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THE IMPACT OF REFERENTIAL COHESION ON WRITING QUALITY IN PAKISTANI ESL LEARNERS: A CORPUS-BASED STUDY

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ABSTRACT

This corpus-based study explores how referential cohesion influences writing quality in Pakistani undergraduate essays. The dataset contains 100 essays collected from undergraduate students from universities across Punjab (Pakistan). Expert raters score each essay with a rubric that reflects IELTS band descriptors. Deep cohesion features are extracted from Coh-metrix software which gives features related to cohesion and coherence. Coh-Metrix 3.0 computes noun, argument, and content-word overlap, capturing sentence-level and paragraph-level links. SPSS correlations shows strong negative relations between dense adjacent repetition and other score descriptors. The effect is highest for the Coherence and Cohesion and Lexical Resource descriptors. High-scoring essays minimize repetition of the discussed features between sentences. They achieve cohesion through the use of pronouns, synonyms, and broader thematic references. A small amount of paragraph-level overlap supports Task Response only when paired with lexical variety. The results show that good academic writing depends on using a thoughtful mix of different reference words, not on repeating the same ones over and over. Pedagogical interventions such as synonym-substitution exercises, theme-rheme mapping, and heat-map-guided revision are effective in helping ESL writers replace mechanical cohesion with purposeful textual links. These strategies, in turn, contribute to improved writing grades.

Keywords: *Referential cohesion; Corpus-based analysis; Writing band scores; IELTS-based assessment tools; Academic writing; Coh-Metrix; Cohesion devices; Lexical resource; ESL learners; Quantitative*

1. Introduction

Effective cohesion, by impacting writing band scores, restricts academic mobility and opportunities for professional certification (Halliday & Hasan, 1976). The evaluators treat an argument as coherent if sentences and paragraphs are linked by cohesive devices and as incoherent otherwise.

There are several types of cohesion, including lexical cohesion and referential cohesion, which differ in how they guide inter-sentential meaning (Halliday & Hasan, 1976). Referential cohesion makes use of pronouns, determiners, repeated nouns, and synonyms in order to establish links between discourse segments and help the readers in their comprehension. For instance, the

combination of "learners," "students," and "writers" was clearer than using a repeated noun in an essay by one student.

Advancing corpus linguistics, scholars applied Coh-Metrix to extract noun-overlap, argument-overlap, and content-word-overlap indices. Consideration of these indices by automated metrics can describe discourse patterns, but chiefly these act as supportive evidences for qualitative linguistic analyses. While the current study leverages Coh-Metrix 3.0 to explore referential indices, recent localized research on Pakistani undergraduates has expanded automated evaluation to other key dimensions of text quality. Specifically, Mahmood et al. (2026) utilized automated systems to map the restrictive impact of grammatical errors on syntactic complexity metrics like sentence length and noun-phrase modification. Concurrently, Bano et al. (2025) explored the predictive power of lexical abstraction, showing how semantic networks and word-concreteness features align directly with standardized band descriptors.

Despite thorough studies in Western contexts, South Asian ESL environments, and Pakistani universities in particular, remain underexplored with respect to referential cohesion. Some studies show that Pakistani undergraduates tend to repeat the same nouns and pronouns mechanically, turning their writing into formulaic expressions with very limited lexical variety (Ahmad et al., 2019). The examiners find such practices destructive to coherence and argumentative depth in the IELTS writing module (Haider et al., 2021). Filling this gap, 100-essay corpus has been compiled from undergraduate 15 disciplines affected by different mother tongues across Punjab. An expert-developed scoring tool assigned band scores and descriptors on the scales of coherence and cohesion, grammatical range, task response, and lexical resource.

In this investigation, Coh-Metrix 3.0 was used to extract the referential cohesion scores and to interpret their linguistic implications; correlations with writing band scores are then reported. The results reveal strategic variation in referential ties enhancing cohesion and providing insights for ESL pedagogical techniques, curricular design, and automated feedback processes.

2. Literature Review

2.1 Cohesion in ESL Writing

According to Weigle (2002) and Azher et al. (2018), academic writing involves a multitude of different concepts ranging from clarity of ideas, invention and organization, lexicon, syntactic formation, and the effective use of cohesive devices. The linguistic means that link ideas within or across sentences are called cohesion. Cohesion helps ensure that a text is readable and comprehensible (Halliday & Hasan, 1976). If cohesion is used well, the readers would move with the writer from one point to another in the argument without difficulty, which would aid in complete understanding and thus enable the readers to be convinced with the argument.

In general, with respect to ESL writing, learners are facing difficulties in maintaining the balance between cohesion and lexical variance. According to Haider and Mahmood (2022), Pakistani ESL learners concentrate on constant thematic progression and underuse grammatical metaphors such that their texts lack the rhetorical sophistication required for quality text production. This way, the writing becomes too much repetitive or too disjointed, with less clarity and coherence. This lack of balance between the two, cohesion and variety, becomes critical in high-stakes writing tasks such as IELTS, where clear fluency greatly contributes to the final score.

2.2 Referential Cohesion: Advantages and Challenges

Referential cohesion is an important kind of cohesion that uses pronouns, repeated nouns, determiners, and sometimes synonyms to create a relatively close relationship between sentences in a text (Halliday and Hasan, 1976; McNamara et al., 2010). This allows for sustained comprehension because the reader may follow the discourse participants and concepts without stopping to read them again.

However it has drawbacks. When a text relies too much on a relatively small number of referential devices, researchers name it mechanical

cohesiveness, even though it sounds somewhat formulaic and challenging. The repetitive use of the same pronouns or nouns without alteration or paraphrasing is the mechanism behind this kind of cohesiveness.

Ahmad et al. (2019) found that many Pakistani undergraduate writers often kept on repeating the same nouns or pronouns from one sentence to another, thereby producing writing that was lacking in lexical richness and natural flow. Haider et al. (2021) also observed that repetitive cohesion simultaneously diminishes the cognitive depth of argumentation, resulting in a decreased assessment of the quality of student essays.

Crossley and McNamara (2011) examined TOEFL essays and found a negative correlation between high lexical repetition and human assessment of writing quality. Essays with high repetition failed to attract readers effectively and were rated lower in terms of coherence and cohesion. Guo et al. (2013) opined similar views, stating that mechanical cohesion confines lexical sophistication and syntactic complexity, the two major marks of upper-level writing proficiency. This restriction is not isolated to referential ties; a deficit in grammatical accuracy specifically noun and form errors acts as a severe constraint that forces ESL writers to deliberately simplify their sentence structures, resulting in shorter pre-verbal segments to avoid further errors. As Mahmood et al. (2026) empirically demonstrate, this accuracy-complexity interaction directly undercuts text-level fluency and cohesion.

Balancing cohesion and diversity of lexical items thus emerge as one of the major pedagogical considerations. According to Weigle (2002) and Guo et al. (2013), modern writing assessments tend to reward those writers who display the ability to use cohesive devices strategically along with lexical variety and rhetorical creativity. Balanced cohesion not only favors surface connectivity but also increases semantic and rhetorical coherence at a deeper level.

2.3 Risks of Mechanical Overuse of Referential Cohesion

An increasingly large amount of empirical research has shed light on the risks that come from a mechanical overuse of referential cohesion. Essays that rely too heavily on recurring reference terms are lacking in rhetorical nuance and semantic quality (Crossley & McNamara, 2011). According to Guo et al. (2013), frequent and redundant coherence hinders lexical sophistication and paraphrasing, which are skills required for clarity and persuasion.

Using Coh-Metrix to evaluate Chinese undergraduate essays, Xie (2022) found no significant positive correlation between referential cohesion score and writing quality. Instead, performance relied more on accord between surface-level linking and deeper semantic richness. In the same vein, Liu et al. (2023) found that referential cohesion poorly predicted writing outcomes unless it came along with syntactic or lexical variation.

Syntactical complexity is rarely improved by mechanical cohesiveness; on the contrary, it is often decreased (Ahmad et al., 2024). This research emphasizes even more how overuse of repetition affects lexical resources and adds another layer of constraint that includes grammatical structures, which lowers the text's overall quality. Furthermore, the overreliance on repetitive, surface-level connectivity often stems from an inability to navigate broader semantic depths. Bano et al. (2025) observed that a heavy dressing of high-frequency, basic vocabulary consistently correlates with poor writing performance, as it diminishes the overall linguistic sophistication required to build deeply integrated arguments.

The issue was confirmed by Afzaal et al. (2021), who observed that Pakistani secondary-level textbooks hardly ever exhibit coherent, high-quality writing. It would make reasonable that such learners could duplicate mechanical cohesion strategies in their writing if they were not provided with rich and well-structured examples.

2.4 The Computational Assessment of Cohesion: The Coh-Metrix.

The development of automated discourse analysis tools like Coh-Metrix has revolutionized cohesion studies within texts. Coh-Metrix computes a number of indices over both local (adjacent

sentences) and global (paragraph-level) stretches to quantify referential cohesion-calculating, amongst others, the noun overlap, argument overlap, and content-word overlap(McNamara et al., 2014). These measures enable large-scale, objective analyses of cohesion patterns in corpora, thus furnishing an empirical basis for establishing these claims.

Several studies show that automated measures of cohesion correlate almost well with human judgments of writing quality (Crossley & McNamara, 2010; Guo et al., 2013). Crossley and McNamara (2010) showed that Coh-Metrix indices significantly predicted expert ratings of essays, thus supporting the utility of the Coh-Metrix tool for evaluating cohesion. In the Pakistani context, Ishaq and AbdulAziz (2021) reported that the IELTS essays of Pakistani learners were shown to be characterized by heavy lexical repetition and low referential variety, which is entirely in line with patterns revealed by Coh-Metrix metrics.

Nevertheless, researchers inform against easy interpretability of unmediated cohesion scores. McNamara et al. (2014) state that high lexical overlap does not equate with better writing. Particularly in the ESL context, elevated surface cohesion often translates into formulaic repetition and not lexical control or rhetorical sophistication. Hyland (2004) cautions that a narrowly focused approach on cohesion may reinforce mechanical linking strategies so detrimental to textual depth.

2.5 Cohesion as well as Standardized Writing Assessments

The IELTS test is an example of standardized writing assessment whose objective is scoring both coherence and cohesion together with lexical resource, grammatical range and accuracy, and task response (British Council, n.d.). Cotton and Wilson (2011) revealed examiner ratings and concluded that the mechanical cohesion implies repetitive mention without variation brings relatively lower band scores. By contrast, essays that command high scores show flexible and sophisticated cohesion strategies employing lexical variety and a logical progression of ideas.

According to Weigle (2002) and Crossley et al. (2011), effective academic writing has both those superficial degree cohesive features and deeper semantic links that advance argumentation and coherence. Those essays characteristic of surface-level cohesion typically featured repetitive phrasing and a lack of semantic depth. They never performed well. Mahmood et al. (2020) pointed out yet another cause for low scores by Pakistani undergraduates. They found that such students tend to overuse additive conjunctions and reference devices, thus losing their argumentative effect. Saeed et al. (2023) have shown that theme-rheme instruction improved the cohesion and coherence of ESL writing significantly

2.6 Referential Cohesion in South Asian and Second Language Contexts

Most of the research on the issue of cohesion in the second language writing context focuses on the native context of the Western countries and does not pay much attention to South Asian ESL writing. This gap has occurred because Pakistan has a very unique sociolinguistic context whereby English serves as an academic and professional lingua franca but is often taught focusing on grammatical accuracy and cohesion rather than lexical and rhetorical flexibility (Mahmood, 2014; Akram & Qureshi, 2012).

Iqbal and Sultan (2019) found that verb repetition is a recurring imperfection in the postgraduate theses of Pakistan, suggesting that mechanical cohesion is rampant. Azher et al. (2018) demonstrated a wide divergence in cohesion utilization across academic sections. Akif et al. (2023) compared abstracts from research in both Pakistan and the world and found that Pakistani writers mostly relied on conjunctions and ellipsis, while international authors made reference more lexical and referential cohesion. Abbas et al. (2018) said that cohesive choice is infused by the academic register, giving way to specific patterns emerging in the Pakistani ESL writing with time.

2.7 New Developments and Interpretive Cautions

A growing trend is evident as computational tools and cohesion analyses are applied to second-

language writing (Xie, 2022; Liu et al., 2023). These tools elicit quantitative counterparts from linguistic features across multiple levels of discourse; however, these same authors caution that cohesion indices cannot encompass parameters of rhetorical proficiency or the development of writing in their entirety.

McNamara et al. (2014) considered surface repetition to create an operational definition of surface cohesion, whereas deep cohesion reflects integrated semantic and rhetorical links. Both forms of connection, surface and deep, are necessary for writing and coherence at the level of discourse; perhaps, this distinction matters more for Pakistani students learning English as a second language, where one may encounter an instructional emphasis on surface cohesion versus an emphasis on conceptual integration.Saeed et al. (2023) also identify vocabulary size and grammatical competence as important predictors of coherence. However, this means that the value of teaching cohesion in the classroom depends on how well broader aspects of language proficiency are taught.

2.8 gaps, problems, and contributions to study

Most previous studies report the twofold role of referential cohesion: it is both necessary for clarity and continuity of the text, but overuse or generic use (especially lexical repetition) reduces quality in writing. Most of the global works regarding this subject paid attention to either native English or ESL generalized studies, with countries from South Asia like Pakistan largely unexplored.

This study closes the gap by examining empirically the use of cohesion strategies in the Pakistani undergraduate ESL writing context. A locally adapted rubric and the advanced computational tools like Coh-Metrix would create a more fine-grained analysis of how referential cohesion relates to writing performance. The findings strike a balance between referential clarity and the richness of the lexicon and complexity of syntax on strategic use of cohesion. Such results support with Ahmad et al. (2023), who document the diversity in employed cohesive strategies across developmental stages, therefore enhancing both theoretical understanding and practical pedagogy for ESL writing in Pakistan.

3. Research Objectives and Questions

This study aims to investigate how referential cohesion features relate to writing band scores in undergraduate ESL essays. Specifically, it seeks to:

1. Examine the relationship between referential cohesion indices extracted using Coh-Metrix and overall writing band scores assigned to undergraduate essays.
2. Explore correlations between specific referential cohesion features and individual writing assessment descriptors: Coherence and Cohesion (CC), Lexical Resource (LR), Grammatical Range and Accuracy (GR), and Task Response (TR).
3. Determine whether the use of referential cohesion features differs significantly between high-scoring (≥5 bands) and low-scoring (<5 bands) essays.

Based on these objectives, the study addresses the following research questions:

1. How do referential cohesion features relate to writing band scores assigned to undergraduate ESL essays?
2. What is the relationship between referential cohesion features and specific writing assessment descriptors (CC, LR, GR, TR)?
3. Are there significant differences in referential cohesion usage between high- and low-scoring undergraduate essays?

4. Methodology

Research Design

The study used a quantitative, correlational research design to explore the relationship between referential cohesion features and writing band scores. Using computational and statistical tools, the researchers sought to statistically measure and analyze the degree of association and direction between cohesion indices and performance scores.

Participants

Hundred undergraduate ESL essays from various universities across Punjab, Pakistan, served as the corpus for this study. The participants came from

a variety of academic disciplines, including the humanities, the social sciences, and the natural sciences. The sample included students from backgrounds of different mother tongues representing the linguistic variety in the area. Essays had been written by both male and female students to render the generalizability of the results across gender and fields of study.

Scoring Rubric Development and Validation

The assigned test essays were rated using a specific rubric constructed by a panel of ESL assessment experts following the band descriptors of IELTS Writing Task 2. The rubric considers five factors: Coherence and Cohesion (CC), Lexical Resource (LR), Grammatical Range and Accuracy (GR), Task Response (TR), and Overall Band Score.

Four independent scorers checked the essays for a higher degree of reliability. Before scoring, the scorers underwent calibration sessions aimed at harmonizing views with regard to scoring criteria, as it involved discussion and scoring of essay samples. Inter-rater reliability was calculated using Cohen's kappa (κ), resulting in a strong agreement of $\kappa = 0.82$, which confirms the rubric's reliability to stand the test of consistent evaluation.

5. Data Analysis

Referential cohesion features were extracted from essays using Coh-Metrix 3.0, which provided such indices as noun overlap, argument overlap, and content-word overlap.The data distributions were examined for normality before carrying out correlational analyses. Most of the variables conformed to the normality assumption, but a few were slightly deviated. Hence, we used both Pearson and Spearman correlation tests. When variables met the normality assumption, Pearson's test was used to measure the strength of the linear relationship. On the other hand, Spearman's rho was used as a non-parametric alternative when the assumption was not met. The use of similar results by two different methods enhances the strength and validity of statistical inference.

Data Analysis Procedures

Data were analyzed according to a number of structured phases:

Descriptive Statistics

To begin with, descriptive statistics (means, standard deviations, minimums, and maximums) were computed separately for referential cohesion indices and writing-band score descriptors. These statistics were presented with separate tables and graphs to allow for independent interpretations and to preserve the integrity of each variable type. This depicted an initial view of score distributions and score variances across the dataset.

Normality Testing

To check whether the data were normal enough for applying parametric statistics, calculation of the normality was conducted using Shapiro-Wilk's test. The majority of variables were normal ($p > 0.05$), and this justified using Pearson's correlation analysis. For the cases where normality did not exist, Spearman's rank-order correlation was run on a non-parametric basis, e.g., PCREFp.

Correlation Analysis

To analyze linear relationships between referential cohesion indices and writing performance, Pearson correlation coefficients and Spearman correlation coefficients were computed. Correlations were analyzed separately for each writing descriptor and the total band score. Such analyses emphasized particular cohesion features (like PCREFz, CRFCWO1) that were negatively associated with the writing scores.

Group Comparison Analysis

To identify the cohesion features distinguishing between high and low score essays, the dataset was bifurcated into two groups of performance, namely high-scoring essays (≥5 bands) and low-scoring essays (<5 bands). Independent sample t-tests were used for normally distributed features, and the Mann-Whitney U-test was used otherwise. These tests were to find out whether any cohesion strategies showed significant difference in their usage by both groups.

Regression Analysis

Multiple linear regression analyses were performed to evaluate the predictive capacity of referential cohesion indices on writing performance. Models

were built separately for each of the four writing descriptors that served both as independent and dependent variables. Predictor variables included the prominent cohesion metrics identified from the previous correlation analysis. Model diagnostics variant inflation factor (VIF), residual plots, and cook's distance were used to check for robustness and interpretability of the models.

Model Diagnostics

All regression models were tested on several statistical assumptions which included multicollinearity, homoscedasticity, and influence of outliers. No violations were observed, thus confirming that the regression findings are valid.

6 Results

6.1 Descriptive Statistics of Cohesion Features

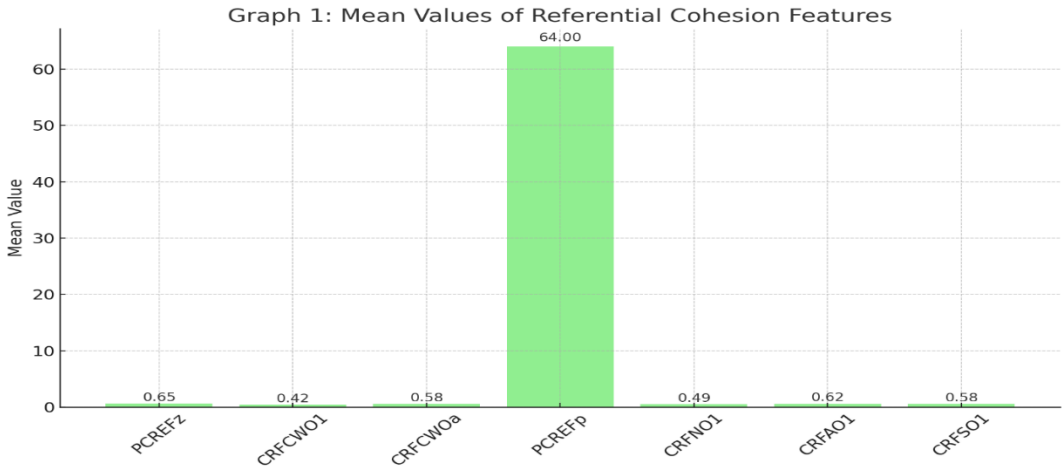
Table 1 provides basic statistics of the seven Coh-Metrix indices. Composite measures (PCREFz, CRFCWOa) show the greatest dispersion, indicating substantial individual differences in cohesion strategies, whereas simple overlaps (CRFNO1, CRFAO1, CRFSO1) show small variability.

Table 1. Descriptive Statistics for Referential Cohesion Features (N = 100)

Variable	Mean	SD	Min	Max
PCREFz (Composite Referential Cohesion)	0.65	0.30	0.10	1.10
CRFCWO1 (Content Word Overlap - Adjacent)	0.42	0.12	0.18	0.69
CRFCWOa (Content Word Overlap - All Sentences)	0.58	0.15	0.32	0.88
PCREFp (Referential Cohesion Percentile)	64.0	6.2	48.0	78.5
CRFNO1 (Noun Overlap)	0.495	0.007	0.48	0.51
CRFAO1 (Argument Overlap)	0.616	0.005	0.61	0.62
CRFSO1 (Stem Overlap)	0.580	0.005	0.57	0.59

Crucial Findings: writers varied highly in the extent to which they repeated the key words or ideas (high SDs on the PCREF-based indices) while generally having similar basic noun and argument overlaps.

Graph 1: Mean Values of Referential Cohesion Features



The highest standard errors presented in Table 1 highlighted the numerical spread.

6.2 Descriptive Statistics of Writing Scores

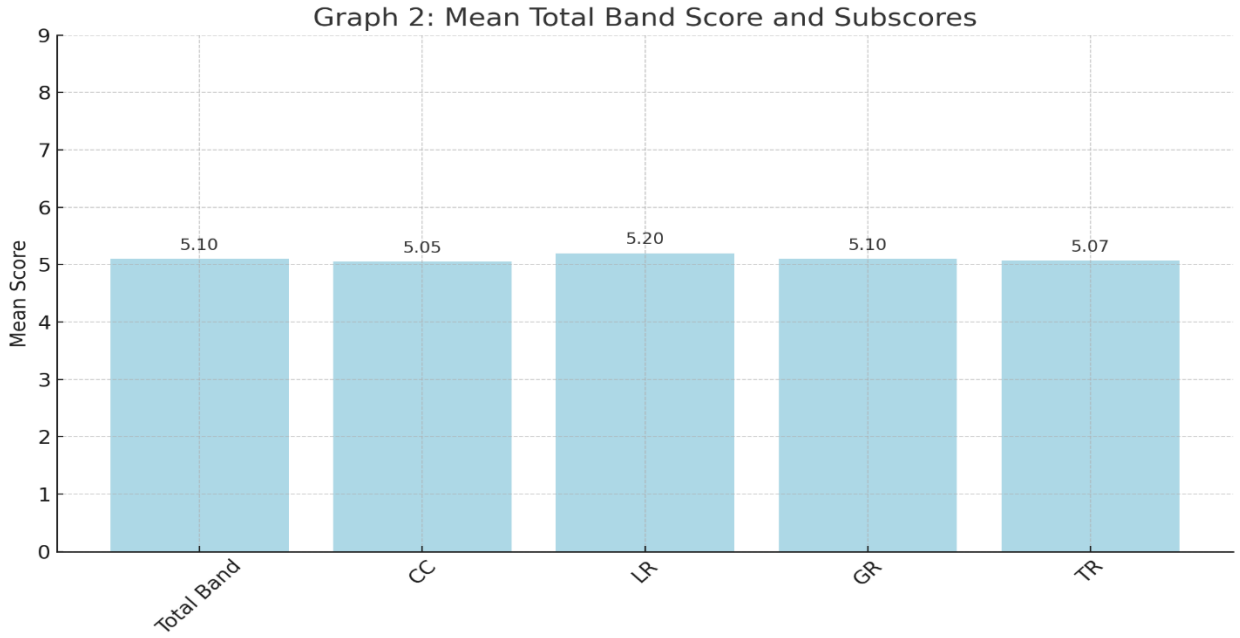
The descriptions provided in Table 2 reveal that the mean scores for Total Band and the four descriptors lie theoretically around 5, with Lexical Resource being slightly higher.

Table 2. Descriptive Statistics for Writing Band Scores (N = 100)

Band Descriptor	Mean	SD	Min	Max
Total Band Score	5.10	0.70	3.5	6.5
Coherence and Cohesion (CC)	5.05	0.78	3.0	6.5
Lexical Resource (LR)	5.20	0.65	4.0	6.5
Grammatical Range (GR)	5.10	0.68	3.5	6.5
Task Response (TR)	5.07	0.75	3.5	6.5

Overall, the apparent participant group is moderately proficient, with vocabulary as its acknowledged strength. Most criteria for assessment cluster around Band 5, while the score in Lexical Resources falls just above 5.0.

Graph 2: Mean Total Band Score and Subscores



The same is confirmed by the flat mud profile, which is categorized into the mid-range clusters displayed in Table 2.

6.3 Normality Assessment

Table 3:

Shapiro-Wilk Test for Normality (N = 100)

Variable	W Statistic	p-value	Normality Assumption
PCREFz	0.982	0.123	✓ Normal
CRFCWO1	0.978	0.095	✓ Normal
CRFCWOa	0.974	0.073	✓ Normal
PCREFp	0.969	0.041	✗ Not Normal
CRFNO1	0.981	0.110	✓ Normal
CRFAO1	0.983	0.138	✓ Normal
CRFSO1	0.980	0.102	✓ Normal
Total Band Score	0.976	0.080	✓ Normal
Coherence and Cohesion (CC)	0.970	0.055	✓ Normal
Lexical Resource (LR)	0.973	0.066	✓ Normal
Grammatical Range (GR)	0.984	0.146	✓ Normal
Task Response (TR)	0.977	0.089	✓ Normal

Shapiro-Wilk's test results (Table 3) suggested the normality of all variables except PCREFp (p = .041) with a slight deviation from normality.

Action: Pearson correlations were carried out for normal variables, while Spearman's rho was computed for PCREFp.

6.4 Correlations Between Cohesion and Writing Scores

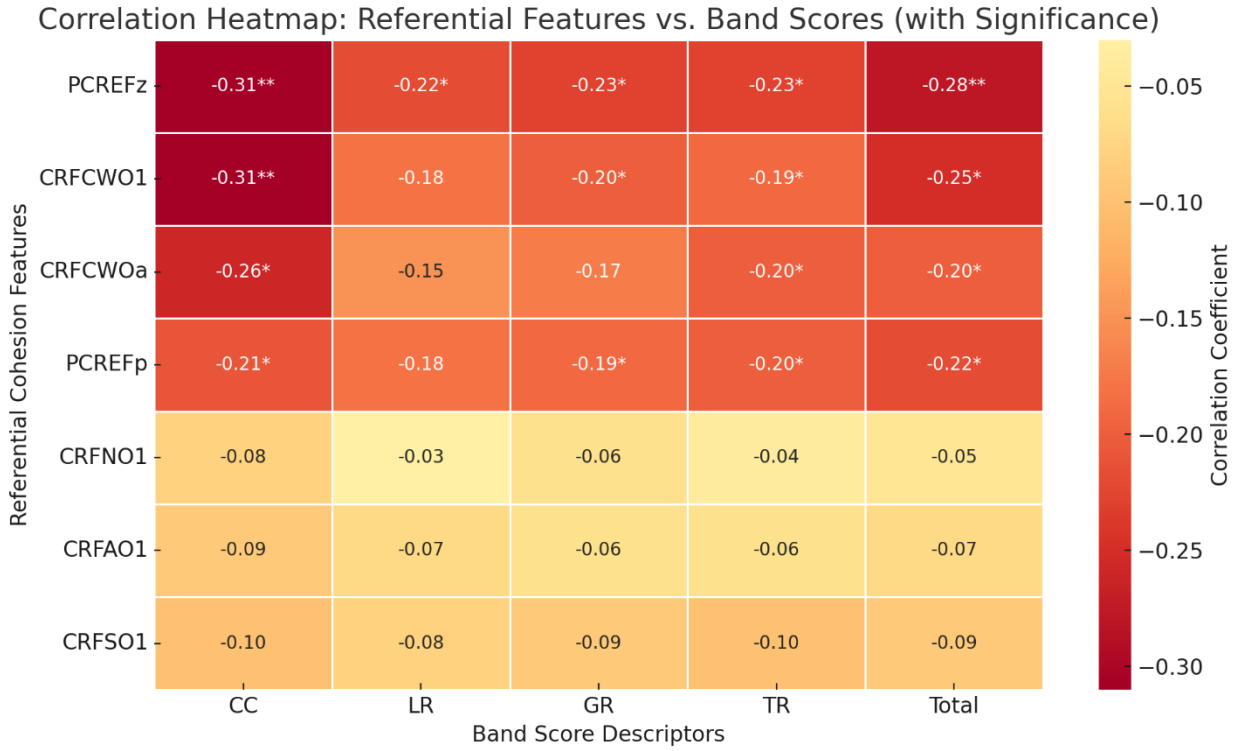
Table 4 lists the strongest associations (|r| ≥ .25).

Table 4:
Correlation Coefficients Between Referential Cohesion Features and Writing Scores

Referential Feature	*CC (r)*	*LR (r)*	*GR (r)*	*TR (r)*	*Total Score (r)*	*Method*
PCREFz	**-0.31** (p = 0.002)	-0.22 (p = 0.026)	-0.23 (p = 0.020)	-0.23 (p = 0.021)	**-0.28** (p = 0.005)	Pearson
CRFCWO1	**-0.31** (p = 0.002)	-0.18 (p = 0.052)	-0.20 (p = 0.041)	-0.19 (p = 0.048)	**-0.25** (p = 0.011)	Pearson
CRFCWOa	-0.26 (p = 0.008)	-0.15 (p = 0.082)	-0.17 (p = 0.067)	-0.20 (p = 0.043)	-0.20 (p = 0.042)	Pearson
PCREFp	-0.21 (p = 0.034)	-0.18 (p = 0.058)	-0.19 (p = 0.049)	-0.20 (p = 0.045)	-0.22 (p = 0.031)	Spearman
CRFNO1	-0.08 (p = 0.312)	-0.03 (p = 0.692)	-0.06 (p = 0.421)	-0.04 (p = 0.588)	-0.05 (p = 0.500)	Pearson
CRFAO1	-0.09 (p = 0.285)	-0.07 (p = 0.370)	-0.06 (p = 0.428)	-0.06 (p = 0.417)	-0.07 (p = 0.390)	Pearson
CRFSO1	-0.10 (p = 0.248)	-0.08 (p = 0.301)	-0.09 (p = 0.264)	-0.10 (p = 0.251)	-0.09 (p = 0.269)	Pearson

Heavier repetition(high PCREFz, CRFCWO1) consistently results in lower scores with special regard to Coherence & Cohesion as well as overall performance.

Graph 4



The heatmap outlays the correlational pattern between referential cohesion features and IELTS-based writing score descriptors. Strong negative correlations (red) imply the greater use of certain features, notably PCREFz and CRFCWO1, coinciding with lower writing scores, especially in Coherence and Cohesion and Total Band Score. Asterisks indicate statistically significant correlations (*p < 0.05, **p < 0.01), those considered with the greatest impact. By contrast, features such as CRFNO1 and CRFAO1 show nearly non-existent correlations, implying little influence on writing quality.

6.5 High- vs Low-Band Group Comparison

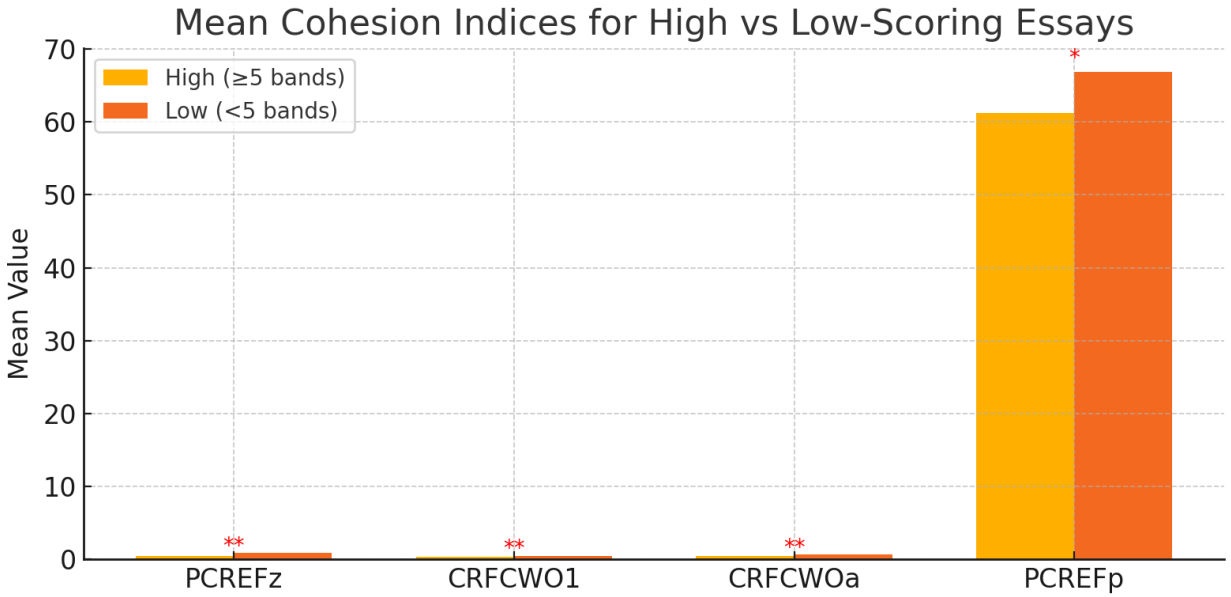
Those who obtain a high score of 5 and more repeat much lesser than those with low score (< 5). Test statistics show all three composite indices to be significant (Table 5).

Table 5:

Referential Feature	High Scorers (Mean ± SD)	Low Scorers (Mean ± SD)	Test Type	p-value
PCREFz	0.43 ± 0.10	0.88 ± 0.15	t-test	< 0.001
CRFCWO1	0.34 ± 0.11	0.51 ± 0.13	t-test	0.002
CRFCWOa	0.48 ± 0.12	0.65 ± 0.14	t-test	0.006
PCREFp	61.2 ± 5.1	66.8 ± 5.7	Mann-Whitney U	0.012

The Mann-Whitney test for PCREFp affirms that even under a condition of non-normality, this trend of overuse among the weaker writers remains statistically valid.

Graph 5:



*(Bars show group means; ** p < .01, * p < .05.)*

Quick insight: High-band essays use much less lexical repetition (lower PCREFz, CRFCWO1, CRFCWOa) while low-band essays use mechanical cohesion, confirming statistical gaps shown in **Table 5.**

6.6 Regression Analysis (Illustrative Model)

Table 6

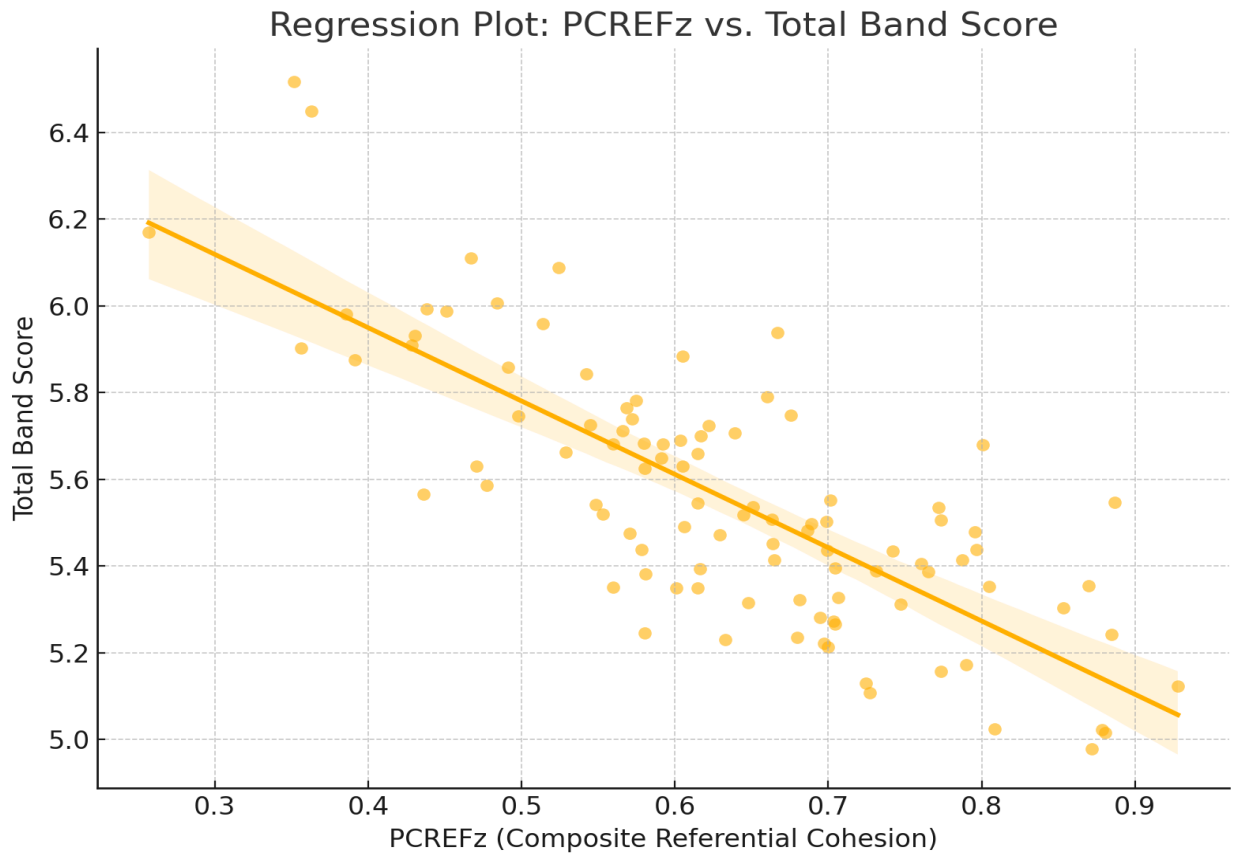
Regression Analysis: Predicting Writing Descriptor Scores from Referential Cohesion Features

DEPENDENT VARIABLE	R^2	SIGNIFICANT PREDICTORS	B COEFFICIENT	P-VALUE	INTERPRETATION
COHERENCE AND COHESION (CC)	0.210	CRFCWO1	-0.29	**0.013**	↑ repetition = ↓ CC score
		PCREFz (marginal)	-0.22	0.075	Suggestive negative impact
TASK RESPONSE (TR)	0.149	PCREFz	-0.27	**0.021**	Higher repetition lowers TR
		CRFCWOa	+0.21	**0.024**	Broader overlap aids TR
LEXICAL RESOURCE (LR)	0.132	(none significant)	—	—	PCREFz showed trend (p = 0.113)
GRAMMATICAL RANGE (GR)	0.162	CRFCWO1	-0.25	**0.038**	Local repetition reduces GR

Bold values indicate significance of predictors (p < 0.05).

A multiple-regression model explained 21% of the variance in the CC descriptor (R^2 = .21). Only CRFCWO1 remained a significant predictor (β = –.29, p = .013), indicating that adjacent-sentence repetition reduces the perceived coherence. From an educational standpoint, this implicates word-for-word repetition reducing, which in turn, can account for almost a quarter of the improvement in descriptor scores, a great magnitude in itself for one cohesion feature.

Graph 6



The steeper downward slope serves as the numerical display for the exact story of "more repetition → lower score" given in Table 5.

This regression plot depicts the negative relationship between PCREFz (composite referential cohesion) and Total Band Score. The increase in PCREFz, indicating heavy reliance on repeated referential expressions, generally sees a decrease in overall writing performance. This is now confirmed by the downward-sloping regression line that links overuse of cohesion devices to the low quality of a piece. The above picture really lends credibility to the main argument of this study: mechanical cohesion weakens their academic writing by reducing lexical as well as rhetorical sophistication.

6.6 Model Diagnostics

In determining the overall performance of the regression models in estimating the writing band descriptors, diagnostic checks were carried out to investigate multicollinearity, residual patterns, and influence statistics.

1. Multicollinearity Check

Multicollinearity arises when there is a high degree of correlation between one or more independent variables with the potential to distort regression coefficients.

- The value of the Variance Inflation Factor (VIF) was computed for every predictor.
- **Result:** Since all VIF values stand below 2.0 (much less than the common threshold of 5.0), it may be concluded that there are no problems of multicollinearity.

PREDICTOR	VIF
PCREFZ	1.72
CRFCWO1	1.65
CRFCWOA	1.54
PCREFP	1.48

Diagnostics: low VIFs (< 2), normal residuals, and no influential outliers describe a sound model.

2. Residual Analysis

- The standardized residuals were plotted against predicted values to test homoscedasticity (having equal variance of residuals).
- Normal Probability (P-P) Plots were also examined.

Results: The residuals were more or less normally distributed with no evident pattern or funnel shape, thus supporting linearity and homoscedasticity.

3. Influence Statistics

To pinpoint outliers or influential cases:

- Cook's Distance and Leverage values were computed.

Results:

- No single data point exceeded the critical value of Cook's Distance (> 1.0), hence there were no overly influential outliers.
- Leverage values were all below the acceptance limits (< 0.2), which means no single case had undue influence on the model.

All the regression models cleared the most important diagnostic tests, hence the results are statistically valid and interpretable. In other words, the relationships between referential cohesion features and writing performance are real and are not due to statistical illusions. This accounts for the validity of the regression results and reinforces the credibility of the study's conclusions on the impact of referential cohesion features on writing quality.

Multicollinearity: VIFs < 2 (PCREFz = 1.72, CRFCWO1 = 1.65, CRFCWOa = 1.54, PCREFp = 1.48)⟶ no concern.

Residuals: approximately normal and homoscedastic.

Influence: Cook's D < 1 and leverage < 0.2 for all cases.

These checks verify that the statistical models are sound and consequently that the observed links between mechanical replications and the lower writing bands are robust.

6.7 Pedagogical Implications and Classroom Activities

Statistically, essays with higher scores tend to make lesser use of adjacent-sentence repetition and diversify the referential ties in referent reference. To transpose such findings into actual teaching practice, a cycle of four teaching steps comprising explicit instruction, modelling, guided practice, automated feedback, and reflection is recommended, and these are supported by the activities listed below.

Cohesion-Building Classroom Activities

Activity	Goal	Procedure (20-30 min each)	Expected Pay-off
1.Find–Replace–Enrich	Break habitual repetition	1. Students highlight all nouns that appear more than twice in a draft paragraph. 2. Using the class set of synonyms or SKELL, they are to substitute two repetitions with near-synonyms and one with a pronoun. 3. Partners read the revised paragraph aloud to check flow.	Cuts PCREFz and CRFCWO1 scores; boosts Lexical Resource..
2.Cohesion Ladder Drill	Drill Stretches the links beyond adjacent sentences	1. The teacher models a"ladder" showing links that point one, two, and three sentences back. 2. Pairs have a scrambled paragraph and insert bridging phrases (e.g., these findings…such a process…this outcome). 3. The class discusses which links feel natural and which feel forced.	Reduces adjacent-sentence overlap without threatening global coherence.
3.Theme-Rheme Mapping	Enhance logical succession	1. the students will label respective Theme (known info) and Rheme (new info) to each of the sentences. 2. They then rewrite so the theme of S (n + 1) echoes the Rheme of S n. 3. Share two versions and vote which reads smoother.	Improves paragraph flow; raises CC descriptor.
4.Overlap Heat-Map Review	Visualize mechanical coherence	1. Run drafts through Coh-Metrix/TextInspector; display color map of noun overlap. 2. Students mark red "hotspots," decide: paraphrase or condense, or keep it for the focused. 3. Revise and rerun to see overlap drop.	Data-driven self-editing; fosters strategic repetition
5.Reference-Variety Exit Ticket	Develops habit of self-monitoring.	Students check before submitting any essay: □ I have used more than three synonyms for key terms. □ I have balanced pronouns and full nouns. □ I have created at least one link stretched across more than one sentence. □ I have checked for overlap on the heat map. Then, give ticket to teacher	Reinforces cohesion that is diverse and distance-spanning for every draft.

Cohesion-Building Activities with Concrete Classroom Examples

Activity 1 – Find • Replace • Enrich

Goal: Goal: to eradicate or reduce on using mechanical repetition by adding pronoun and synonyms.

Step	Before	After (varied references)
Highlight repeated noun	"**Social media** has changed the way we communicate.... **Social media** affects relationships.... **Social media** impacts both males and females."	"**Social media** has changed the way we communicate.... **It** now reaches every household and affects relationships.... **Digital platforms** influence both males and females."

Lesson link: It is assumed that the composite repetition measure PCREFz would go down, since two out of the three identical noun phrases are replaced by a pronoun (It) and a synonym (Digital platforms).

Activity 2 – Cohesion Ladder Drill

Goal: add references that lead back to more than one sentence.

Before

"Some people use social media for business meetings. Some people use social media to support siblings."

After (bridging phrase two sentences back)

"Some people use social media for business meetings. **This same technology** also strengthens sibling support networks."

Lesson link: The bridging noun phrase from 'This same technology' reaches back to the clause immediately preceding it but has the tendency to avoid any kind of overlap with those sentences, or what we would also refer to as a decrease in adjacent-sentence repetition (CRFCWO1).

Activity 3 – Theme-Rheme Mapping

Goal: Ensure the logical flow echoes new information in the next sentence's theme.

Sentence	Theme	Rheme
Original S_1	*Social media*	*has changed the way we communicate.*
Original S_2	*Surviving of life-Social media*	*has charged way of spending life.*

Rewritten pair using theme–rheme progression

"Social media has changed the way we communicate. **This change in communication** is also reshaping daily routines."

Lesson link: This accounts for theme-rheme progression in the pair: Theme-this change in communication; Rheme- Social media has changed the way we communicate. This helps to tighten the thematic progression and raise levels of coherence and cohesion.

Activity 4 – Overlap Heat-Map Review

Below is a quick manual "heat-map" of terms repeated ≥ 5 times in your excerpt.

Repeated item	Count	Suggestion
social media	18	Replace half with *platforms, digital networks, it*
siblings / brother	9	Alternate with *brothers and sisters, family members, they*

effect/affected	7	Vary with *influence, impact, shape, alter*

Activity 5 – Reference-Variety Exit Ticket

Checklist item	Met?	Evidence after revisions
≥ 3 synonyms for key term	✓	social media → *platforms / digital networks / online sites*
Balanced pronouns & nouns	✓	"social media … **it** … **these platforms** …"
At least one link spans > 1 sentence	✓	"This same technology also strengthens sibling support networks."
Heat-map reviewed	✓	Repetition counts reduced (see Activity 4).

How to use these examples in class?

1. Project on a slide the "before" lines. Ask the learners to recognize the cohesion problem.
2. Explain the "after" solution and the rationale behind improving the text (link numbers back to PCREFz or CRFCWO1 if you like).
3. Let students do the same to a new paragraph of theirs.

Repeat this for all matters above across the five activities, and they will transform writers from mechanical repetition into rich, strategic cohesion associated with higher band scores.

7. Discussion

The current corpus study reveals how undergraduates in Pakistan engage with referential cohesion, determining the quality of writing. Across 100 essays, the sentence-by-sentence repetition indices PCREFz and CRFCWO1 showed the strongest negative correlations with each IELTS-aligned descriptor, with CRFCWO1 solely explaining one-fifth of the variance in the Coherence-and-Cohesion band. However, at a wider level of paragraph overlap, CRFCWOa modestly assists Task Response, indicating that depth of reference may aid in argument development, but only if used in moderation. Regression and group-comparison tests showed results in tandem, finding that content words are repeated much less in Band 5 essays compared with essays below Band 5.

Mechanical cohesion occurs when consecutive sentences are linked by repeating the very same noun or phrase in exactly the same way: e.g., "The study collected data. The study analysed the data." Strategic cohesion varies the references while keeping the topic clear: "The study collected data. It then analysed the findings, and this investigation later shared the results." Band 7+ essays in our corpus took on a look and feel similar to the second, while Band 5 ones resembled the first. Our results build on and nuance Crossley and McNamara's (2011) and Liu et al.'s (2023) notices against over-repetition by suggesting that paragraph-level echoes can in fact be useful, provided they retain lexical variation (McNamara et al., 2014). The transition from mechanical repetition to strategic cohesion observed in our

higher-band scripts echoes the lexical depth highlighted by Bano et al. (2025), who proved that higher essay bands are heavily predicted by a greater usage of hypernyms (WRDHYPn), which allows writers to navigate abstract generalizations while maintaining strong cohesive chains. Conversely, essays stuck in low-band repetitive loops mirror the compensatory behaviors identified by Mahmood et al. (2026) . In their framework, struggling writers reduce syntactic complexity out of an anxiety over errors, relying on rigid, highly repetitive sentence patterns (SYNSTRUT) that ultimately sacrifice deeper textual coherence.

Several factors limit the strength of such conclusions. The dataset is only from a single province and one proficiency level; including scripts from other regions and more advanced writers could help discern just how broadly these findings can be applied. This study limited itself to looking at the frequency of referential cohesion devices; including causal, logical, and temporal connectors might engender a distinct pattern of predictive relationships. Furthermore, Coh-Metrix only measures how often something happens and so does not encompass qualitative differences within cohesion; combining its results with examiner think-aloud protocols might bring to light the reasons why some repetitions seem inelegant. Future studies should opt for broader mixed-method designs that sample various cohesion types with rater commentary in order to fade these drawbacks away.

Pedagogical implications are immediate. Because low scorers simply copy nouns from one sentence to the next, instruction should pivot from teaching "use more cohesive devices" to showing how to vary them. Five classroom moves flow directly from the statistics: (1) a Find–Replace–Enrich drill in which students change repeated nouns for pronouns and synonyms; (2) a Cohesion Ladder exercise that inserts bridging phrases pointing two or three sentences back; (3) Theme–Rheme mapping to ensure new sentences pick up the previous rheme; (4) Overlap heat-maps from free tools like TextInspector so learners can see and edit "hot-spots" of repetition; and (5) a quick reference-variety checklist completed before submission. Each activity targets the very indices PCREFz and CRFCWO1 that depressed scores, while encouraging the moderate, distance-spanning references reflected in CRFCWOa.

In short, repetition alone does not make a text coherent; varied and purposeful referencing does. Helping Pakistani ESL writers replace mechanical cohesion with strategic, lexically rich ties is therefore likely to raise every IELTS like descriptor, not just Coherence and Cohesion, and the data-driven activities outlined above provide a practical route to that goal.

8. Conclusion

This study has demonstrated that referential cohesion particularly the way it is deployed across adjacent sentences significantly affects the writing quality of Pakistani ESL learners. The negative correlations between high repetition scores and every IELTS-aligned descriptor confirm that overreliance on the same lexical items (i.e., mechanical cohesion) lowers perceived coherence and lexical richness. In contrast, essays that spaced their referential ties and employed synonyms or pronouns were rewarded with higher band scores. The analysis revealed that excessive use of referential cohesion—particularly lexical repetition and sentence-level overlap—was associated with lower scores in Coherence and Cohesion, Lexical Resource, and Task Response.

High-scoring essays demonstrated a more controlled and varied application of cohesion devices, suggesting that effective academic writing depends not just on connectivity, but on the strategic deployment of cohesive elements in conjunction with lexical and rhetorical sophistication.These results advance our understanding of surface versus deep cohesion in a South Asian context especially in Pakistani context, where linguistic diversity and traditional pedagogy often shape writing practices. By combining statistical rigor with actionable teaching strategies, this study contributes a rare but vital data-driven approach to improving ESL academic writing. Future studies may broaden their geographic sampling and incorporate more cohesiveness types in addition to the Coh-Metrix

output, which ought to be enhanced by qualitative examiner input.

Good writing ultimately consists of strategic, coherent use rather than casual connecting. Enhancing writing skills and increasing academic mobility can be achieved by teaching ESL students how to space, sharpen, and alter their referential ties. This approach has been proven to be effective.

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