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INVESTIGATING THE EFFECTS OF FREQUENCY LEVELS ON VOCABULARY GAINS THROUGH EXPLICIT TEACHING

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Abstract: Although frequency is widely recognized as a key predictor of vocabulary learning, relatively few studies have examined how lexical frequency shapes different dimensions of word knowledge under the condition of explicit vocabulary instruction. To address this gap, the present study investigated how high- and low-frequency words responded to identical post-reading explicit instruction. The study was original in that it: (a) treated lexical frequency, not exposure frequency, as the central variable, (b) held time-on-task, input, and instructional procedures constant to isolate its effects, and (c) drew on the connection between lexical frequency and different dimensions of word knowledge. Forty pre-intermediate EFL learners (N = 40) were assigned to either a high-frequency or low-frequency condition and received explicit instruction on 13 target words following a shared reading passage. Learners completed a 10-minute reading phase, a single 45-minute instructional session, and pre-tests, immediate post-tests, and delayed post-tests measuring form recall, meaning recall, and meaning recognition. Results showed that explicit post-reading instruction led to substantial gains in recall-based knowledge, with form recall emerging as the strongest dimension and meaning recognition the weakest. High-frequency words yielded consistently higher scores than low-frequency words, particularly in recall measures, whereas recognition scores showed no significant differences between frequency levels when exposure was controlled. These findings suggest that lexical frequency exerts its strongest influence on recall-based knowledge under explicit conditions, while recognition is less responsive to frequency when exposure and instructional conditions are strictly controlled.

Keywords: corpus-informed vocabulary, explicit instruction, word frequency, vocabulary knowledge

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KHẢO SÁT TÁC ĐỘNG CỦA MỨC ĐỘ TẦN SUẤT TỪ VỰNG ĐỐI VỚI SỰ TIẾN BỘ TỪ VỰNG THÔNG QUA PHƯƠNG PHÁP GIẢNG DẠY TRỰC TIẾP

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Tóm tắt: Mặc dù tần suất từ vựng từ lâu đã được xem là một yếu tố dự báo quan trọng cho khả năng học từ vựng, vẫn còn rất ít nghiên cứu tìm hiểu cơ chế ảnh hưởng của tần suất từ vựng lên các kiến thức từ vựng trong điều kiện giảng dạy từ vựng trực tiếp. Dựa trên định hướng này, nghiên cứu hiện tại khảo sát ảnh hưởng của các từ thuộc nhóm tần suất cao và tần suất thấp lên các kiến thức từ vựng trong cùng một quy trình giảng dạy từ vựng trực tiếp sau khi đọc. Tính mới của nghiên cứu thể hiện ở việc: (a) xem tần suất từ vựng (lexical frequency) – thay vì tần suất tiếp xúc (frequency of occurrence) – như biến số trung tâm; (b) giữ nguyên thời lượng thực hiện nhiệm vụ, đầu vào ngôn ngữ, và quy trình giảng dạy nhằm tách biệt và xác định rõ tác động của biến số này; và (c) khai thác mối liên hệ giữa tần suất từ vựng và các dạng kiến thức từ vựng khác nhau. 40 người học tiếng Anh trình độ tiền trung cấp (N = 40) được phân vào hai nhóm học từ vựng - tần suất cao hoặc tần suất thấp – và được giảng dạy trực tiếp 13 từ vựng mục tiêu sau khi đọc cùng một đoạn văn. Người học trải qua giai đoạn đọc 10 phút, một buổi dạy từ vựng trực tiếp kéo dài 45 phút, và lần lượt làm các bài kiểm tra trước, bài kiểm tra ngay sau can thiệp, và bài kiểm tra trì hoãn sau một tuần, nhằm đo lường khả năng ghi nhớ dạng thức, ghi nhớ nghĩa và nhận diện nghĩa. Kết quả cho thấy ngay cả khi mức độ tiếp xúc còn hạn chế, nhóm từ tần suất cao vẫn đạt được mức tiến bộ đáng kể ở cả hai nhiệm vụ ghi nhớ. Trong khi đó, nhóm từ tần suất thấp chỉ đạt mức cải thiện tương đối ở hai nhiệm vụ này, và không duy trì được kết quả đến lần kiểm tra trì hoãn. Ở phương diện nhận diện nghĩa, không có sự khác biệt đáng kể giữa hai nhóm. Những kết luận này khẳng định vai trò của tần suất trong giảng dạy từ vựng, đồng thời cho thấy các nhiệm vụ ghi nhớ chịu ảnh hưởng rõ rệt hơn từ yếu tố tần suất từ vựng so với nhiệm vụ nhận diện.

Từ khóa: từ vựng dựa trên khối liệu, giảng dạy từ vựng trực tiếp, tần suất từ, kiến thức từ vựng

1. Introduction

Frequency has long been recognized as one of the most reliable predictors of vocabulary learning. Words that occur more often in language use are typically recognized, processed, and retained more efficiently than those that appear less frequently (Brysbaert et al., 2018; Vilkaitė-Lozdienė & Schmitt, 2020). While this predictive value of frequency is well established, important gaps remain in how frequency and frequency effects are investigated in research on vocabulary learning.

First, much of what is known about frequency effects comes from research on incidental learning, where repeated encounters naturally lead to greater gains for high-frequency items (Pellicer-Sánchez, 2016; Uchihara et al., 2018; Webb, 2007a; Webb & Nation, 2017). In contrast, findings from explicit learning contexts are far less consistent. Studies that operationalize frequency as the number of exposures or retrievals within a task generally show positive effects on learning, particularly for productive knowledge (Nakata, 2016; Peters, 2014a). Others, however, have reported weaker, short-term, or non-significant effects (Webb & Chang, 2015; Meng & Wang, 2022). These mixed results suggest that once attention and

practice opportunities are explicitly managed, frequency may not function in the same straightforward way as it does under incidental exposure.

Second, there is little consensus on how frequency itself should be conceptualized in explicit vocabulary research. Most deliberate-learning studies operationalize frequency as an exposure-based variable, i.e., the number of times learners encounter or retrieve a word within a learning task. Much less research has examined lexical frequency as an inherent property of words, that is, their relative commonness in the language, rather than as a function of exposure. As a result, it remains unclear whether different frequency bands differ in their learnability when exposure is controlled.

Third, questions remain about how frequency effects distribute across different dimensions of vocabulary knowledge. Frequency-based advantages (when operationalized as number of exposures) are typically strongest for receptive tasks such as meaning recognition (Brysbaert et al., 2018), whereas recall-based tasks rely on deeper retrieval and often show more variable outcomes (Webb, 2007a; Webb & Nation, 2017). Although studies using explicit post-reading procedures (e.g., Sonbul & Schmitt, 2010; Sonbul & Macis, 2021) demonstrate overall learning gains, they have not directly compared frequency levels or examined whether frequency effects are consistent across form recall, meaning recall, and meaning recognition. The durability of such effects over time also remains underexplored.

The present study addresses these gaps by systematically comparing high- and low-frequency vocabulary under identical post-reading instructional conditions. All instructional variables, including the reading passage, teacher, time-on-task, and number of retrieval opportunities, were held constant, allowing lexical frequency to be examined without confounding differences in exposure. By assessing gains across three dimensions of vocabulary knowledge at immediate and delayed post-tests, the study provides a comprehensive view of how frequency influences explicit vocabulary learning and the extent to which these effects persist over time.

To this aim, the study addresses the following research questions:

RQ1: *To what extent does each frequency group show gains in form recall, meaning recall, and meaning recognition following explicit post-reading instruction?*

RQ2: *To what extent do vocabulary gains differ between the high-frequency and low-frequency groups across these three vocabulary knowledge types?*

2. Literature Review

2.1. Lexical Frequency

In vocabulary research, frequency has been treated as one of the most robust quantitative indicators of lexical processing and learning. Most simply, it refers to how often a word tends to occur in language use and, by extension, to how likely a language user is to know that word, recognize it, or be able to produce it (Ellis, 2002). In corpus linguistics, frequency is typically established through counts across large samples of authentic language, organized into frequency bands that reflect the relative commonness of words in general usage (Nation, 2016a; Schmitt & Schmitt, 2020). Since corpus-based frequencies reflect actual usage patterns across large, authentic language samples (Le, 2020), they provide an empirical basis for determining which lexical items should be prioritized in instruction. This statistical measure captures what can be termed lexical frequency, or macro-level frequency (Durrant et al., 2022), a property intrinsic to the word itself rather than to the task or context in which it appears.

It is essential, however, to distinguish lexical frequency from frequency of occurrence,

or micro-level frequency, which refers to how often a learner encounters or recalls a word within a specific learning condition (Durrant et al., 2022). While both forms of frequency contribute to vocabulary development, they represent distinct mechanisms: lexical frequency reflects a word's typical presence in the language, whereas frequency of occurrence reflects how many learning opportunities a word receives in a given instructional sequence.

This distinction is not only conceptually important but also practically useful. From a theoretical standpoint, separating lexical frequency from frequency of occurrence helps clarify whether vocabulary learning is shaped more by general language patterns or by what learners actually do in the classroom. If lexical frequency continues to support learning even when exposure is controlled, then frequency-informed curriculum design, and the use of corpus-based word lists, remains well justified. In contrast, if frequency of occurrence proves more influential, this highlights the need to design classroom tasks that provide repeated recall and spaced practice for all words, regardless of how common they are in the language.

From a pedagogical standpoint, the distinction informs how vocabulary should be sequenced and recycled in the classroom. High-frequency words, those that learners are most likely to encounter in input, may require fewer encounters to become familiar, but they can still benefit from targeted retrieval practice to consolidate form-meaning connections. Low-frequency words, by contrast, are less likely to be met incidentally and may need sustained, deliberate recycling to achieve similar levels of retention (Conklin, 2020). Understanding whether frequency effects arise from a word's familiarity, the amount of retrieval practice, or the way these two factors combine can help teachers balance what to teach (high-utility words) with how to teach it (through systematic recall and review). While the present study focuses exclusively on lexical frequency, recognizing this distinction provides conceptual clarity for interpreting its findings.

2.2. Frequency Levels and Corpus-Based Word Lists

Lexical frequency is often operationalized in terms of frequency levels – high-, mid-, and low-frequency bands – which are typically derived from lexical coverage principles linking vocabulary size to text comprehension (Vilkaitė-Lozdienė & Schmitt, 2020). Research suggests that learners need to understand approximately 95-98% of the running words in a text to comprehend it adequately (Kormos, 2020; Nation, 2016a). To reach this threshold, various cut-off points have been proposed for what constitutes high-frequency vocabulary. Nation (2001, as cited in Nation, 2016a) identified the most frequent 2,000-word families as the high-frequency boundary, Schmitt and Schmitt (2014, as cited in Vilkaitė-Lozdienė & Schmitt, 2020) proposed 3,000, while Dang and Webb (2020) suggested as few as 1,000-word families.

These differences reflect contrasting interpretations of the necessary lexical coverage and the practical constraints of classroom learning. Higher cut-offs (2,000-3,000 families) are aimed at supporting the 95-98% coverage required for comfortable reading, whereas lower thresholds (around 1,000 families) are justified on pedagogical grounds: diminishing returns in coverage after the first 1,000 families and the difficulty many learners face in acquiring very large vocabulary sets (Dang & Webb, 2020). A number of widely used high-frequency word lists fall within the 2,000-3,000 range, including West's General Service List (1953, as cited in Nation, 2022b), Nation's BNC/COCA lists (Nation, 2016a), and Browne's New General Service List (2014). Beyond these boundaries, words are typically classified as mid- or low-frequency, although the notion of mid-frequency vocabulary remains inconsistently defined and under-researched (Vilkaitė-Lozdienė & Schmitt, 2020).

While any numerical boundary between frequency levels is necessarily arbitrary, the

distinction between high- and low-frequency vocabulary remains pedagogically meaningful. High-frequency words account for a disproportionate share of running words in texts (Zipf's law) and thus represent a relatively small set of items that can yield substantial gains in coverage and communicative function (Nation, 2022b; Schmitt & Schmitt, 2020). Low-frequency words, in contrast, make up a large group but each appears only infrequently, and are therefore less likely to be encountered incidentally. These distributional properties underpin most arguments for prioritizing high-frequency vocabulary in instruction while recognizing that different frequency levels may require different instructional approaches.

2.3. Lexical Frequency in Incidental and Explicit Learning

Much of what is known about frequency effects in vocabulary learning comes from incidental learning research, where words are acquired through repeated encounters in reading or listening. In such conditions, frequency largely reflects contextual exposure, and repeated encounters often lead to gradual, measurable improvements in receptive knowledge. A substantial body of research confirms this pattern: repeated exposure strengthens recognition and meaning identification, with recall typically developing only after extensive repetition (Webb, 2007a; Pellicer-Sánchez, 2016; Bisson et al., 2014; Uchihara et al., 2018). Gains under these conditions therefore reflect the cumulative impact of exposure rather than the effects of deliberate attention or retrieval.

In contrast, in explicit learning contexts, where attention is directed and retrieval is required, the relationship between frequency and learning is less straightforward and less consistent. Many studies in this area have operationalized frequency not as a lexical property but as the number of retrievals or exposures within a task, that is, as frequency of occurrence. These studies generally show that increased opportunities for retrieval enhance learning outcomes, particularly for recall-based measures (Nakata, 2016; Peters, 2014a), although some have reported weaker or short-term effects (Schuetze, 2015) or even non-significant relationships (Webb & Chang, 2015; Wang et al., 2025). While these findings clarify how repetition supports retention, they shed little light on whether lexical frequency itself continues to influence learning once exposure is held constant.

A similar emphasis on repetition rather than lexical frequency is evident in research on explicit post-input instruction, where learners engage in word-focused activities after reading or listening. Numerous studies have shown that adding short, explicit tasks following input enhances vocabulary gains compared with reading or listening alone (Peters, 2019b; Nguyen & Boers, 2019). These findings align with earlier work on contextual support, which suggests that vocabulary learning benefits not only from richer input but also from subsequent focus on form and meaning. Webb (2008b) found that more informative contexts, sentences rich in semantic cues, yielded stronger vocabulary gains than less informative ones, while Hughes (2019) showed that embedding word pairs in reading passages as pre-reading tasks led to more successful recall than purely isolated formats. Even meaning-given word lists, when combined with minimal contextualization, have been shown to produce learning gains comparable to more context-rich approaches (Mondria, 2003; Nation, 2016a; Webb, 2007a).

Together, these studies indicate that frequency, contextual support, and explicit attention all contribute to vocabulary learning. However, they also reveal an important limitation: explicit attention and repetition are often confounded with lexical frequency. When high-frequency words receive more encounters and more focused practice than low-frequency words, it becomes difficult to determine whether the observed gains are driven by frequency as a property of the words or by the number of exposures and retrievals they receive.

Only a limited number of studies have investigated lexical frequency within explicit post-reading conditions. Sonbul and Schmitt (2010), and Sonbul and Macis (2021) examined vocabulary learning through the Read-Plus paradigm, comparing incidental reading with reading followed by explicit focus on target words. In both studies, explicit attention after reading produced larger learning gains, particularly for recall, and high-frequency words were generally easier to learn than low-frequency ones. Explicit retrieval also benefited low-frequency items most, suggesting that attention after input can partly offset the disadvantages associated with low lexical frequency. However, lexical frequency was not systematically manipulated as an independent variable, and exposure was not controlled across frequency levels. It therefore remains unclear whether explicit attention can independently modify the frequency advantage when exposure is held constant.

2.4. Lexical Frequency and Dimensions of Lexical Knowledge

Lexical frequency does not influence all dimensions of vocabulary knowledge equally. While high-frequency words are generally recognized, recalled, and retained more successfully than low-frequency ones, the size of this advantage depends on the cognitive demands of the task. Recognition-based measures show the clearest frequency effects: frequent words are recognized and processed faster because they have stronger mental representations (Brysbaert et al., 2018). Large-scale lexical decision studies across several languages have confirmed that frequent words are processed more efficiently than infrequent ones due to their entrenched memory traces (Brysbaert et al., 2018). In second-language learning, this can translate into a processing advantage: frequent words become familiar with fewer encounters, while infrequent words require more repetition to reach comparable levels of familiarity (Conklin, 2020).

When knowledge is assessed through recall-oriented measures, the frequency advantage becomes less consistent. Recall tasks such as translation or form completion require learners to retrieve lexical information without external cues, engaging deeper processing than recognition. High-frequency words are still recalled more accurately, but the gap between high- and low-frequency items narrows, suggesting that recall depends as much on retrieval effort as on lexical familiarity (Webb, 2007a; Webb & Nation, 2017). Similar trends have been reported in explicit post-reading studies: both frequency levels benefit from retrieval, but high-frequency words tend to show greater stability over time (Sonbul & Schmitt, 2010; Sonbul & Macis, 2021). This evidence supports the view that lexical frequency exerts its strongest influence on receptive knowledge, while productive or recall-based knowledge depends more heavily on intentional retrieval and repetition.

The durability of these effects also remains uncertain. Although short-term advantages for high-frequency words are well documented, fewer studies have examined whether these differences persist when exposure and retrieval are controlled. Longitudinal work suggests that low-frequency items are more vulnerable to attrition than high-frequency ones (Webb, 2007a; Chang & Hu, 2018), as their weaker lexical representations make them harder to retain over time. At the same time, studies incorporating spaced or repeated retrieval indicate that such disadvantages can be mitigated through deliberate recycling and recall practice (Nakata, 2016). These mixed findings point to the need to investigate how lexical frequency interacts with explicit attention and controlled exposure across different dimensions of lexical knowledge and over time, a gap that the present study directly addresses.

2.5. Gaps in the Literature

Taken together, previous research indicates that lexical frequency is a powerful

predictor of vocabulary learning, particularly for receptive aspects of word knowledge such as recognition and meaning identification. However, several issues remain unresolved and align with the concerns outlined in the introduction. First, lexical frequency has rarely been isolated from exposure and retrieval effects, making it difficult to determine whether frequency independently influences learning outcomes when the number of instructional encounters is held constant. Second, explicit learning studies have seldom manipulated lexical frequency as an independent variable under controlled exposure, especially in post-reading contexts where learners receive the same instructional treatment. Third, the distribution of frequency effects across different dimensions of lexical knowledge, and the durability of these effects over time, remains underexplored.

The present study addresses these gaps by systematically comparing high- and low-frequency words under identical post-reading conditions and examining learning outcomes across form recall, meaning recall, and meaning recognition at both immediate and delayed testing points. In doing so, it extends previous post-input instruction research by treating lexical frequency as a key variable to be analyzed rather than simply as a background feature of the target words.

2.6. Conceptual Framework

This study adopts the "Read-Plus" framework (Sonbul & Schmitt, 2010) as its primary theoretical foundation. The framework conceptualizes explicit post-reading instruction as an extension of meaning-focused input, in which an initial reading phase provides incidental lexical encounters and a subsequent "plus" stage consolidates learning through explicit retrieval and form-focused practice. The model assumes that vocabulary learning is most effective when incidental exposure is immediately reinforced by intentional processing that strengthens memory traces and promotes deeper lexical integration.

However, the current study extends their model in two important ways. First, it isolates word frequency as the key variable, allowing for a controlled comparison of how high- and low-frequency words respond to the same instructional treatment. Finally, it uses corpus-based tools (AntWordProfiler and the New General Service List) to categorize frequency bands, therefore enhancing the objectivity and replicability of target word selection.

This design makes it possible to examine how word-level frequency affects learning when instructional conditions are held constant and across three dimensions of lexical knowledge – form recall, meaning recall, and meaning recognition – at both immediate and delayed testing points. In doing so, the study shifts the "Read-Plus" framework from an instructional comparison (explicit vs. implicit learning) to a controlled design for analyzing how lexical frequency interacts with explicit attention to shape vocabulary learning outcomes.

3. Methods

3.1. Participants and Setting

The study was conducted at a private university in Ho Chi Minh City, Vietnam, where English is a compulsory subject for all first-year students. Participants were 40 freshmen enrolled in two pre-existing English classes that used the *Life A1-A2* coursebook (Hughes et al., 2016) as part of a three-hour-per-week, pre-intermediate, skill-integrated General English course taught by the same instructor. The learning environment reflected typical Vietnamese EFL tertiary conditions: a textbook-based and input-limited setting in which classroom instruction serves as the primary source of English exposure. Such conditions make this context particularly relevant to research on frequency-based explicit vocabulary instruction, as learners

have few opportunities for incidental lexical exposure outside the classroom, and word selection therefore plays an important role in their vocabulary development.

All participants were native speakers of Vietnamese, aged 20-23, and had received formal English instruction since an average starting age of 9.13 (Min = 8, Max = 12, SD = 1.19). The two intact classes were assigned to one of the two instructional conditions:

- *High-frequency condition (n = 18):* students learned target words selected from the first 1,000 bands of the new-GSL.

- *Low-frequency condition (n = 22):* students learned words drawn from beyond the 3,000-word band of the same list.

Their receptive vocabulary knowledge was assessed using the 2,000-word level of the updated Vocabulary Levels Test (Webb et al., 2017). Their average score was 15.67 (SD = 6.14), indicating limited vocabulary knowledge with considerable variation. An analysis of variance (ANOVA) confirmed that the two groups did not differ significantly in either their receptive vocabulary knowledge, $F(1, 38) = 0.015$, $p = .904$, or the age at which they began learning English, $F(1, 38) = 0.035$, $p = .852$, suggesting that both groups were comparable in proficiency before instruction.

3.2. Design of the Study

Participants received explicit word-list instruction following reading activities, but differed in the frequency level of the target words: one group focused on high-frequency words, and the other on low-frequency words.

This quasi-experimental study investigated how word frequency levels influence vocabulary gains under a fixed instructional condition - explicit post-reading word-list instruction. The design followed a pre-test/post-test/delayed-post-test format with three testing points:

- a pre-test administered one week before instruction,

- an immediate post-test administered directly after instruction, and

- a delayed post-test administered one week later without prior notice.

The two intact classes were assigned to two instructional conditions that differed only in the frequency level of the target words. The high-frequency group received instruction on items within the first 1,000 bands of the new-GSL, whereas the low-frequency group learned items drawn from beyond the 3,000-word band. Apart from this difference in target vocabulary, all other aspects of the procedure, including the reading passage, instructional sequence, teacher, timing, and testing format, were held constant across groups to isolate the effect of frequency level.

The procedure consisted of three stages. First, all participants completed a pre-test assessing prior knowledge of their respective target words. One week later, both groups took part in the same 10-minute silent reading of the shared passage, followed by identical comprehension-checking questions. This was immediately followed by explicit word-list instruction following the Read-Plus procedure (Sonbul & Schmitt, 2010), in which each target word was presented with its part of speech, a brief English definition, a Vietnamese translation, and a contextualized example. Immediately after instruction, participants completed the immediate post-test measuring form recall, meaning recall, and meaning recognition. Finally, a delayed post-test was administered one week later to assess retention.

3.3. Target Words and Materials

The reading passage *Looking for the New Earth* (Hughes et al., 2016, pp. 146-147) was

selected from *Life A1-A2*, the coursebook used in the participants' EGP class. The text matched the learners' pre-intermediate proficiency and aligned with the classroom curriculum. Using the New General Service List (New-GSL; Browne, 2014) and AntWordProfiler, 20 candidate words were first identified and categorized into high- and low-frequency bands. The New-GSL was selected for three main reasons. First, its strong focus on written language (Schmitt & Schmitt, 2020) makes it particularly suited to the post-reading instructional condition of this study. Second, it provides 92% coverage of common input (Browne, 2014), and studying high-frequency words intentionally. Third, its modern, corpus-based core of general English vocabulary offers a suitable foundation for learners who need to rebuild their basic lexical knowledge (Nation, 2016a). This was especially relevant given the participants' limited mastery at the 2,000-word level, which pointed to the need to reinforce core lexical knowledge.

From this pool, 13 words per group were retained after matching for part of speech, word length, and morphological simplicity to ensure comparability and control over cognitive load. This number represented a realistic instructional load – one minute per item within a 45-minute class session, which helped maintain balanced exposure and ensure that the procedure reflected authentic classroom conditions.

3.4. Instruments

Three vocabulary tests were used to measure different aspects of vocabulary knowledge: form recall, meaning recall, and meaning recognition. All tests contained 13 items corresponding to each group's assigned target words.

The complete test materials (Appendices A and B) are accessible via the QR code provided at the end of the manuscript.

Pre-test

The pre-test assessed learners' prior knowledge of the target words. It consisted of 13 Vietnamese cues and four English options per item (one correct answer and three distractors drawn from other frequency bands). Participants selected the correct English equivalent of each cue. No penalties were applied for incorrect responses.

Immediate post-test

The immediate post-test included three sections measuring:

- *Form recall:* fill-in-the-blank items requiring correct spelling of the target word;

- *Meaning recall:* English production from Vietnamese cues; and

- *Meaning recognition:* multiple-choice items with one correct answer, distractors, and an "I don't know" option.

Delayed post-test

The delayed post-test had the same structure and scoring scheme as the immediate post-test and was administered one week later to measure retention.

Scoring

The same scoring procedures were applied across all post-testing phases. The scoring criteria are as follows:

- *Form recall (spelling test):* 1 point for a fully correct spelling; 0.5 points for minor spelling errors (one vowel/consonant missing or misplaced); 0 points for incorrect answers.

- *Meaning recall (translation/definition test):* 1 point for fully correct answers; 0.5 points for partially correct answers; 0 points for incorrect answers.

- *Meaning recognition (multiple-choice test):* 1 point for a correct answer; 0 points for "I don't know" or no answer; -0.33 points for incorrect responses.

The one-third (-0.33) deduction was adopted following Sonbul and Schmitt (2010), who used the same adjustment to account for guessing in multiple-choice recognition tests. Because each item in the present study had four options (one correct answer and three distractors), a learner had a 25% chance of guessing correctly. Applying a -0.33 penalty offsets this advantage by balancing the expected value of an incorrect guess, thus discouraging random guessing without imposing an overly harsh penalty.

3.5. Procedures

The procedure consisted of three stages.

Stage 1: Pre-test

Participants completed the pre-test one week before instruction to assess any prior knowledge of their assigned target words and to establish a baseline for later comparison.

Stage 2: Intervention

One week later, both groups participated in a 10-minute silent reading of the shared passage "Looking for the New Earth", followed by a brief 3-minute comprehension check. Immediately afterward, they received a single 45-minute explicit instructional session. Following the Read-Plus procedure (Sonbul & Schmitt, 2010), each of the 13 target words was presented with its part of speech, a brief English definition, a Vietnamese translation, and a contextualized example, with no explanation exceeding one minute. No further recycling or review activities were provided after this session, and all instruction was delivered by the same instructor to maintain consistency.

Stage 3: Post-tests

Immediately after the instructional session, participants completed the immediate post-test measuring form recall, meaning recall, and meaning recognition. A delayed post-test was administered one week later without prior notice to assess retention.

3.6. Data Analysis

Data were first summarized using descriptive statistics (means, standard deviations, and percentage scores) for each group, test type, and testing phase. To address RQ1, a repeated-measures ANOVA was conducted on meaning-recognition scores across the three testing phases (pre-test, immediate post-test, delayed post-test) to examine the overall effect of time, while developments in form recall and meaning recall were examined descriptively and through paired-samples effect sizes. To address RQ2, separate one-way ANOVAs were run for each vocabulary knowledge dimension at the immediate and delayed post-tests to compare the performance of the high-frequency and low-frequency groups. Partial eta squared (ηp^2) and paired-samples Cohen's *d* were calculated to indicate the magnitude of observed effects.

4. Findings and Discussion

4.1. Findings

4.1.1. Vocabulary Gains Within High- and Low-Frequency Groups

RQ1: To what extent does each frequency group show gains in form recall, meaning recall, and meaning recognition following explicit post-reading instruction?

Preliminary checks confirmed that the two groups were comparable before instruction

in both receptive vocabulary knowledge at the 2,000-word level ($F(1, 38) = 0.015$, $p = .904$) and in their pre-test scores across all three vocabulary measures (all $ps > .05$). A repeated-measures ANOVA on meaning-recognition scores confirmed a significant effect of time, $F(2, 78) = 6.63$, $p = .002$, $\eta p^2 = .15$, indicating substantial gains from the pre-test to the immediate post-test and partial retention at the delayed post-test. Since RQ1 aimed to describe within-group development rather than to test each knowledge dimension separately, inferential analysis was limited to meaning-recognition scores to establish the overall effect of time.

Vocabulary gains within the high frequency group. The high-frequency group performed strongly across all dimensions of vocabulary knowledge. Among the three dimensions, form recall emerged as the strongest, with learners maintaining nearly complete accuracy (97.85%) after one week. Meaning recall also remained high at 86.54%, suggesting that knowledge of word meaning was well consolidated. Meaning recognition, however, yielded the lowest scores overall, reflecting its relatively limited response to instruction.

Table 1

Vocabulary Gains for the High-Frequency Group at Both Testing Points

Test Type	Immediate post-test			Delayed post-test		
	M*	SD	%	M*	SD	%
Form Recall	11.83	0.93	91.00%	12.72	0.38	97.85
Meaning Recall	10.72	3.54	82.46%	11.25	3.31	86.54
Meaning Recognition	6.96	4.4	53.54%	8.87	2.60	68.23

** Maximum score = 13*

These results indicate that explicit post-reading instruction generated strong and stable gains for high-frequency items, particularly in recall-based knowledge. Performance continued to develop over time, with learners showing a substantial additional gain in form recall (paired-samples $d \approx 0.97$), a modest gain in meaning recall ($d \approx 0.19$), and a moderate gain in meaning recognition ($d \approx 0.51$) from the immediate to the delayed post-test.

Vocabulary gains within the low-frequency group. The low-frequency group showed moderate gains across all three dimensions of vocabulary knowledge, with little variation between the immediate and delayed post-tests. Among the three dimensions, form recall yielded the highest gains, rising slightly to 83.15% after one week. Meaning recall followed closely, increasing to 76.15%, suggesting modest consolidation of word meaning. Meaning recognition showed the lowest performance overall, remaining nearly unchanged and declining slightly to 65.92%, indicating that this aspect of knowledge was least responsive to instruction.

Table 2

Vocabulary Gains for the Low-Frequency Group at Both Testing Points

Test Type	Immediate post-test			Delayed post-test		
	M*	SD	%	M*	SD	%
Form Recall	10.70	1.70	82.31	10.81	1.41	83.15
Meaning Recall	9.75	2.62	75.00	9.90	2.05	76.15
Meaning Recognition	8.66	3.55	66.62	8.57	3.43	65.92

** Maximum score = 13*

Overall, the low-frequency group demonstrated moderate gains, with limited consolidation over time, especially for recognition-based knowledge. For the low-frequency group, changes from the immediate to the delayed post-test were negligible, with very small

effect sizes for form recall (paired-samples $d \approx 0.06$), meaning recall ($d \approx 0.07$), and meaning recognition ($d \approx 0.09$).

4.1.2. Comparing Vocabulary Gains Across Frequency Levels

RQ2: To what extent do vocabulary gains differ between the high-frequency and low-frequency groups across form recall, meaning recall, and meaning recognition?

Across all three dimensions, the high-frequency group consistently outperformed the low-frequency group at both testing points. The largest frequency effects appeared in form recall and meaning recall, while meaning recognition showed minimal differences between groups. This overall pattern indicates that frequency level exerted a stronger influence on recall-based knowledge than on recognition-based knowledge.

At both testing points, form recall was the type of knowledge best learned in both frequency groups, followed by meaning recall. In all cases, meaning recognition consistently yielded the lowest gains. This pattern is markedly different from the general task difficulty hierarchy proposed by Laufer et al. (2004) (as cited in Nation, 2022b), which ranked meaning recognition as the easiest and form recall as the most difficult. The two rankings can be summarized as follows (Table 3):

Table 3

Difficulty Rankings of Vocabulary Knowledge Types Between Laufer Et Al. (2004) and the Current Study

Study	Difficulty Ranking
Laufer et. al (2004)	*Meaning recognition = Form recognition < meaning recall < form recall
Current study	*Form recall < Meaning recall < Meaning recognition

*< *means less difficult than*

*= *means equal in difficulty to*

Group comparisons by knowledge types. While both groups followed the same difficulty ranking, the extent of learning gains differed sharply, especially in the two recall-based dimensions.

Form recall: Form recall showed the clearest distinction between the two groups. The high-frequency group demonstrated both higher accuracy and stronger short-term retention, with statistically significant differences at both test points: $F(1, 38) = 9.89$, $p = .003$ (immediate) and $F(1, 38) = 81.45$, $p < .001$ (delayed).

Meaning recall: A similar, though weaker, pattern was found in meaning recall**,** where the frequency gap widened at the delayed post-test ($F(1, 39) = 8.38$, $p = .006$), showing clearer long-term advantages for high-frequency words.

Meaning recognition: No significant differences emerged between groups ($F(1, 38) = 1.26$, $p = .27$), suggesting that recognition-based knowledge was less sensitive to frequency when exposure was identical.

4.2. Discussion

4.2.1. Recall and Recognition Under Explicit Learning

The present findings show that lexical frequency functions differently when learning occurs under explicit rather than incidental conditions. Whereas previous incidental studies (Bisson et al., 2014; Pellicer-Sánchez, 2016; Webb, 2007a) found that repeated encounters tend

to enhance recognition before recall, the current data reveal the opposite hierarchy. Across both frequency groups, form recall was the most successfully acquired dimension, followed by meaning recall, while meaning recognition consistently yielded the lowest scores.

This reversal can be understood within retrieval-based approaches to vocabulary learning. Under explicit attention, learners must deliberately establish form-meaning mappings, which prioritizes active retrieval rather than passive recognition. Retrieval-based frameworks emphasize that recalling lexical information strengthens memory traces more effectively than repeated exposure (Peters, 2019b). Thus, the strong performance on recall tasks likely reflects the deeper processing triggered by explicit instruction, in contrast with the shallow processing typical of recognition-dominated incidental learning. These results challenge the common assumption that receptive knowledge is inherently easier to acquire than productive knowledge (Sonbul & Schmitt, 2010), showing that under explicit attention, recall processes may develop more rapidly than recognition.

The relatively weak gains in meaning recognition also align with studies suggesting that receptive knowledge develops more slowly and is less responsive to explicit instruction (van Zeeland & Schmitt, 2013). This pattern reinforces recent concerns (Sevigny et al., 2024) that recognition tasks may overestimate learners' command of high-frequency vocabulary, as they do not require the deeper retrieval processes essential for stable lexical knowledge. The dominance of recall-based performance observed here also reflects the lexical processing demands of reading, where learners must retrieve meaning from memory without external cues. The findings thus indicate that explicit post-reading instruction not only reinforces form-meaning connections but also strengthens the type of lexical access required for comprehension.

4.2.2. Frequency Effects Under Explicit Instruction

Comparisons across the two frequency groups show that high-frequency items benefited more strongly from explicit post-reading instruction than low-frequency ones, particularly in recall-based measures. The high-frequency group achieved near-ceiling performance in form recall and maintained high accuracy in meaning recall after one week, indicating rapid consolidation. These outcomes suggest that high-frequency words, already partially represented in memory, respond quickly to explicit focus by strengthening existing lexical representations. The strong retention of high-frequency items after a single instructional cycle also suggests that minimal explicit exposure may be sufficient to stabilize their form-meaning links. This is consistent with Conklin's (2020) observation that additional exposures to common words yield diminishing returns because such words require fewer retrievals for durable learning.

In contrast, low-frequency items showed more modest gains, with limited improvement in meaning recall and slight decline in meaning recognition after a week. The limited gains across all dimensions in the low-frequency group suggest that a single retrieval opportunity, even when explicit, may not be sufficient to support durable learning. This highlights how low-frequency words are particularly prone to attrition over time, even for receptive knowledge, which is generally regarded as stable (Schmitt & Schmitt, 2020). Such items may therefore require repeated retrievals to ensure long-term retention (Conklin, 2020).

Frequency effects in this study were also selective: the largest differences emerged in form recall and meaning recall, whereas meaning recognition showed no significant between-group difference. This pattern indicates that frequency plays a stronger role when tasks require deeper processing and retrieval, and that recognition tasks may be less sensitive to frequency when exposure is controlled. The stronger gains in the high-frequency group likely reflect the

greater accessibility of high-frequency items, whose robust lexical representations and semantic associations may reduce the cognitive load during form-meaning integration. By contrast, low-frequency items lack these supportive features, making them less responsive to single-session explicit instruction. This reduced responsiveness also helps explain why the frequency effect was minimal for meaning recognition, which relies less on deep form-meaning integration and more on task format. In this respect, the finding reinforces claims that task format (recall vs. recognition), rather than knowledge type alone, can shape performance outcomes (Brysbaert et al., 2018; Nation, 2022b).

The strength of the frequency effect may also reflect the participants' limited vocabulary size. Preston (1935, as cited in Brysbaert et al., 2018) proposed that second language learners with a smaller vocabulary tend to exhibit stronger frequency effects than those with a large vocabulary. Given that the participants in this study were pre-intermediate EFL learners with limited vocabulary knowledge, the larger gains in the high-frequency group may be partly attributed to their lexical constraints.

5. Pedagogical Implications

Based on these findings, the pedagogical implications are organized around three key considerations: (1) who benefits most from frequency-based instruction, (2) what vocabulary should be taught explicitly, and (3) how it should be effectively delivered.

5.1. Who Benefits Most From Frequency-Based Vocabulary Instruction?

5.1.1. Teachers

The study has demonstrated the importance of frequency awareness in vocabulary teaching. For teachers, this means that they should clearly distinguish between high- and low-frequency words and prioritize their instructional time accordingly: high-frequency words deserve focused, initial explicit instruction, while low-frequency words are better reinforced later through varied, repeated exposure. To support this process, tools such as lexical profilers can help teachers direct learners' attention to words in a text that are more aligned with their current vocabulary level.

5.1.2. Learners

The study also makes clear that not all learners benefit equally from frequency-based instruction. The sharper gains observed among pre-intermediate EFL learners in the high-frequency group support two important insights: (1) high-frequency vocabulary is especially beneficial for lower-proficiency learners, and (2) such vocabulary is strongly associated with early learning gains and should therefore be prioritized in the initial stages of learning (Nation, 2016a).

5.2. What to Teach Explicitly and What to Leave to Incidental Learning?

The clear processing advantages shown by the high-frequency group also support the view that high-frequency vocabulary should be taught explicitly (Nation, 2001, as cited in Vilkaite-Lozdiene & Schmitt, 2020). While such words are likely to occur repeatedly in natural language settings, this is not always the case in "input-poor" contexts like the EFL classroom (Gu, 2020, p. 274), where learners' main source of input is the teacher and the textbook (Milton, 2007, as cited in Peters, 2019b). In these settings, simply leaving high-frequency vocabulary to incidental learning may not be sufficient for these important words to be thoroughly consolidated by learners.

In contrast, the lower gains found in explicit teaching of low-frequency words suggest

that these items are better addressed through incidental learning. As Nation (2022b) recommends, low-frequency words should be taught only when they are crucial for understanding the text or when they belong to a relevant technical vocabulary. Otherwise, learners may benefit more from strategies such as guessing from context, quick definitions, or not addressing the word at all. The caveat, however, based on the slight attrition observed in meaning recognition, is that incidental learning of low-frequency words will only be effective if learners encounter these words repeatedly across varied exposures.

5.3. How to Teach Frequency-Based Vocabulary More Effectively?

Given the clear differences in learning gains across frequency levels, it is reasonable to approach each group of words differently in the language classroom. In the high-frequency group, recall-based knowledge responded most strongly to instruction, with form recall showing the highest retention. This suggests that meaning-focused instruction should not be overlooked in frequency-based teaching. As Nation (2022b) emphasizes in his four-strand model, deliberate learning and meaning-focused input should be balanced with fluency development and incidental exposure.

More importantly, this study supports the use of a complementary approach: high-frequency vocabulary is best acquired through a blend of incidental reading, where learners first encounter target words in context, and explicit post-reading tasks, which essentially reinforce recall and strengthen understanding.

6. Conclusion

All vocabulary learning should start with input (Barcroft, 2015), and this study highlights that not all input is equally effective. High-frequency input, particularly when meaning-focused and explicitly reinforced, can lead to considerable learning gains, even after a single 45-minute instructional session. This suggests that learners do not simply need more input, but the right kind of input: frequent and contextually supported. In contrast, the limited gains and slight attrition observed for low-frequency words indicate that these items may require multiple instructional encounters to achieve comparable levels of retention.

One key limitation is the brevity of the intervention: the learners completed only one session of explicit instruction following a 10-minute reading phase, with only a single opportunity for retrieval. This restricted the amount of consolidation possible, particularly for low-frequency items. Future research should extend the duration of instruction and incorporate multiple retrieval opportunities to examine whether stronger and more durable gains can be achieved.

Moreover, while the results point to observable gains in short-term retention, particularly for high-frequency words in form and meaning recall, this retention rate is limited by the study's focus on the form-meaning link. A more comprehensive design should look at productive knowledge, and long-term retention to provide a fuller account of learners' lexical development across these frequency levels.

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APPENDICES

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