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A Sociolinguistic Perspective on English Minimal Pairs as Articulated by Engineering Students

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Abstract

This study investigates the variation in the pronunciation of English vowel minimal pairs among engineering undergraduates in Telangana, India. Sixty-four second-language speakers from four colleges affiliated with two universities participated in pre- and post-tests involving reading tasks and minimal pair drills. Data were analyzed using both quantitative (SPSS paired-samples *t*-tests) and qualitative methods. Results show a statistically significant improvement ($p < .005$) in the post-test, indicating the positive effect of targeted pronunciation training. However, specific contrasts—particularly those involving vowel length, diphthong glides, and central vowels absent in General Indian English—remained challenging. The study highlights sociolinguistic influences such as parental education and social rank on phonetic performance and emphasizes the need for context-sensitive pronunciation pedagogy that balances Received Pronunciation (RP) norms with General Indian English (GIE) realities. These findings provide pedagogical insights for pronunciation teaching among non-native English learners in technical education.

Keywords: *minimal pairs, Indian English, sociophonetics, pronunciation teaching, diphthongization, engineering students*

Introduction

Pronunciation evolves continuously, and variation across speakers is both natural and expected (Sweet, 1906). For non-native speakers, entrenched phonological habits from the first language often interfere with English pronunciation (Sethi et al., 2004). Accurate segmental articulation, particularly distinguishing minimal pairs, is crucial for intelligibility. Studies such as those by Levis and Cortes (2008) and Tuan (2010) have highlighted the challenges faced by university students in producing discrete sounds. Building on these insights, this research explores minimal-pair pronunciation among engineering undergraduates in Telangana, focusing on sociolinguistic influences.

Aim of the Study

The aim of the study is to describe the variance of English vowels of Minimal pairs of Telangana speakers. It is both quantitative and qualitative study. The main objectives of the study are:

1. To obtain the performance of the production of English vowels in relation to the following social variables: (a). Age (b). Gender (c). Social Rank (d). Father's Qualification (e). Mother's Qualification.

2. To obtain the variance in the production of English Minimal Pairs among the participants

Hypotheses
The hypotheses underlying the research are:

- There is no significant difference in the performance of vowel production in terms of age
- There is no significant difference in terms of the gender of the participants in rendering the variants
- There is no significant difference among the Social Rank of the participants
- There is no significant difference in Parental Qualification of the participants
- There is no significant difference in the performance of the participants in the production of English minimal Pairs

Method

The method employed in this study makes use of Sociolinguistic variables and Linguistic variables for gathering data and analyzing quantitatively by using by using SPSS Package, t-test and a paired test is employed to arrive at performance level Processing the figures and interpreting the results is done finally. The data was collected by recording the participants' articulation as they read the word-list which included Minimal Pairs. The variations are observed from the audio recordings of the participant's speech. It reports several deviations in the articulation of all the twenty vowels and it focuses on the analysis of the variations of the participants.

Participants

Sixty-four undergraduate engineering students from four colleges (two universities: Osmania University and JNTU, Hyderabad) participated. All were L2 English speakers aged 17–18. Stratified random sampling balanced age, gender, social rank, and parental education.

Material used for the Study

A standardized word-list (monophthongs, diphthongs, and 12 minimal-pair contrasts) was presented in isolation and in carrier phrases. Minimal pairs were adapted from *Exercises in Spoken English, Part 3: Vowels* (CIEFL/OUP, 1977).

Procedure

Participants completed a pre-test at program entry and a post-test after one semester of pronunciation instruction. Readings were audio-recorded. Each token was transcribed for phonological (intended) and phonetic (actual) realization; variants were coded.

Data Analysis

Descriptive statistics were compiled for sociolinguistic strata. Inferential analyses used paired-samples *t*-tests (SPSS). Significance threshold was set at $\alpha = .005$. The qualitative analysis catalogued recurrent variant patterns by contrast.

Results

Overall Effects

A paired-samples *t*-test across all participants indicated a statistically significant improvement from pre- to post-test on minimal-pair production accuracy ($p = .000$, $\alpha = .005$). University-wise analyses showed significant improvement for JNTU ($p = .000$) but not for OU ($p = .079$).

Figure 1. Mean minimal-pair scores by age group (Pre vs. Post).

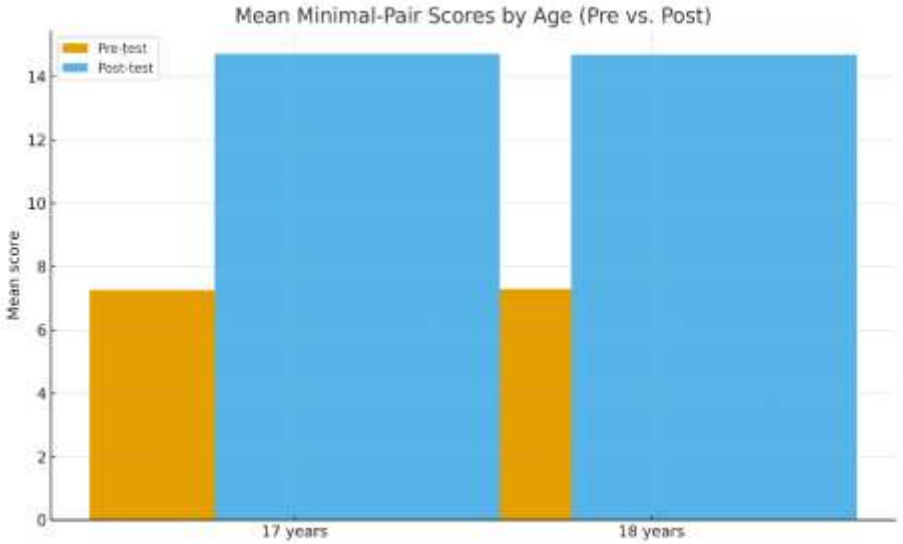


Figure 2. Mean minimal-pair scores by gender (Pre vs. Post).

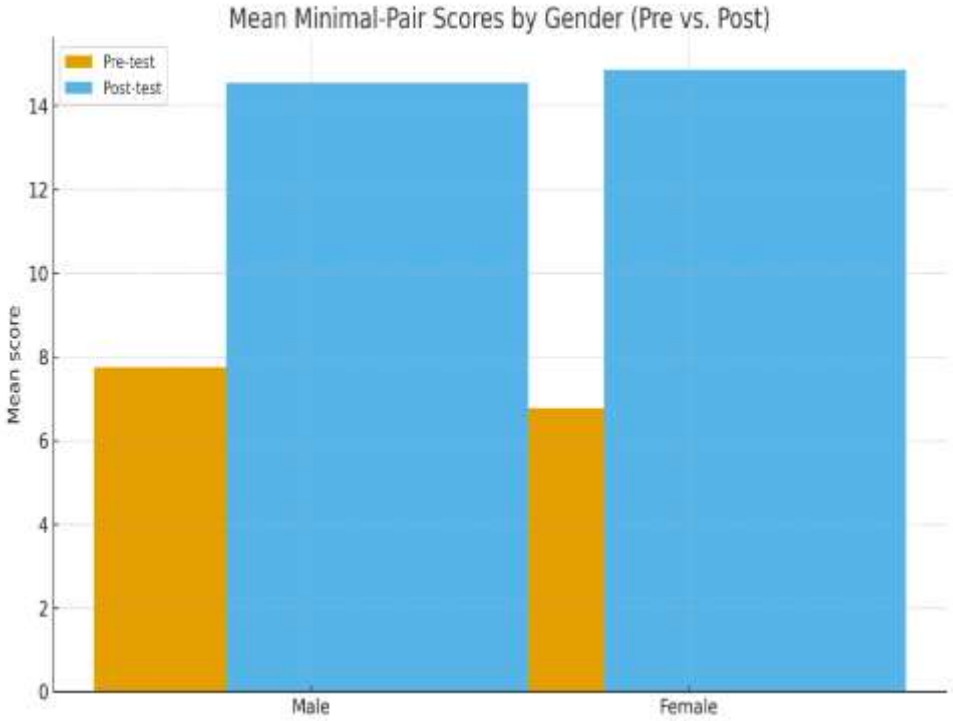


Figure 3. Mean minimal-pair scores by social rank (Pre vs. Post).

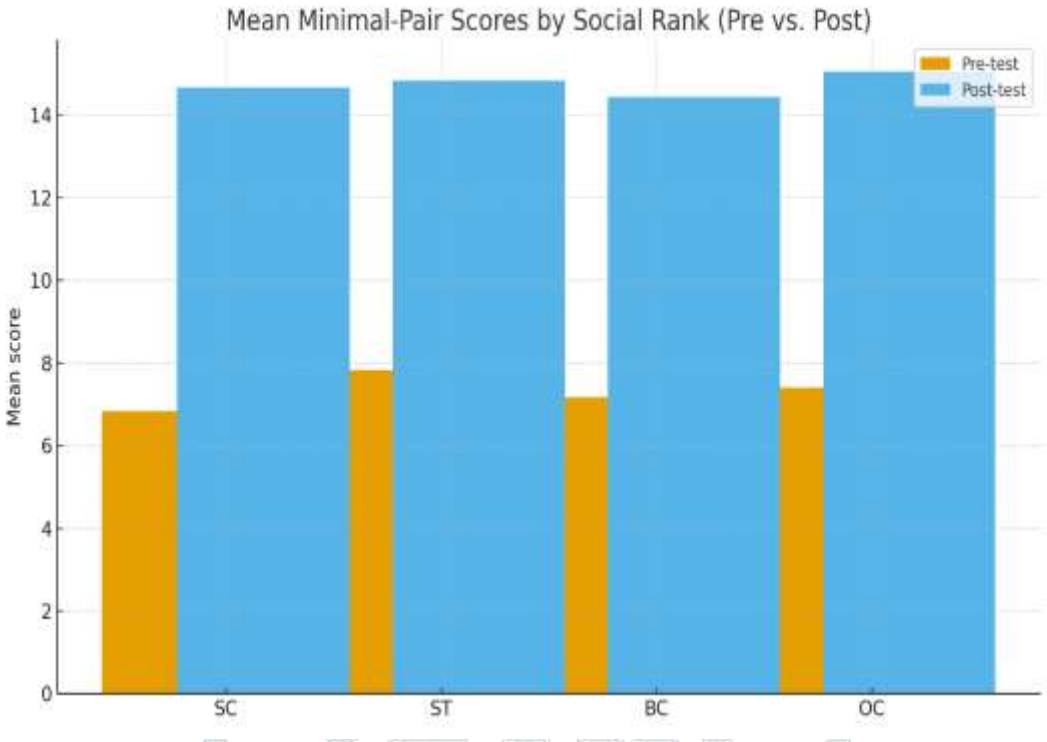


Figure 4. Mean minimal-pair scores by father's education (Pre vs. Post).

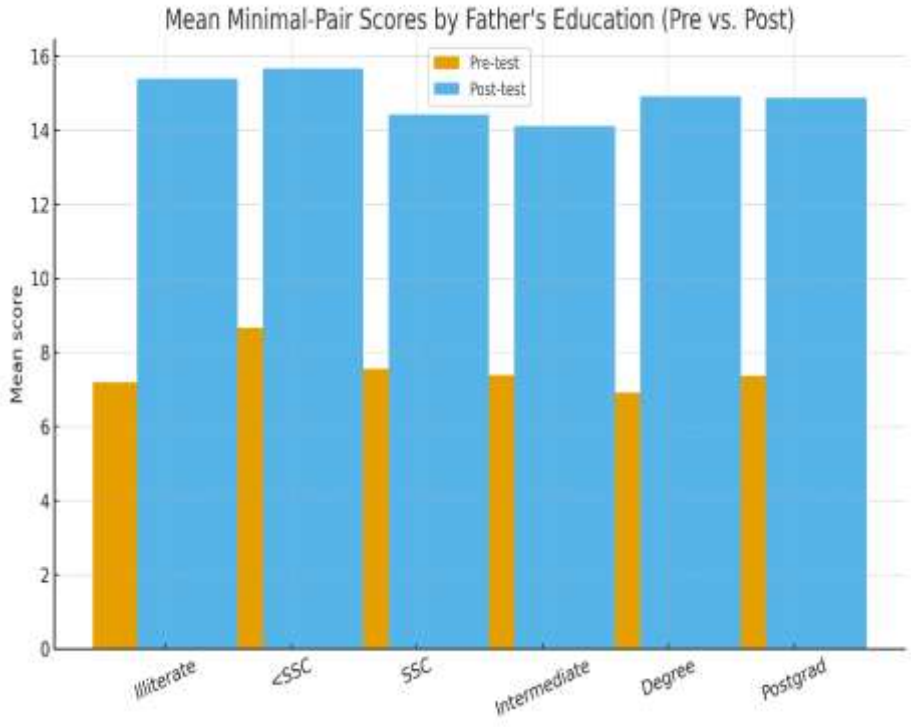
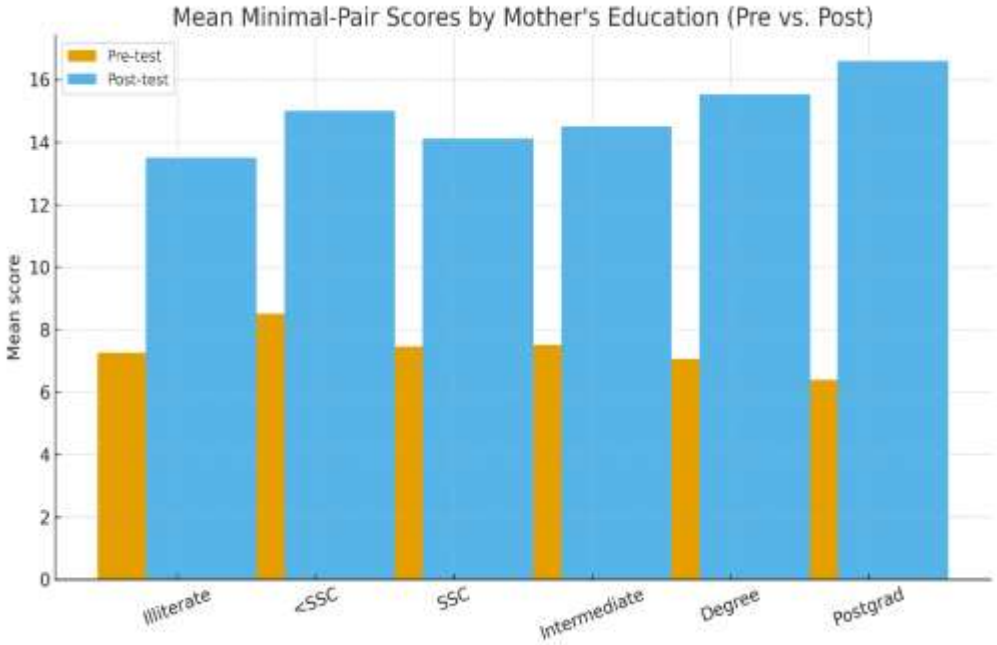


Figure 5. Mean minimal-pair scores by mother's education (Pre vs. Post).



Sociolinguistic Subgroups (Descriptives)

Table 1 summarizes pre- and post-test means by subgroup. Gains were broadly positive across all strata.

Table 1

Descriptive Means by Sociolinguistic Variables (Pre → Post) and Gain

Variable	Group	Pre	Post	Gain
Age	17 years	7.25	14.71	7.46
	18 years	7.30	14.70	7.40
Gender	Male	7.76	14.55	6.79
	Female	6.77	14.87	8.10
Social Rank	SC	6.83	14.67	7.84
	ST	7.83	14.83	7.00
	BC	7.17	14.43	7.26
	OC	7.41	15.05	7.64
Father's Education	Illiterate	7.20	15.40	8.20
	< SSC	8.67	15.67	7.00
	SSC	7.57	14.43	6.86
	Intermediate	7.39	14.11	6.72
	Degree	6.91	14.91	8.00
	Post-Graduation	7.38	14.88	7.50
Mother's Education	Illiterate	7.25	13.50	6.25
	< SSC	8.50	15.00	6.50
	SSC	7.46	14.12	6.66
	Intermediate	7.50	14.50	7.00
	Degree	7.06	15.53	8.47
	Post-Graduation	6.40	16.60	10.20

Note. Means derived from author-provided summary statistics for N = 64.

Inferential Tests

Table 2

Paired *t*-test for Minimal-Pair Accuracy (All Participants)

Contrast	Test	*p* (2-tailed)
Minimal-pair accuracy	Pre vs. Post	.000

Note. Significance evaluated at α = .005.

Table 3

Paired *t*-tests by University

University	Contrast	Test	*p* (2-tailed)
OU	Minimal-pair accuracy	Pre vs. Post	.079
JNTU	Minimal-pair accuracy	Pre vs. Post	.000

Contrast-Specific Patterns

Consistent with the qualitative analysis supplied by the author, several contrasts remained unstable at post-test (e.g., /iː–ɪ/, /ʌ–ɜː/, /eɪ–aɪ/, /ɔː–əʊ/, /eɪ–e/), with frequent monophthongization of diphthongs (e.g., /eɪ/ → [eː]), neutralization toward [ə] for central vowels (/ʌ/, /ɜː/), and inconsistent length control. In contrast, /u–uː/ was stable across both administrations.

Discussion

Although overall improvement was evident, challenges persisted for contrasts involving diphthongs (/eɪ/, /əʊ/) and central vowels (/ʌ/, /ɜː/). These findings are consistent with previous studies on GIE vowel mergers (Bansal & Harrison, 1972; Balasubramanian, 1981). Learners often substituted /ə/ for /ʌ/ and monophthongized diphthongs, reflecting systemic features of GIE. Effective instruction should thus integrate perception drills, explicit modeling, and awareness of regional variants.

Conclusion

The study concludes that structured pronunciation training significantly enhances students' production of English minimal pairs. Nevertheless, persistent errors in length and diphthongization highlight the need for sustained, targeted pedagogy. Integrating sociophonetic awareness within engineering curricula can promote greater intelligibility and linguistic competence.

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