'Professions', and 'Clothes' are classified as natural and inclusive, often reflecting prototypical levels of categorization and exhibiting cohesion indices (CI) above the standard average, which refer to the degree of coincidence in the words retrieved by informants for each semantic category. Conversely, categories like 'Hobbies' (radial-inclusive) and 'School' (radial-relational) exhibit below-average (CI) values, aligning with the concept of family resemblance, which posits that category membership does not require all members to share necessary and sufficient features. Each category was presented on a paper-and-pencil questionnaire and on a separate page with numbered lines. Participants were given two minutes to respond to each prompt and could only proceed to the next category after the two-minute period had expired. The LAT has been helpful in measuring LA, word production, and semantic prototypes in the lexicons of foreign language learners (Šifrar 125-126; Jiménez Catalán and Fernández-Fontecha 77-78; Mora and Jiménez Catalán 74-75; Mora 269-270).

The lemmatized words were selected based on criteria from the University of La Rioja's Applied Linguistics Group (GLAUR) and previous L2 English studies (Jiménez Catalán et al. 41; Mora 179-180). Criteria included excluding Spanish words, proper nouns, film titles, brand names, prepositions, pronouns, repeated words, possessive

adjectives, and articles. Spelling errors were corrected, and plural forms were changed to singular unless the plural form was listed in dictionaries.

For the textbook analysis, we examined the two EFL textbooks used by the learners during data collection, as described in the sample section.

3.3. Data Analysis and Procedures

The LA output data for both participant groups were analyzed using the Dispogen II tool (Echeverría et al. 81-91), which calculated LA values, the total number of words (tokens), the number of different words (types), and the mean word production for each semantic category. It also provided the CI, indicating word overlap across informants. The availability of each word was determined using a formula (López Chávez and Strassburger Frías 227-51) to calculate its position and frequency in the responses. IBM SPSS Statistics (Version 26.0) was then used to analyze statistically significant values and compare the results between groups.

To compile the EFL materials corpora thoroughly, the content, along with the instructions from the textbook activities, was included. The textbooks were converted into .txt files and analyzed using WordSmith Tools (version 7.0) (Scott). This facilitated word counting, vocabulary size calculation, and the generation of alphabetical and frequency-based word lists. Both individual words and lexical units (including phrasal verbs and idioms) were examined, following definitions by Carter (4) and Sinclair (160), who considered lexical items as units of meaning rather than isolated words.

For lemmatization, the base and inflected forms of words were grouped together according to the procedures outlined by GLAUR, which included spelling corrections, symbol removal, the exclusion of proper nouns, and converting verbs to their base infinitive forms. The prototypical analysis of EFL textbooks was based on previous work by Mora 372, which adhered to the classifications established by Dixon (79-206) and Viberg (123-162), categorizing content words such as nouns, adjectives, and verbs. Nouns were classified into concrete categories (real physical objects, things, or places), abstract categories (ideas, qualities, or states), and speech act categories (communicative functions), while verbs were categorized by motion (action), stative (non-action), perceptual (experiences related to one of the physical senses), and speaking (reported speech). Adjectives were analyzed by value (quality attributed to a noun) and similarity (comparisons between entities, states, or events).

4. RESULTS

Before presenting the results of the three research questions set out in this study, Table 2 presents the overall findings on the learners' LA across the five semantic categories selected.

Table 2. EFL learners' overall results on lexical availability output.

	Children					Adolescents				
SC	Tokens	Types	*M*	*CI*	*p*	Tokens	Types	*M*	*CI*	*p*
'Hobbies'	663	255	9.47	0.37	.068	950	288	14.42	0.49	.004
'House'	881	224	12.57	0.56	.023	1133	192	17.13	0.89	.200
'Professions'	544	169	7.77	0.45	.006	826	199	12.59	0.62	.029
'Clothes'	849	137	12.14	0.88	.023	902	111	13.65	1.23	.200
'School'	942	249	13.45	0.54	.021	1248	275	18.89	0.68	<.001

Note. SC: Semantic Category; CI: Cohesion Index; *p*: p-value (p. > 0.05: normally distributed, $p < 0.05$: non-normally distributed).

Overall results indicated that adolescent learners retrieved a statistically significantly higher number of tokens than children across all selected semantic categories. However, the findings revealed that children's retrieval of word types in the categories 'House' and 'Clothes' surpassed that of adolescents. The mean tokens showed that, in both groups of learners, the highest number was represented in the category 'School', while the lowest was found in 'Professions'. Regarding the CI, 'Clothes' achieved the highest count across the five categories. The Kolmogorov-Smirnov normality tests indicated that the data distributions differed between the two groups. As seen in Table 2, the children's data were not normally distributed in all cases, except for the semantic category of 'Hobbies' ($p = .068$). In comparison, adolescents' data indicated that the distribution was normal for two cue words, 'House' ($p = .200$) and 'Clothes' ($p = .200$), whereas 'Hobbies' ($p = .004$), 'Professions' ($p = .029$), and 'School' ($p < .001$) were not normally distributed.

Turning to the learners' vocabulary production results, RQ1 aimed to identify evidence of prototypes among the 50 most frequent words in their lexical output. Table 3 illustrates the prototypical patterns in word production for both groups of informants by considering the number of informants who evoked the same word.

The results indicated that prototypes were present among the 50 most frequent words. As shown in Table 3, the most prototypical word for children and adolescent EFL learners was *teacher*, which ranked within the top ten lexical items. The word *teacher* was retrieved by 113 younger learners and 128 older students, ranking first on both lists. This outcome was also attributed to the fact that children and adolescent learners categorized the word *teacher* into two of the selected semantic categories: 'Professions' and 'School'. Additionally, this word was triggered for younger learners in response to the cue word 'Hobbies'. Therefore, the words retrieved across all the semantic categories surpassed the number of participants in our sample. Following *teacher*, other words like *t-shirt, table, shoe, chair, pencil*, and *TV* displayed shared prototypical associations between the two groups of EFL learners in the top ten words of the list. Within this top ten, the words *book*, *shorts, football, bathroom, kitchen,* and *desk* were not prototypical when comparing the

lists of children and adolescents. Although there were other prototypical words beyond the top ten lexical items in the learners' lists, they were less prototypical than the leading words. For instance, the word *friend* ranked 18th in the children's list but fell to 36th in the adolescents' list. Results also indicated that the least prototypical words were *eat* in the children's list and *pencil case* in the adolescents' list, meaning these two lexical items were the least available among both groups within the most frequent 50-word list.

Table 3. Children's and adolescents' prototypical word associations (LA output).

Children			Adolescents		
W	F	%	W	F	%
1. Teacher	113	2.92	***1. Teacher***	128	2.53
2. T-shirt.	65	1.68	***2. Chair***	79	1.56
3. Table	62	1.60	***3. T-shirt***	60	1.19
4. Shoe	55	1.42	***4. Bathroom***	58	1.15
5. TV	51	1.32	***5. Kitchen***	58	1.15
6. Book	50	1.29	***6. Pencil***	55	1.09
7. Chair	48	1.24	***7. Shoe***	54	1.07
8. Pencil	42	1.09	***8. Table***	54	1.07
9. Shorts	40	1.03	***9. TV***	54	1.07
10. Football	36	0.93	***10. Desk***	53	1.05
11. Police	36	0.93	*11. Jeans*	52	1.03
12. Bathroom	35	0.90	*12. Bed*	51	1.01
13. Bed	35	0.90	*13. Sofa*	50	0.99
14. Doctor	34	0.88	*14. Bedroom*	49	0.97
15. Door	34	0.88	*15. Sock*	49	0.97
16. Jeans	34	0.88	*16. Livingroom*	48	0.95
17. Computer	33	0.85	*17. Book*	47	0.93
18. Friend	32	0.83	*18. Hat*	43	0.85
19. Kitchen	32	0.83	*19. Exam*	42	0.83
20. Sofa	32	0.83	*20. Computer*	40	0.79
21. Maths	31	0.80	*21. Door*	40	0.79
22. Window	31	0.80	*22. Doctor*	39	0.77
23. Jacket	30	0.78	*23. Shirt*	39	0.77
24. Bedroom	29	0.75	*24. Trousers*	38	0.75
25. Draw	29	0.75	*25. Engineer*	37	0.73
26. English	29	0.75	*26. Trainers*	36	0.71
27. Glove	29	0.75	*27. Basketball*	34	0.67
28. Livingroom	29	0.75	*28. Football*	34	0.67
29. Pen	29	0.75	*29. Pen*	34	0.67
30. Play	29	0.75	*30. Jacket*	33	0.65
31. Sleep	28	0.72	*31. Maths*	33	0.65

32. Tablet	27	0.70	*32. Window*	32	0.63
33. Trousers	27	0.70	*33. Study*	30	0.59
34. Basketball	26	0.67	*34. Dress*	29	0.57
35. Blue	26	0.67	*35. Nurse*	29	0.57
36. Sock	25	0.65	*36. Friend*	28	0.55
37. Dress	24	0.62	*37. Student*	28	0.55
38. Glasses	24	0.62	*38. Coat*	27	0.53
39. Scarf	24	0.62	*39. Read*	27	0.53
40. Trainers	24	0.62	*40. Sing*	26	0.51
41. Food	23	0.59	*41. English*	25	0.49
42. Yellow	23	0.59	*42. Room*	25	0.49
43. Cook	22	0.57	*43. Dance*	24	0.47
44. Family	22	0.57	*44. Policeman*	24	0.47
45. Mask	22	0.57	*45. Scarf*	24	0.47
46. Shirt	22	0.57	*46. Skirt*	24	0.47
47. Boot	21	0.54	*47. Write*	24	0.47
48. Cap	21	0.54	*48. Cook*	23	0.45
49. Hat	21	0.54	*49. Glove*	23	0.45
50. Eat	20	0.52	*50. Pencil case*	22	0.43

Note. W: word – F: Frequency (number of informants who produced the same word).

Before moving to RQ2 regarding the representation of word prototypicality in the EFL textbooks for 6th and 12th graders, Table 4 illustrates the characterization of the textbooks selected for this study.

Table 4. Distribution of corpus and content words per textbook.

	Corpus (content + function words)	Tokens (content words) *Lemmatized	Types (content words) *Lemmatized
New Tiger 6	120, 449	8,477	1,452
Key to Bachillerato 2	394, 506	27,315	3,486

The results indicated that when comparing the lexical differences between the two textbooks, the adolescent EFL learners' textbook (*Key to Bachillerato 2*) contained the highest number of words, encompassing both content and function words, while the EFL children's material (*New Tiger 6*) exhibited the lowest count. Regarding lexical variation, the type-token ratio (TTR) was 37.74 for *New Tiger 6* and 45.50 for *Key to Bachillerato 2*. The frequency of content word occurrences varied, with a minimum of nine repetitions, representing 16.25% in *New Tiger 6* and 18.15% in *Key to Bachillerato 2*.

Findings for RQ2 regarding evidence of word prototypicality in the learners' EFL textbooks indicated that certain prototypical content words were present in each course book, based on their frequency (i.e., repetition or number of occurrences throughout the text). Analysing how prototypes were represented in each textbook involved classifying the content words identified in the learners' textbooks, as shown in Tables 5 and 6.

Table 5. Vocabulary input in the children's textbook (the 50 most frequent content words).

New Tiger 6							
W	F	WC	TC	W	F	WC	TC
1. Listen	133	V	Perception	*26. Make*	41	V	Motion
2. Read	126	V	Motion	*27. Place*	40	N	Abstract
3. Like	103	V	Stative	*28. Project*	39	N	Abstract
4. People	103	N	Concrete	*29. Answer*	38	N/V	Speech Act
5. Go	102	V	Motion	*30. Club*	37	N	Concrete
6. Think	87	V	Stative	*31. Favourite*	37	ADJ	Value
7. Find	77	V	Motion	*32. Take*	36	V	Motion
8. Say	77	V	Speaking	*33. Talk*	36	V	Speaking
9. Day	63	N	Abstract	*34. Friend*	35	N	Concrete
10. See	59	V	Perception	*35. Learn*	35	V	Motion
11. Help	56	V	Motion	*36. Year*	34	N	Abstract
12. Story	56	N	Abstract	*37. Name*	33	N	Abstract
13. Play	55	V	Motion	*38. Put*	33	V	Motion
14. Good	53	ADJ	Value	*39. Sport*	32	N	Concrete
15. Country	51	N	Concrete	*40. Volcano*	32	N	Concrete
16. Time	51	N	Abstract	*41. Call*	31	V	Speech Act
17. World	51	N	Concrete	*42. Past*	31	N	Abstract
18. Write	50	V	Motion	*43. Ask*	30	V	Speaking
19. Live	49	V	Stative	*44. Different*	30	ADJ	Similarity
20. Use	48	V	Motion	*45. Home*	30	N	Concrete
21. Tree	46	N	Concrete	*46. Look*	30	V	Perception
22. Know	43	V	Stative	*47. Question*	29	N	Speech Act
23. Want	43	V	Stative	*48. Visit*	29	V	Motion
24. Park	42	N	Concrete	*49. Activity*	28	N	Abstract
25. School	42	N	Concrete	*50. Culture*	28	N	Abstract

Note. W: Word, F: Frequency, TC: Type of Category, WC: Word class, N: Noun, V: Verb, ADJ: Adjective.
Source: Mora (371).

Table 6. Vocabulary input in the adolescents' textbook (the 50 most frequent content words).

Key to Bachillerato 2							
W	F	WC	TC	W	F	WC	TC
1. Notebook	355	N	Concrete	*26. Look*	111	V	Perception
2. Use	342	V	Motion	*27. Ask*	110	N	Speaking
3. Word	336	N	Abstract	*28. Job*	109	N	Concrete
4. People	313	N	Concrete	*29. Choose*	106	V	Motion
5. Sentence	263	N	Abstract	*30. Listen*	104	V	Perception
6. Question	260	N	Speech Act	*31. Year*	104	N	Abstract
7. Say	246	V	Speaking	*32. See*	96	V	Perception
8. Complete	238	V	Motion	*33. Key*	95	N	Concrete
9. Think	215	V	Stative	*34. Exam*	94	N	Abstract
10. Write	214	V	Motion	*35. School*	93	N	Concrete
11. Text	206	N	Abstract	*36. Speak*	93	V	Speaking
12. Answer	204	N/V	Speech Act	*37. Thing*	92	N	Concrete
13. Verb	204	N	Abstract	*38. Want*	91	V	Stative
14. Go	180	V	Motion	*39. Take*	89	V	Motion
15. Make	169	V	Motion	*40. Find*	88	V	Motion
16. Good	164	ADJ	Value	*41. Paragraph*	88	N	Abstract
17. Read	153	V	Motion	*42. Walk*	88	V	Motion
18. Like	140	V	Stative	*43. Example*	87	N	Abstract
19. Form	134	N	Abstract	*44. Activity*	86	N	Abstract
20. Correct	128	ADJ/V	Value	*45. Unit*	86	N	Abstract
21. Work	121	V	Motion	*46. Know*	85	V	Stative
22. Give	115	V	Motion	*47. Language*	80	N	Abstract
23. Past	113	N	Abstract	*48. Need*	80	V	Stative
24. Phrase	113	N	Abstract	*49. Start*	80	V	Motion
25. Time	112	N	Abstract	*50. Change*	79	V	Stative

Note. W: Word; F: Frequency; WC: Word class; TC: Type of Category; N: Noun; V: Verb; ADJ: Adjective. Source: Mora (373).

Overall results showed evidence of prototypes among the 50 most frequent content words. The most prototypical categories were concrete nouns at 24% (e.g., *people, park, school*) and motion verbs at 24% (e.g., *go, play, learn*). Following these, abstract nouns ranked as the second-most frequent group, also highly represented at 20% (e.g., *day, story, time*). Classifications of additional content words included speech act nouns at 4% (e.g., *question, answer*), stative verbs at 10% (e.g., *live, know, want*), speaking verbs at 8% (e.g., *talk, ask, call*), and perceptive verbs at 6% (e.g., *listen, see, look*). Adjectives were represented to a lesser extent, comprising value adjectives at 4% (e.g., *good, favourite)* and similarity adjectives at 2% (e.g., *different*).

Turning to prototypical content words, the ten most frequent lexical items were highlighted, as shown in Table 5. The findings indicated that prototypes in *New Tiger 6* were closely associated with verbs (*listen, read, like, go, think, find, say,* and *see*), along with a concrete noun (*people*) and an abstract noun (*day*). The most prototypical word was the perceptual verb *listen*, which appeared 133 times (1.57%) in the children's textbook. In contrast, the least prototypical words in the 6th graders' material were *activity* and *culture*, each occurring 28 times (0.33%).

The adolescents' course book also evinced word prototypicality among the 50 most frequent content words, as in the children's textbook. The prototypes mainly referred to abstract nouns at 30% (e.g., *exam, language, paragraph*), while motion verbs constituted 26% (e.g., *walk, make, work*). Concrete prototypical nouns accounted for 12% (e.g., *notebook, people, job*), and stative verbs comprised 10% (e.g., *need, know, like*). Other classifications included speech acts at 4% (e.g., *answer, question*), perceptual verbs at 6% (e.g., *listen, see, look*), speaking verbs at 6% (e.g., *ask, say, speak*), and value adjectives at 4% (e.g., *good*, *correct*). The prototypical content words among the ten most frequent in *Key to Bachillerato 2* were evenly distributed between verbs (*use, say, complete, think*, and *write*) and nouns (*notebook, word, people, sentence,* and *question*). However, the most prototypical content word in the adolescents' textbook was the concrete noun *notebook*, which appeared 355 times (1.15%) throughout the text. In contrast, the least prototypical content word was *change*, with 79 occurrences (0.28%). Results from the content word analyses conducted in both EFL textbooks revealed the representation of prototypes; however, the most prototypical word in each varied by course level. Additionally, the ten most prototypical content words in each textbook list indicated that three lexical items are repeated (*people*, *think*, and *say*). In the case of *people,* although it exhibited different frequencies of occurrence, it is equally ranked fourth in both lists of the two textbooks (Tables 5 and 6).

Finally, RQ3 aimed to analyze the extent to which the prototypical word associations observed in the English LA output of children and adolescent EFL learners reflect the prototypical content words in their EFL textbooks. To this end, Tables 7 and 8 compare the 50 most frequent word lists generated by each age group in response to a LAT and the 50 most frequent content words found in the materials.

Results in Table 7 indicated that prototypical words were relatively scarce in the young learners' LA output and their EFL textbook word lists, at least among the 50 most frequent words. Two prototypes were found in both lists: *play* and *friend*. In the children's lexical output, *play,* as a motion verb, was ranked 30th (F = 29), while in the EFL textbook *New Tiger 6*, it was positioned 13th (*F* = 55). In the case of *friend*, this lexical item was placed 18th (F = 32) in the ranking list of the children's word availability, whereas in the children's material, *friend* was in 34th place (F = 35). Despite the differences in the ranking positions of the word lists, the frequency values were broadly similar, suggesting that *friend* represented a prototypical word association in the 6th graders' lexicon and their textbook. Therefore, given that the frequency values in the lists were moderately high and that these two lexical items

were highly retrieved across three of the five selected semantic categories ('Hobbies', 'House', and 'School'), *play* and *friend* emerged as the most prototypical words in the vocabulary of this group of learners.

Table 7. The output-input word prototypicality relationship in EFL children learners.

Children's Lexical Output				Children's EFL Textbook			
W	F	W	F	W	F	W	F
1. Teacher	113	*26. English*	29	*1. Listen*	133	*26. Make*	41
2. T-shirt	65	*27. Glove*	29	*2. Read*	126	*27. Place*	40
3. Table	62	*28. Living room*	29	*3. Like*	103	*28. Project*	39
4. Shoe	55	*29. Pen*	29	*4. People*	103	*29. Answer*	38
5. TV	51	***30. Play***	29	*5. Go*	102	*30. Club*	37
6. Book	50	*31. Sleep*	28	*6. Think*	87	*31. Favourite*	37
7. Chair	48	*32. Tablet*	27	*7. Find*	77	*32. Take*	36
8. Pencil	42	*33. Trousers*	27	*8. Say*	77	*33. Talk*	36
9. Shorts	40	*34. Basketball*	26	*9. Day*	63	***34. Friend***	35
10. Football	36	*35. Blue*	26	*10. See*	59	*35. Learn*	35
11. Police	36	*36. Sock*	25	*11. Help*	56	*36. Year*	34
12. Bathroom	35	*37. Dress*	24	*12. Story*	56	*37. Name*	33
13. Bed	35	*38. Glasses*	24	***13. Play***	55	*38. Put*	33
14. Doctor	34	*39. Scarf*	24	*14. Good*	53	*39. Sport*	32
15. Door	34	*40. Trainers*	24	*15. Country*	51	*40. Volcano*	32
16. Jeans	34	*41. Food*	23	*16. Time*	51	*41. Call*	31
17. Computer	33	*42. Yellow*	23	*17. World*	51	*42. Past*	31
18. Friend	32	*43. Cook*	22	*18. Write*	50	*43. Ask*	30
19. Kitchen	32	*44. Family*	22	*19. Live*	49	*44. Different*	30
20. Sofa	32	*45. Mask*	22	*20. Use*	48	*45. Home*	30
21. Maths	31	*46. Shirt*	22	*21. Tree*	46	*46. Look*	30
22. Window	31	*47. Boot*	21	*22. Know*	43	*47. Question*	29
23. Jacket	30	*48. Cap*	21	*23. Want*	43	*48. Visit*	29
24. Bedroom	29	*49. Hat*	21	*24. Park*	42	*49. Activity*	28
25. Draw	29	*50. Eat*	20	*25. School*	42	*50. Culture*	28

Note. F: Frequency (the number of times the occurrences appeared in the text). Bold-type words pointed to the coinciding prototypical words found in the children's lexical output and textbook word lists.

Table 8. The output-input word prototypicality relationship in EFL adolescent learners.

Adolescents' Lexical Output				Adolescents' EFL Textbook			
W	F	W	F	W	F	W	F
1. Teacher	128	*26. Trainers*	36	*1. Notebook*	355	*26. Look*	111
2. Chair	79	*27. Basketball*	34	*2. Use*	342	*27. Ask*	110
3. T-shirt	60	*28. Football*	34	*3. Word*	336	*28. Job*	109
4. Bathroom	58	*29. Pen*	34	*4. People*	313	*29. Choose*	106
5. Kitchen	58	*30. Jacket*	33	*5. Sentence*	263	*30. Listen*	104
6. Pencil	55	*31. Maths*	33	*6. Question*	260	*31. Year*	104
7. Shoe	54	*32. Window*	32	*7. Say*	246	*32. See*	96
8. Table	54	*33. Study*	30	*8. Complete*	238	*33. Key*	95
9. TV	54	*34. Dress*	29	*9. Think*	215	***34. Exam***	94
10. Desk	53	*35. Nurse*	29	***10. Write***	214	*35. School*	93
11. Jeans	52	*36. Friend*	28	*11. Text*	206	*36. Speak*	93
12. Bed	51	*37. Student*	28	*12. Answer*	204	*37. Thing*	92
13. Sofa	50	*38. Coat*	27	*13. Verb*	204	*38. Want*	91
14. Bedroom	49	***39. Read***	27	*14. Go*	180	*39. Take*	89
15. Sock	49	*40. Sing*	26	*15. Make*	169	*40. Find*	88
16. Living room	48	*41. English*	25	*16. Good*	164	*41. Paragraph*	88
17. Book	47	*42. Room*	25	***17. Read***	153	*42. Walk*	88
18. Hat	43	*43. Dance*	24	*18. Like*	140	*43. Example*	87
19. Exam	42	*44. Policeman*	24	*19. Form*	134	*44. Activity*	86
20. Computer	40	*45. Scarf*	24	*20. Correct*	128	*45. Unit*	86
21. Door	40	*46. Skirt*	24	*21. Work*	121	*46. Know*	85
22. Doctor	39	***47. Write***	24	*22. Give*	115	*47. Language*	80
23. Shirt	39	*48. Cook*	23	*23. Past*	113	*48. Need*	80
24. Trousers	38	*49. Glove*	23	*24. Phrase*	113	*49. Start*	80
25. Engineer	37	*50. Pencil case*	22	*25. Time*	112	*50. Change*	79

Note. F: Frequency (the number of times the occurrences appeared in the text). Bold-type words pointed to the coinciding prototypical words found in the adolescents' lexical output and textbook word lists.

In the adolescents' lexical output and EFL textbook, as with the children's results, few prototypical words were observed (Table 8). Three semantic prototypes stood out among both word lists: *exam*, *read*, and *write*. The prototype *exam* ranked 19th (F = 42) in the older learners' lexical output, whereas in the ELT textbook *Key to Bachillerato 2* it held the 34th position (F = 94). The second prototypical lexical item,

read, was ranked 39th (F = 27) in the 12th graders' vocabulary production word list, while in their textbook it appeared in 17th place (F = 153). Lastly, *write* was positioned 47th (F = 24) in the adolescents' word production, while in the EFL textbook it ranked 10th (F = 214). Thus, *exam, read,* and *write* emerged as the most prototypical words in the 12th graders' lexical availability output and their EFL textbook. The significance of this result is underscored by the fact that *read* and *write* were also found in the categories 'School' and 'Hobbies'. Nonetheless, frequency results from each word list indicated that in the adolescents' lexical output, *exam* was the most prototypical word association, while *write* achieved the highest level of prototypicality in their textbook.

The differences between the two-word lists (Tables 7 and 8) suggest evidence of prototypical word associations among the 50 most frequent words in the learners' LA and their corresponding ELT textbooks, albeit to a lesser extent. Furthermore, word prototypicality in both groups also varied concerning words and frequency values, as each group of students belonged to different course levels, and there was a noticeable age difference.

5. DISCUSSION

This study aimed to analyze the lexical input-output relationship of EFL learners through semantic prototypes. RQ1 investigated word prototypicality in learners' word retrieval across five semantic categories. The results showed that children and adolescents retrieved the word *teacher* as their first response among the 50 most frequent word types. These findings align with those by Šifrar (147), which suggested that words fulfill similar functions due to standard human biology, psychology, and communication needs. The word *teacher* also owes its prototypicality to being represented in the categories 'Professions' and 'School'. However, this result should be interpreted cautiously, as no prior research has compared 6th and 12th graders within these two semantic categories, making it challenging to compare our findings directly. The coincidence of the prototype triggered by both learner groups was measured by the frequency of word retrieval for each semantic category in the LAT. These results concurred with the study by Jiménez Catalán et al. (42-46), as word responses were also analyzed in terms of frequency, which, in LA, refers to the number of informants who retrieved the same word. Thus, words were ranked from most to least frequently produced for each semantic category in the LAT. The study found that both groups of EFL learners primarily retrieved short words, which are easier and faster to recall (Kleiber 56-57). These short words, viewed as central (prototypes) to categories (Rosch et al. 382), are also the easiest to acquire when learning a language (Murphy 38). The results indicated that basic-level words were predominantly nouns, aligning with earlier findings by Šifrar (131). Moreover, this study's frequent retrieval of basic words is consistent with previous research, such as that by Šifrar (161) and Mora (219-221), where foreign language (FL) learners of Spanish and English also favored basic-level terms in vocabulary tasks. The study highlighted the importance of typicality in LA

among EFL learners. In keeping with Rosch (199), typicality refers to the *good examples* people provide when categorizing items, and these typical items often serve as cognitive reference points. The findings support that typicality is significant in determining which words are most readily available and possess high prototypicality in a LAT (Hernández Muñoz et al. 950). Highly available prototypical words generated by both groups of learners, such as *football, kitchen, t-shirt, TV,* and *teacher*, appeared first on the response lists, while atypical words were ranked lower. This suggests that less available words were less likely to reflect collective knowledge, leading to more individual rather than group responses, as suggested by Šifrar (131).

The results of RQ2 showed that prototypicality was present among the 50 most frequent content words in the ELT textbooks, as selected by employing the semantic approaches proposed by Dixon (79-206) and Viberg's (123-162) classification of words. The study found that in the children's textbook (*New Tiger 6*), the most prototypical content words were concrete nouns and motion verbs, in line with previous research by Guerra and Jiménez Catalán (281) and Nordlund (64). However, the results should be interpreted with caution because only one textbook sample was analyzed. Abstract nouns, speech act nouns, and certain verbs (stative, speaking, and perceptual) appeared less frequently. The most prototypical word was *listen*, a perceptual verb, likely because perception is more accessible to young children than abstract mental states (Davis and Landau 1-3). Among the top ten most frequent words, verbs dominated, particularly motion verbs, followed by perceptual, stative, and speaking verbs. This trend suggests that verbs, one of the largest classes of content words (Börjars and Burridge 47), are essential for vocabulary acquisition and play a central role in children's textbooks.

The analysis of the adolescents' textbook (*Key to Bachillerato 2*) revealed a distinct pattern compared to the children's textbook (*New Tiger 6*). In the 12th graders' textbook, prototypical words were more strongly associated with abstract nouns, followed by motion verbs. Unlike the 6th-grade textbook, abstract nouns outnumbered concrete nouns, likely due to the cognitive shift in adolescence toward more abstract and complex thinking (Lang et al. 339). The prototype in *Key to Bachillerato 2* was *notebook*, a concrete noun commonly used in school contexts. Motion verbs represented the most significant subcategory among the top ten most frequent words; however, unlike the children's textbook, no perceptual verbs were present. This suggests that, while perceptual verbs related to physical senses existed, they were less frequent and less prototypical than those found in the children's textbook. Overall, the findings highlight a shift in the types of words deemed prototypical as learners transition from primary to secondary education. The results also indicate that the children's and adolescents' textbooks contained essential prototypical content words, despite age and course level differences. It can be argued that some of these fundamental words are included in EFL textbooks to facilitate a general comprehension of the language (Alsaif and Milton 31). However, caution is warranted, as the sample of textbooks in this study is limited to only two texts.

RQ3 aimed to unveil whether the prototypical words retrieved by EFL children and adolescent learners reflect the word prototypicality found in their EFL textbooks. The study discovered that prototypical words were underrepresented among the 50 most frequent content words in the two selected English textbooks. In the children's textbook *New Tiger 6*, only *play* and *friend* are matched as words commonly used by young learners. The word *friend* is essential in children's literature due to the importance of friendship in childhood (Sherman 452), while *play* is frequently used because of children's active nature (Broughton et al. 169-170). The presence of these words in both children's vocabulary and textbooks suggests that environmental linguistic input, such as daily life and school contexts, contributes to language acquisition, as Galeote (208) indicated. In the adolescents' textbook, *Key to Bachillerato 2*, and the 12th graders' lexical output, prototypical words were limited and differed from those of younger learners. The most frequent words—*read, write,* and *exam*—were closely tied to the school environment. This aligns with Galeote (211-212), reinforcing that learners acquire vocabulary relevant to their educational context. From these results, we concluded that textbook designers consider the needs of learners at each stage of their lives (childhood, adolescence). For children, the prototypes showed they were more involved in physical activities and the people they did them with. In contrast, adolescents' responses were more related to school activities linked to their preparation before taking the university entrance exam.

6. CONCLUSIONS

The present study examined the input-output relationship through word prototypicality in the available lexicon of EFL learners and their EFL textbooks. The findings led us to conclude that within the 50 most frequent words, EFL children and adolescent learners most frequently retrieved the word *teacher*, confirming that certain words are universally prototypical due to their relevance in daily life and education. Moreover, short, basic-level nouns were the most accessible, supporting previous research on ease of recall and acquisition. This study also emphasized that learners retrieve words closely linked to their environments. Younger learners tend to favor concrete nouns and motion verbs, while adolescents shift toward abstract nouns, reflecting their cognitive development and school-related priorities. Regarding the prototypicality differences in each textbook, the children's textbook (*New Tiger 6*) prioritized concrete nouns and motion verbs, whereas the adolescent textbook (*Key to Bachillerato 2*) included more abstract nouns. This indicates a progression in lexical complexity with age and educational level. Notably, while some prototypical words in the textbooks matched the most frequent words among learners (e.g., *play* and *friend* for children, *read, write,* and *exam* for adolescents), many high-frequency learner responses were absent from textbooks. This suggests that textbooks may not fully align with the natural lexical retrieval patterns of EFL learners. The educational implications of this study emphasize that, given the importance of linguistic input in vocabulary acquisition, textbook design should better integrate the prototypical words that learners naturally retrieve. Furthermore, a more balanced representation of concrete and abstract vocabulary could enhance

lexical availability and overall language comprehension. In addition, identifying prototypes in vocabulary learning determines how the EFL learners' mental lexicon is organized when categorizing information in response to a LAT. This has clearly shown that the differences and similarities in this respect could possibly bring insights into how prototypical words affect vocabulary learning and how they are represented in the EFL learners' available lexicon and ELT textbooks. This study acknowledges that only two textbooks were analyzed, which limits the generalizability of the findings. Future research should consider a broader sample of textbooks and learners to gain deeper insights into the relationship between lexical prototypicality and language acquisition. In addition, as a prospective avenue for research, it would be valuable to examine the frequency bands of the most prototypical words found in textbooks and to triangulate these findings with participants' vocabulary size.

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