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Probing into the Effectiveness of Lexical Cohesive Ties in Reading Comprehension of Iranian High School Students

ABSTRACT

The present study aimed to investigate the effectiveness of lexical cohesive ties in the reading comprehension of Iranian high school students. Using a quantitative, descriptive-correlational, two-stage research design, the first stage examined the Vision series textbooks to identify and quantify lexical cohesive ties (e.g., repetition, synonymy, hyponymy, and collocation) based on Tanskanen's (2006) framework. In the second stage, the relationship between lexical cohesion and students' reading comprehension was analyzed. The findings revealed a positive relationship between the density and organization of lexical cohesive ties and reading comprehension. Among the textbooks analyzed, Vision 2 demonstrated the most effective cohesive structure, suggesting that an appropriate density of lexical cohesive ties, combined with activity-related cohesive devices, facilitates reading comprehension among intermediate-level learners. These findings highlight the importance of systematically incorporating lexical cohesive ties into EFL textbook design and provide practical implications for curriculum developers, textbook writers, and English language teachers. Future research is recommended to investigate the effects of lexical cohesion across different educational contexts using longitudinal or experimental research designs.

Keywords: Lexical Cohesion, Coherent Links, EFL, Lexical Coherence, Reading Comprehension

Introduction

Reading comprehension is one of the central competencies in second and foreign language learning because it enables learners to move beyond the recognition of isolated linguistic forms toward the construction of meaningful representations of written discourse. Reading is not simply a process of decoding words or identifying grammatical structures; rather, it requires readers to establish relationships among words, clauses, sentences, and larger units of discourse while integrating textual information with their existing linguistic and conceptual knowledge. Contemporary research has consequently treated reading

as a multidimensional process involving cognitive, linguistic, strategic, affective, and instructional factors. Studies of reading achievement increasingly indicate that successful comprehension depends on the interaction between characteristics of the reader and characteristics of the text, including the ways in which information is linguistically organized and semantically connected. For example, recent research has examined the contribution of learning strategies to the relationship between reading and academic achievement, emphasizing that comprehension outcomes are partly shaped by how learners actively process written information (1). Likewise, self-regulated learning strategies have been associated with reading comprehension across first- and second-language contexts, demonstrating the importance of strategic cognitive engagement when learners encounter written texts (2).

The complexity of reading comprehension becomes particularly salient in English as a foreign language (EFL) contexts, where learners are required to process a language to which they may have comparatively limited exposure outside formal instruction. EFL readers must recognize vocabulary, interpret grammatical relations, establish semantic associations, draw inferences, activate background knowledge, and integrate information across successive parts of a text. When one or more of these processes is inefficient, comprehension may become fragmented. The difficulty is potentially greater among school-age learners who are simultaneously developing linguistic proficiency and academic reading skills. Research on reading instruction has therefore emphasized the importance of purposeful teaching practices and teachers' awareness of the processes underlying reading development (3). More recent studies similarly demonstrate that instructional support and learner engagement are relevant to reading performance, with teacher support functioning alongside cognitive and emotional engagement in shaping students' reading outcomes (4). Thus, reading achievement cannot be understood solely in terms of individual vocabulary knowledge or grammatical proficiency; the instructional environment and textual resources through which learners encounter the target language are equally important.

From a cognitive perspective, comprehension requires the reader to establish connections among pieces of information distributed throughout a text. Language learning itself may be understood as sensitivity to recurring patterns and associations in linguistic input, with distributed-processing perspectives emphasizing the gradual formation of interconnected representations through experience with language (5). In reading, such interconnected representations are especially important because meaning does not reside exclusively in individual words. Instead, readers construct meaning by recognizing how lexical items relate to one another and how these relations contribute to the continuity of discourse. This implies that the comprehensibility of a text is influenced not only by the difficulty of individual words but also by the extent to which the text provides linguistic signals that enable readers to recognize conceptual continuity, retrieve previous information, anticipate subsequent information, and establish an integrated semantic representation.

One of the principal linguistic mechanisms through which such textual connectedness is created is cohesion. Cohesion concerns the explicit linguistic relations that connect different components of discourse and allow a sequence of sentences to be interpreted as a unified text rather than as unrelated propositions. Research applying cohesion frameworks to authentic discourse has demonstrated the analytical importance of identifying the devices through which textual elements are connected. For instance, analysis of English newspaper discourse has shown the applicability of cohesion-based approaches for examining how linguistic relationships contribute to textual organization (6). Cohesive organization is therefore relevant not only to discourse analysis but also to language education, since learners' ability to identify relationships among textual elements may influence how efficiently they construct meaning during reading.

Within the broader concept of cohesion, lexical cohesion is particularly relevant to reading comprehension because it is established through semantic and associative relationships among lexical items. Unlike grammatical cohesion, which depends principally on grammatical devices, lexical cohesion emerges when vocabulary items establish continuity through mechanisms

such as repetition, synonymy, semantic inclusion, contrast, equivalence, specification, and collocational association. These relationships create lexical chains that allow readers to recognize that different sections of a passage refer to related concepts. Research on lexical and grammatical cohesion has shown that the identification of such markers provides a productive basis for analyzing how written discourse achieves unity (7). Similarly, investigations of lexical cohesion in academic writing have highlighted the importance of word choice and synonymy for maintaining semantic continuity across discourse (8). These observations indicate that lexical selection is not merely a matter of vocabulary variety; the relationships among selected words can influence the organization and interpretability of the entire text.

Lexical cohesion has particular pedagogical relevance because recurrent and semantically associated vocabulary can provide readers with multiple pathways for establishing relationships among ideas. Repetition, for example, can reinforce a central referent or concept, whereas synonymy and related lexical relations can maintain conceptual continuity without requiring exact repetition. Collocational relationships can activate broader semantic fields and assist readers in connecting new information with familiar conceptual structures. Corpus-based approaches to lexical cohesion have further demonstrated that recurrent lexical patterns can be systematically identified and applied to English language teaching, thereby connecting linguistic analysis with pedagogical practice (9). Research conducted specifically with Iranian EFL learners has also addressed lexical cohesion in relation to comprehension, indicating that the relationship between cohesive organization and understanding has long-standing relevance within the Iranian language-learning context (10).

The educational significance of lexical cohesion is also evident in research conducted on different forms of written discourse. Investigations of literary texts have examined lexical and grammatical cohesion and their implications for learning at the junior-high-school level, suggesting that cohesive relationships constitute pedagogically meaningful textual features rather than purely theoretical constructs (11). Similarly, lexical cohesion has been employed as an analytical framework for evaluating translations, including analyses focusing on multiple forms of lexical cohesion in translated religious discourse (12). Taken together, such studies demonstrate the adaptability of lexical-cohesion analysis across genres and contexts. Nevertheless, the educational importance of cohesive relations becomes especially pronounced in textbook reading passages because textbooks constitute planned instructional input and frequently provide the principal source of sustained English-language reading for learners in EFL school systems.

Textbooks occupy a particularly influential position in centralized educational environments because they help determine not only what language learners encounter but also the sequence, density, and complexity with which linguistic material is presented. In Iran, the English textbooks used in public schools have therefore attracted considerable scholarly attention. Evaluations of Iranian junior-high-school English textbooks have examined teachers' perceptions of newly developed instructional materials and the extent to which revised textbooks address weaknesses attributed to previous materials (13). At the secondary-school level, the Vision series represents an important component of formal English education, and researchers have investigated different dimensions of these textbooks. For example, the cultural representation incorporated into the Vision English textbook series has been systematically evaluated, highlighting the importance of examining textbook content beyond purely grammatical dimensions (14). Such work establishes textbook evaluation as an essential component of understanding the quality and pedagogical implications of English instruction in Iranian secondary education.

The effectiveness of instructional materials also depends on how textbook intentions are realized in classroom teaching. Research examining correspondence between recommendations provided in teachers' guides and the actual classroom practices of Iranian English teachers using the Vision series has drawn attention to the relationship between curricular design and instructional implementation (15). This relationship is particularly important for reading instruction. Even when teachers employ appropriate classroom strategies, the linguistic organization of the passages presented to learners may either support or

complicate comprehension. Consequently, evaluating reading materials requires attention not merely to subject matter, cultural content, or activity design but also to the internal linguistic architecture of the texts. Lexical cohesive ties represent one such architecture because they determine how vocabulary distributed throughout a passage contributes to continuity of meaning.

The quality of textual input is also relevant because reading difficulties may result from heterogeneous cognitive and linguistic profiles. Recent studies have demonstrated considerable variation in reading performance among learners with reading or learning difficulties. Research on adolescents has sought to develop criteria for identifying learners at risk for dyslexia by characterizing component reading processes, underscoring the need to recognize that reading performance reflects multiple underlying abilities (16). Research involving Arabic-speaking university students has similarly distinguished dimensions such as reading accuracy and reading rate when examining reading subtypes, illustrating the heterogeneity that can exist even among older readers (17). Moreover, a systematic review comparing cognition, reading, mathematics, and attention among students with disabilities emphasizes the interconnected yet distinguishable nature of cognitive and academic performance domains (18). These findings reinforce the need for reading materials that provide sufficient textual support without creating unnecessary processing demands.

Recent intervention research further demonstrates that reading performance can respond to changes in instructional and learning environments. Brain-based teaching principles have been investigated in relation to EFL reading comprehension, reflecting continuing interest in instructional approaches designed to facilitate cognitive processing during reading (19). Flipped approaches to EFL reading comprehension have likewise been examined in terms of both learning achievement and students' perceptions, illustrating the increasing diversification of instructional models used to support reading development (20). Other research has investigated reading performance among children with learning disabilities through parent-child play-based intervention, showing that reading development may be approached through broader educational and psychosocial mechanisms rather than through conventional language exercises alone (21). Collectively, these studies demonstrate that reading comprehension is malleable and sensitive to characteristics of instruction, engagement, and learning support.

At the same time, improvements in reading ability do not depend exclusively on innovative instructional models. Fundamental pedagogical practices surrounding text engagement remain crucial. Research into teachers' strategies for developing students' reading ability in other educational contexts has emphasized the importance of structured teacher guidance in supporting accurate and meaningful engagement with written material (22). Within EFL education, corrective feedback also represents an important mechanism through which learners can become more aware of linguistic form and improve their language production. Evidence from Iranian EFL contexts indicates that corrective feedback can influence learners' writing at both micro- and macro-levels, demonstrating the pedagogical value of explicit attention to linguistic organization (23). Although writing and reading constitute distinct language skills, both require learners to recognize how lexical and structural elements operate across units larger than the individual sentence. Accordingly, a stronger understanding of cohesive organization may have implications for receptive as well as productive language development.

Despite the growing literature on reading strategies, instructional support, learner engagement, learning disabilities, textbook evaluation, and innovative teaching approaches, comparatively less attention has been devoted to the systematic distribution of lexical cohesive ties within the reading passages that constitute routine instructional input for Iranian high-school students. This is a consequential gap because lexical cohesion may function as a bridge between the linguistic properties of a textbook and the cognitive processes involved in comprehension. A passage containing insufficient semantic connectivity may require readers to infer relationships with relatively little textual assistance, whereas excessive or poorly organized repetition may limit lexical richness without necessarily improving comprehension. Effective cohesion is therefore likely to involve not simply the

presence of cohesive devices but an appropriate pattern and density of lexical relationships suited to learners' proficiency and the semantic demands of the text.

This distinction is especially relevant when textbooks are organized developmentally across successive grade levels. Reading passages intended for learners at different stages of proficiency should theoretically reflect changes in lexical complexity, semantic organization, and the amount of explicit support provided to readers. Simple repetition may be especially useful when learners have limited lexical resources because it maintains referential stability and reduces the need to process unfamiliar lexical alternatives. At higher levels, however, broader semantic relations, including specification, generalization, contrast, and different forms of collocation, may help learners develop more flexible lexical networks. The pedagogical issue is therefore not whether cohesive ties should be present, but how different forms of lexical cohesion are distributed and whether their density and organization correspond to learners' comprehension performance. This perspective complements research emphasizing strategic reading (2), teacher support (4), and learning strategies (1) by directing attention to the textual conditions under which those learner processes operate.

Examining the Vision series from this perspective is particularly important because the textbooks provide sequential instructional materials for Iranian secondary-school EFL education. Previous evaluations have established the value of analyzing these textbooks in relation to teacher perceptions, curricular implementation, and cultural representation (13-15), yet the internal lexical architecture of their reading passages requires further systematic investigation. Research on cohesion in discourse (6), academic writing (8), educational texts (11), corpus-informed language teaching (9), and Iranian EFL comprehension (10) provides a conceptual basis for expecting lexical relationships to matter for comprehension. An analysis that quantifies the frequency and density of different lexical cohesive ties across successive Vision textbooks and relates these textual characteristics to learners' reading performance can therefore contribute simultaneously to discourse analysis, textbook evaluation, and EFL reading pedagogy.

Accordingly, the aim of the present study was to investigate the distribution and density of lexical cohesive ties in the Vision series English textbooks and determine their relationship with the reading comprehension of Iranian high-school EFL students.

Methods and Materials

The purpose of this study is twofold. First, it attempts to find out the distribution of lexical cohesive sub-types in recently developed high school English textbooks in Iran; second, it aims to investigate their possible impact on EFL learners' reading comprehension. Therefore, a quantitative, descriptive-correlational research design with two successive phases was used. The design was non-experimental and *ex post facto*, since it observed and measured variables as they naturally occurred without any intervention or manipulation of the learning environment.

Phase One was a quantitative content analysis of the Vision series textbooks. Guided by the analytical framework of Tanskanen (2006), this phase systematically reduced text features to numbers. The main reading passages were coded to produce quantifiable measures, including frequency, density (per 100 words), and proportional distribution of various types of lexical cohesive ties, such as repetition and synonymy. The outcome was a dataset consisting only of numbers describing how well the instructional materials cohered.

The integration of the two quantitative data sets actualized the correlational aspect of the design. Statistical analyses were conducted to examine the correlations among the variables measured in each phase. Specifically, inferential statistics, such as ANOVA, were used to compare cohesion measures across proficiency levels in order to address RQ1 & RQ2. Also, correlation coefficients, such as Pearson's *r*, were calculated to explore the possible relations between the density of particular cohesive ties and reading comprehension scores in order to address RQ3. This design was suitable since it allowed the precise

measurement of textual attributes and educational outcomes, thereby permitting a statistical analysis of possible correlations between the composition of textbook passages and their intelligibility for EFL learners.

The materials of this investigation included Vision 1, Vision 2, and Vision 3, which are respectively taught to 10th, 11th and 12th grade high school students.

Collocation, the second main category, acknowledges the problematic yet crucial connections between words that typically co-occur. Tanskanen (2006) organizes these into three types:

- Ordered-Set Collocation: Includes items from recognized ordered series, such as numbers, days, months, or colors (e.g., Tuesday and Thursday; January and March).
- Activity-Related Collocation: Groups words that are commonly associated within a specific activity or scenario (e.g., cook, kitchen, recipe, oven).
- Elaborative Collocation: A broader category for associated items that do not fit the above types, defined with reference to frame theory. Here, words evoke shared knowledge structures or "frames" (e.g., classroom might evoke teacher, student, desk, whiteboard).

Tanskanen's (2006) categorization is summarized in Table.1.

Table.1. Lexical Cohesion Categories in the Model Proposed by Tanskanen (2006)

Reiteration	Collocation
1. Simple Repetition	1. Ordered-Set Collocation
2. Complex Repetition	2. Activity-Related Collocation
3. Substitution	3. Elaborative Collocation
4. Equivalence	
5. Generalization	
6. Specification	
7. Co-specification	
8. Contrast	

Findings and Results

The results section will present the numeric data used to analyze the cohesive ties found in the reading passages of Vision 1, 2, and 3. It will also present the numeric data used to analyze the cohesive ties found in each of the reading passages of Vision 1, 2, and 3. Once the numeric data has been presented, the results will be analyzed to determine the level of proficiency, comparing each level to determine if there are significant trends. Once the cohesive ties have been analyzed, the results will be used to determine the reading scores of 70 students to determine if there are significant differences.

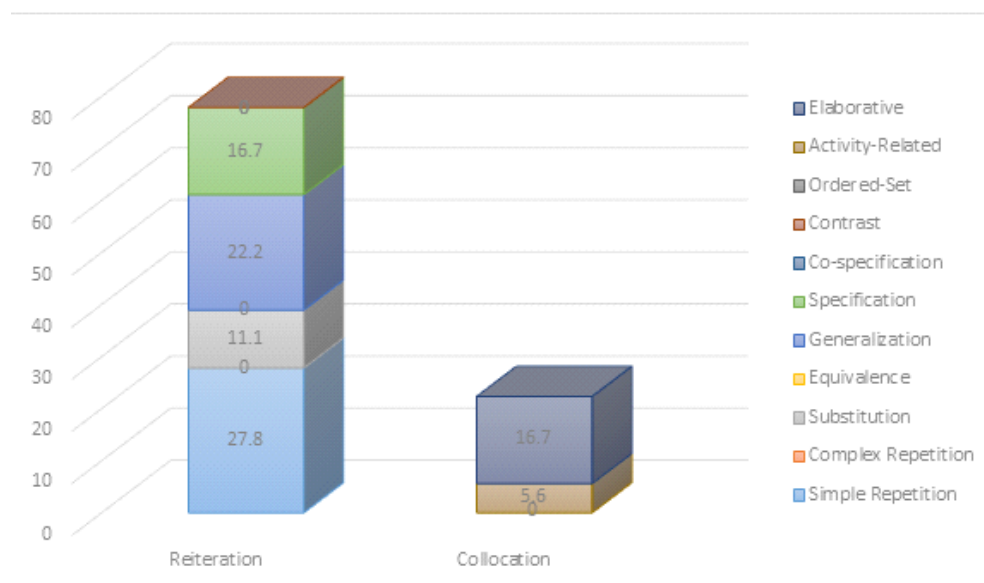


Figure 1. Cohesion Profile of Vision 1 Reading Passages

In the data collected from the four reading passages in "Vision 1," there were a total of 84 cohesive ties out of a total of 686 words. This equates to a rate of 12.2 ties per hundred words.

The most dominant type of cohesive tie is Reiteration at 89.3%. Of these ties, Simple Repetition is the most frequently occurring type at 28.6%, followed by Generalization at 14.3%, and Substitution at 13.1%.

The second most frequently occurring type of cohesive tie is Collocation at 10.7%. This includes a total of Elaborative Collocation at 10.7%; however, Activity-Related Collocation is present at a much lower rate of only 3.6%. Ordered Set Collocation is not present in the text.

The absence of Complex Repetition is notable at 0%. Additionally, Ordered Set Collocation is not present in the text. The low rate of Contrast and the lack of Activity-Related Collocation suggest that the text is written for a specific purpose. Overall, it appears that the text is written for a descriptive or narrative purpose. The high rate of repetition suggests that it is written for a beginner reader.

Tanskanen's (2006) lexical cohesion model was applied to all reading passages in each Vision book. Density (cohesive ties per 100 words) and distribution (proportional frequency of 11 subtypes: 8 reiterations, 3 collocations) were calculated.

Table 2. Comparison of Cohesion Ties (Number)

Category	Subtype	Vision 1	Vision 2	Vision 3	Series Average
REITERATION					
	Simple Repetition	5	60	63	42.7
	Complex Repetition	0	12	19	10.3
	Substitution	2	21	26	16.3
	Equivalence	0	9	8	5.7
	Generalization	4	12	5	7.0
	Specification	3	17	11	10.3
	Co-specification	0	6	3	3.0
	Contrast	0	3	6	3.0
COLLOCATION					
	Ordered-Set	0	0	3	1.0
	Activity-Related	1	20	7	9.3
	Elaborative	3	9	13	8.3
TOTAL					
		18	169	164	117.0

Table 2 deals with raw cohesive ties and shows that there are quantitative gaps between the three reading passages.

Table 3. Comparison of Cohesion Density (per 100 words)

Category	Subtype	Vision 1	Vision 2	Vision 3	Series Average
REITERATION					
	Simple Repetition	3.3	7.83	6.4	5.84
	Complex Repetition	0.0	1.57	1.9	1.16
	Substitution	1.3	2.74	2.7	2.25
	Equivalence	0.0	1.18	0.8	0.66
	Generalization	2.6	1.57	0.5	1.56
	Specification	2.0	2.22	1.1	1.77
	Co-specification	0.0	0.78	0.3	0.36
	Contrast	0.0	0.39	0.6	0.33
COLLOCATION					
	Ordered-Set	0.0	0.00	0.3	0.10
	Activity-Related	0.7	2.61	0.7	1.34
	Elaborative	2.0	1.18	1.3	1.49
TOTAL DENSITY					
		11.8	22.07	16.8	16.89

These density differences likely correspond to varying cognitive loads and support levels for readers, with Vision 2 providing the most explicit lexical guidance through frequent cohesive markers.

In order to examine the impact of these patterns of cohesion on the outcomes of teaching, this section will examine students' reading comprehension test results in relation to each textbook's patterns of cohesion. As has already been noted, there are significant differences between Vision 1, Vision 2, and Vision 3 in their use of lexical cohesion. The question here is whether these differences in text are reflected in students' comprehension of these texts. Using reading comprehension tests based on each textbook's own texts, this section will examine how these results are distributed across grade levels in order to provide a basis on which to evaluate how well each textbook's use of cohesion—ranging from simple repetition in Vision 1 through more complex frame-building in Vision 2 and Vision 3—correlates with student outcomes.

Table 4. Reading Scores for 10th-Grade Students (23 students, Vision 1)

Student ID	Lesson 1: Saving Nature (70/100)	Lesson 2: Wonders of Creation (78/100)	Lesson 3: Value of Knowledge (75/100)	Lesson 4: Traveling the World (65/100)	Individual Average
S1-V1	68	76	73	63	70.0
S2-V1	72	79	77	67	73.8
S3-V1	65	74	70	62	67.8
S4-V1	71	80	76	66	73.3
S5-V1	69	77	74	64	71.0
S6-V1	73	81	78	68	75.0
S7-V1	67	75	72	61	68.8
S8-V1	70	78	75	65	72.0
S9-V1	74	82	79	69	76.0
S10-V1	66	73	71	60	67.5
S11-V1	72	79	77	67	73.8
S12-V1	68	76	73	63	70.0
S13-V1	71	80	76	66	73.3
S14-V1	69	77	74	64	71.0
S15-V1	73	81	78	68	75.0
S16-V1	67	75	72	61	68.8
S17-V1	70	78	75	65	72.0
S18-V1	74	82	79	69	76.0
S19-V1	66	73	71	60	67.5
S20-V1	72	79	77	67	73.8
S21-V1	68	76	73	63	70.0

S22-V1	71	80	76	66	73.3
S23-V1	69	77	74	64	71.0
Class Average	70.0	78.0	75.0	65.0	71.9

Table 4 shows the individual and average comprehension scores for 23 tenth-grade students using Vision 1. A clear trend emerges when examining it by lesson: the class averages correlate very well with the predetermined lesson scores of 70, 78, 75, and 65, with only a hint of deviation (standard deviation of approximately 3.5 points). This consistency indicates that the scoring system reflects the typical class performance well. Notably, the lesson averages reflect the cohesive density we observed in each passage. “Wonders of Creation” (Lesson 2, 78.0) – with more overt repetition – was the leader of the pack, while “Traveling the World” (Lesson 4, 65.0) – with the lowest cohesive density and more descriptive listing – trailed behind. The average for the class is 71.9, which will be used as a standard for comparison with other textbooks on the market.

Discussion and Conclusion

The present study examined the distribution and density of lexical cohesive ties across the Vision 1, Vision 2, and Vision 3 English textbooks and considered how these textual features were associated with the reading comprehension performance of Iranian high-school EFL learners. The results revealed a clear developmental variation in lexical cohesion across the three textbooks rather than a uniform pattern of cohesive organization. According to the quantitative analysis, the total lexical cohesion density was 11.8 ties per 100 words in Vision 1, increased substantially to 22.07 in Vision 2, and then declined to 16.8 in Vision 3, resulting in an overall series average of 16.89 ties per 100 words. At the subtype level, simple repetition represented the most frequent cohesive mechanism across the series, with densities of 3.3, 7.83, and 6.4 per 100 words in Vision 1, Vision 2, and Vision 3, respectively. Vision 2 also showed the highest density of activity-related collocation at 2.61, compared with 0.7 in both Vision 1 and Vision 3. In contrast, more complex forms of lexical cohesion, including complex repetition and contrast, became increasingly visible in the more advanced textbook, Vision 3. These findings indicate that the Vision series does not progress through a simple linear increase in the number of cohesive ties; rather, the type, density, and complexity of cohesion appear to change according to the presumed linguistic demands of different proficiency levels.

The pattern observed in Vision 1 suggests that the lexical organization of the introductory textbook relies primarily on relatively transparent semantic connections. The manuscript reports that reiteration was the dominant form of cohesion in the Vision 1 reading passages, with simple repetition particularly prominent, whereas complex repetition and ordered-set collocation were absent or extremely limited. Such a structure is pedagogically plausible for beginning EFL learners because repeated lexical items reduce the number of new semantic relationships that readers must infer while processing a passage. Lexical repetition can maintain topic continuity, reinforce key vocabulary, and enable learners to recognize that information appearing in different sentences belongs to the same semantic chain. This interpretation is consistent with research emphasizing that lexical cohesion contributes to textual continuity through recurring and semantically related vocabulary (9). Similarly, analyses of lexical cohesion in academic discourse have demonstrated that repetition, synonymy, and related lexical relationships contribute substantially to the organization of written texts and facilitate the maintenance of semantic continuity across sentences (8). In the Iranian EFL context, earlier research has likewise addressed the relationship between lexical cohesion and comprehension, providing support for the assumption that learners’ ability to recognize lexical relationships is relevant to their understanding of written English (10).

The relatively simple cohesive profile of Vision 1 may also be explained cognitively. Beginning foreign-language readers typically allocate substantial processing resources to word recognition, lexical access, and syntactic interpretation. When key concepts are repeatedly represented through familiar or identical lexical items, fewer cognitive resources may be required to

reconstruct referential relationships across sentences. From a distributed-processing perspective, repeated exposure strengthens associations among linguistic representations and allows recurring patterns to become increasingly accessible through experience (5). Consequently, the dominance of repetition in introductory textbook passages may serve a scaffolding function: instead of requiring learners to infer complex semantic equivalence among unfamiliar vocabulary items, the text provides overt lexical continuity. This interpretation is compatible with contemporary findings indicating that reading performance reflects the interaction of several cognitive components rather than a single isolated skill (18). It is also consistent with evidence showing considerable heterogeneity in reading processes among adolescent learners and emphasizing the importance of textual and instructional demands being compatible with readers' developing abilities (16).

A particularly important result was the markedly greater cohesive density observed in Vision 2. The total cohesion density of 22.07 ties per 100 words exceeded the corresponding values for both Vision 1 and Vision 3. Vision 2 also exhibited the greatest density of simple repetition, substitution, equivalence, specification, co-specification, and especially activity-related collocation among several of the examined categories. The manuscript interprets this pattern as providing comparatively explicit lexical guidance to readers. This appears to represent a productive intermediate stage between the simpler repetitive organization of Vision 1 and the more varied and complex lexical organization found in Vision 3. At an intermediate proficiency level, learners may possess sufficient vocabulary to benefit from broader semantic associations while still requiring relatively overt lexical support. Activity-related collocations are especially relevant in this regard because words associated with the same activity or conceptual frame can jointly activate a meaningful knowledge structure. As learners encounter multiple related lexical items, comprehension may be supported not simply through repetition of individual words but through the activation of broader semantic networks.

This interpretation aligns with corpus-based accounts of lexical cohesion, which emphasize that lexical items achieve textual significance partly through recurrent patterns of association and co-occurrence (9). Studies of cohesion have similarly shown that coherent discourse is constructed through systematic lexical and grammatical relationships rather than through isolated vocabulary choices (6). Research examining lexical and grammatical cohesion in educational and literary texts further suggests that the organization of cohesive relations has direct implications for language learning because learners must recognize how vocabulary items collectively maintain the continuity of meaning (11). The present findings extend this perspective to the Vision textbooks by suggesting that activity-related lexical relationships may be particularly beneficial when they provide intermediate EFL readers with semantically organized clusters of vocabulary. In this sense, lexical cohesion may function not only as a formal discourse property but also as an instructional resource that helps readers establish semantic frames and integrate information across a passage.

The reading comprehension results reinforce this interpretation. For the tenth-grade students working with Vision 1, the overall class average was 71.9, while lesson-level means ranged from 65.0 for "Traveling the World" to 78.0 for "Wonders of Creation." Importantly, the manuscript notes that the lesson with stronger overt repetition produced the highest class performance, whereas the passage characterized by lower cohesive density was associated with the lowest comprehension score. More broadly, the study reports that differences in the lexical cohesion patterns of Vision 1, Vision 2, and Vision 3 were reflected in students' comprehension performance, with the more supportive cohesive organization of Vision 2 associated with particularly favorable reading outcomes. These results support the central proposition that lexical cohesion can assist readers in creating a coherent mental representation of text by signaling relationships among ideas and reducing discontinuity in discourse.

The relationship between cohesive organization and reading comprehension is consistent with contemporary research emphasizing the strategic and interactive character of reading. Qi et al. demonstrated that self-regulated learning strategies are

closely associated with reading comprehension in both first- and second-language contexts, indicating that successful readers actively organize, monitor, and integrate information while reading (2). Yim similarly showed that learning strategies mediate the relationship between reading and broader academic achievement among middle-school students (1). These findings are relevant to the present results because cohesive cues can provide linguistic anchors for strategic processing. Repetition can help learners identify key information, semantic relations can encourage integration across sentences, and collocational patterns can facilitate prediction and activation of related knowledge. Thus, the usefulness of lexical cohesion may lie partly in the way it supports the strategic operations required for comprehension.

The findings regarding Vision 3 add an important qualification to the assumption that greater cohesion density automatically produces better comprehension. Although Vision 3 contained a total density of 16.8 ties per 100 words, lower than Vision 2, it included a greater density of several relatively sophisticated cohesive forms. Complex repetition increased from zero in Vision 1 to 1.57 in Vision 2 and 1.9 in Vision 3, while contrast increased from zero to 0.39 and then to 0.6. Ordered-set collocation, absent from the first two textbooks, appeared in Vision 3. These results suggest that advancement across the textbook series involves diversification of cohesive relationships rather than simply increasing their frequency. Vision 3 may therefore require learners to infer and integrate less transparent semantic relationships, which would be appropriate for more advanced students but could simultaneously impose greater processing demands.

This interpretation is supported by recent evidence showing that reading efficiency cannot be reduced to a single dimension of linguistic competence. Research differentiating reading accuracy and rate has demonstrated that learners may show distinct reading profiles even at relatively advanced educational levels (17). Similarly, differences in cognition, attention, and reading skills can interact with the demands placed on students by written materials (18). Accordingly, a text containing more sophisticated lexical connections is not necessarily easier merely because those relationships improve discourse cohesion. The reader must possess adequate lexical knowledge and inferential capacity to recognize those connections. The present results therefore suggest that the optimal level of lexical cohesion is proficiency-sensitive: beginning learners may benefit from overt repetition, intermediate learners may benefit from a dense combination of repetition and frame-building collocation, and more advanced learners may be increasingly exposed to diverse and less explicit semantic relationships.

The findings are also relevant to current approaches emphasizing instructional support in reading development. Lyu and Hu found that teacher support contributes to reading performance through students' cognitive and emotional engagement (4). Similarly, research examining brain-based teaching principles has shown that instructional approaches designed around learners' cognitive processing may enhance EFL reading comprehension (19). These studies help explain why the effectiveness of textbook cohesion cannot be separated from classroom practice. Lexical ties provide potentially useful semantic cues, but learners may differ in their ability to recognize or exploit them. Teachers can therefore play a critical role in directing attention toward repetition, synonymy, lexical sets, collocations, contrastive relations, and other cohesive devices. Cekiso's investigation of teachers' perceptions of reading instruction similarly emphasizes the importance of teachers' understanding of reading processes and instructional practices (3). The present study extends this pedagogical perspective by indicating that teachers should also be sensitive to the cohesion profiles of the texts they teach.

The findings furthermore contribute to the broader evaluation of English textbooks in Iranian schools. Previous studies have assessed Iranian English textbooks from multiple perspectives. Abdi et al. reported teachers' evaluations of redesigned junior-high-school textbooks and demonstrated the importance of considering practitioners' perceptions when evaluating curricular materials (13). Gheitani et al. investigated cultural representation within the Vision series, highlighting the significance of examining what kinds of content are embedded in secondary-school English textbooks (14). Ganji and Khoobkhahi examined correspondence between recommendations in Vision teachers' guides and teachers' actual classroom practices, demonstrating

that intended curriculum and implemented curriculum do not necessarily coincide automatically (15). The present study adds a discourse-level dimension to this body of textbook evaluation research. Rather than focusing primarily on content representation or instructional implementation, it demonstrates that the internal lexical organization of reading passages is itself an important component of textbook quality.

The results also correspond with research suggesting that explicit instructional design can influence reading achievement. Flipped EFL reading instruction has been associated with changes in learning achievement and favorable student perceptions, demonstrating that the organization of learning experiences matters for reading outcomes (20). Likewise, research involving students with learning disabilities has shown that reading performance may respond to interventions extending beyond conventional text instruction, such as parent-child play-based approaches (21). Although these studies concern different interventions, they converge on the broader principle that reading development is responsive to structured forms of support. Lexical cohesion can be conceptualized as a form of support embedded directly within the text itself. Whereas teachers and instructional interventions provide external scaffolding, cohesive lexical relationships provide internal linguistic scaffolding by indicating how ideas relate to one another.

The role of explicit guidance can also be considered in relation to language teaching more broadly. Research on teachers' strategies for improving reading ability underscores the importance of purposeful instructional procedures and structured engagement with written language (22). Similarly, findings from Iranian EFL contexts indicate that corrective feedback can improve learners' language performance at both local and broader organizational levels (23). Although corrective feedback was investigated in writing rather than reading, the implication relevant to the present study is that learners benefit when attention is systematically directed toward linguistic relationships. Lexical cohesive ties may therefore serve as useful instructional targets through which learners can become more aware of the semantic structure of texts.

The present findings are also compatible with evidence from studies of lexical organization in other genres. Aziz demonstrated the relevance of both lexical and grammatical cohesion for analyzing paragraph organization (7), while Danglli and Abazaj emphasized the contribution of lexical choice and synonymy to cohesion in academic writing (8). Esmaeilzadeh et al. showed that forms of lexical cohesion can be meaningfully analyzed even in translated discourse, demonstrating that cohesion contributes to semantic continuity across diverse textual contexts (12). Together with the findings of the present study, these studies suggest that lexical cohesion is not a genre-specific phenomenon but a fundamental property of connected discourse with implications for both text production and text comprehension.

Overall, the results indicate that the pedagogical value of lexical cohesion depends on both **quantity and configuration**. The manuscript itself concludes that effective comprehension cannot be explained simply by increasing the absolute number of cohesive ties; rather, the selection and organization of those ties appear critical. Vision 1 predominantly uses straightforward repetition, Vision 2 combines high cohesive density with substantial activity-related collocation, and Vision 3 introduces a wider range of sophisticated lexical relationships. This developmental pattern suggests that successful EFL textbook design should align lexical cohesion with learners' evolving linguistic and cognitive resources. The findings therefore support viewing cohesion not merely as a descriptive property of discourse, but as a potentially important cognitive and pedagogical mechanism through which textbook texts can facilitate connections among concepts, activation of prior knowledge, and construction of coherent meaning.

Several limitations should be considered when interpreting these findings. First, the analysis was restricted to the Vision textbook series and Iranian high-school EFL learners; therefore, the findings cannot automatically be generalized to other textbooks, educational systems, age groups, or language-learning contexts. Second, the study used a descriptive-correlational design, which permits the identification of relationships between lexical cohesion and reading comprehension but does not

establish that cohesive ties themselves caused differences in comprehension. Third, the number and types of reading passages available in each textbook limited the range of textual material that could be examined, and differences in topic, vocabulary difficulty, syntactic complexity, passage length, and learners' familiarity with subject matter may also have influenced comprehension performance. In addition, reading comprehension was assessed using textbook-related materials, and the findings may differ when standardized or unfamiliar texts are used. Finally, individual learner characteristics, including vocabulary knowledge, prior knowledge, motivation, reading strategies, and general English proficiency, were not simultaneously modeled alongside the textual cohesion indicators.

Future studies should employ experimental and longitudinal designs to determine more precisely whether manipulating the density and type of lexical cohesive ties produces measurable changes in reading comprehension. Researchers could create parallel versions of the same reading passage containing low, moderate, and high levels of lexical cohesion while holding vocabulary, syntax, topic, and length constant. Comparative studies across different textbook series, educational levels, languages, and EFL contexts would also help establish the generalizability of the present findings. Future research could separately investigate the effects of repetition, synonymy, generalization, specification, contrast, and different forms of collocation rather than examining cohesion only as an aggregate textual characteristic. Eye-tracking, think-aloud protocols, response-time measures, and recall tasks could further clarify how learners cognitively process cohesive relationships during reading. It would also be valuable to examine whether proficiency, vocabulary size, working memory, prior knowledge, motivation, and reading strategy use moderate the relationship between lexical cohesion and comprehension.

Textbook developers should systematically examine the lexical cohesion profile of reading passages when designing materials for different proficiency levels. Beginning-level materials may benefit from clear repetition and easily identifiable semantic connections, whereas intermediate passages may incorporate richer activity-related collocations and lexical networks that promote semantic frame construction. At more advanced levels, increasingly diverse relationships such as contrast, equivalence, specification, and elaborative collocation can be introduced without eliminating the cohesive support necessary for maintaining textual continuity. Teachers should also explicitly draw students' attention to lexical chains during reading lessons by asking them to identify repeated words, related vocabulary, lexical sets, synonyms, contrasts, and collocations and to explain how these items connect different parts of a text. Reading activities can further require learners to map cohesive chains, predict related vocabulary, reconstruct omitted lexical links, and summarize passages using key semantic relationships. Such practices can turn lexical cohesion from an implicit feature of textbook discourse into an explicit resource for developing more strategic and independent EFL readers.

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Authors' Contributions

All authors equally contributed to this study.

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The authors of this article declared no conflict of interest.

Ethical Considerations

All ethical principles were adhered in conducting and writing this article.

Transparency of Data

In accordance with the principles of transparency and open research, we declare that all data and materials used in this study are available upon request.

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