

LEXICAL DENSITY AND LEXICAL VARIATION — AN ANALYSIS
OF THE LEXICAL TEXTURE OF SWEDISH STUDENTS' WRITTEN
WORK¹

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1. INTRODUCTION

The principal object of this investigation is to study the lexical content of extended written work in English produced by Swedish students.

There is something in addition to errors which is felt, instinctively, to be a difference in quality of the work of Swedish students compared to that of native speakers. It is of interest to study variations in lexical content and see if they can be expressed in definite terms, which may lead to a more positive evaluation. The syntax of the same essays will be studied at a later date, on the basis of Levenston's theory of over-indulgence and under-representation (Levenston 1971 : 115 ff.).

An attempt is made to apply certain theoretical methods of evaluation to essays and to use the results for two main purposes: a) to compare the lexical texture of Swedish students' work with that of native speakers writing on the same subject, b) to judge the relative quality of the essays and see to what extent the result agrees with a spontaneous evaluation.

This investigation is one of the studies in progress within the Swedish-English Contrastive Studies project at the University of Lund, Sweden.

2. MATERIAL AND METHODS

2.1 MATERIAL

36 essays written by Swedish students were examined. All the students were studying a one-year course (AB 1) in English at the University of Lund, but as it was their first term, they had not yet received any formal teaching in essay-writing.

¹ Paper read at Ustronic, 14th December, 1973.

The subject given was "Sir, I Protest...".

No instructions were given limiting the length of the essay. They vary between 126 and 573 words. The average number of words is 321.

In addition, 3 essays on the same subject, written by native speakers also studying the AB 1 course, were examined.

2.2 METHODS

2.2.1 LEXICAL DENSITY

The basic method used is that of counting the lexical density of the texts. This is a term used by Jean Ure (1971 : 445) to describe the percentage of lexical (i. e., content) words in the total number of words in any given text, either written or spoken.

In this paper a word is taken to mean an orthographic word. One lexical item such as *turn up* is regarded as two words, *turn* a lexical word and *up* non-lexical. Contracted forms such as *haven't* and hyphenated forms such as *baby-sitter* are regarded as one word.

The total number of orthographic words and the total number of lexical words are put into relation to each other to establish lexical density (LD):

$$\frac{LW}{OW} \times \frac{100}{1} = LD$$

2.2.2 VARIATION COUNT

The variation count shows the percentage of the total number of tokens of lexical words which are new types, thus giving a measure of the lexical variety of a text.

The total number of tokens (no. of occurrences of lexical words) and the total number of types (no. of different lexical words) are put into relation to each other to establish variation count (VC):

$$\frac{Ty}{To} \times \frac{100}{1} = VC$$

A separate count was carried out on the nouns, verbs and adjectives in the texts.

2.2.3 LEXICAL WORDS

In this investigation, the basis for the distinction between words with lexical properties and others is the discussion in *A grammar of contemporary English* (Quirk et al. 1972: 46 - 47) on closed-system and open-class items. *Be* and *have* have been included in the count when they appear as lexical words.

2.2.4 ERROR

In spite of an attempt to arrive at a positive evaluation of written work, the question of error must be taken into consideration. For the purposes of this investigation no distinction is made between *mistakes*, due to faulty performance, and *error*, due to defects in linguistic competence (Corder 1967: 166 - 167), but the term *error* is used to cover the whole range of deviances from the correct form.

The total number of orthographic words in each text does not include words involved in error. This was done to avoid making a subjective decision from case to case, as to what to include or disregard. One exception has been made to this. Contracted forms such as *it's* have not been regarded as error, although marked as such by the corrector, as they seemed to be in keeping with the relatively informal style of the texts.

2.3 LIMITATIONS

This investigation must be regarded as a pilot study on a very limited material, to test various applications of the above methods and see if they warrant further studies on a larger scale.

The number of native speakers involved is obviously too small to be the basis for a true comparison between Swedish students' and native speakers' use of lexis.

In discussing writing a foreign language, Lado (1970 : 248) makes the point that the ability to write creatively is not possessed by all native speakers of a language. All three in this investigation may have high creative ability, thus setting an unnecessarily high standard for comparison. The reverse could also be true.

The results are still of interest, bearing in mind these factors, and may show a tendency which can be investigated later with a large and varied group of native speakers.

2.4 ESSAY EVALUATORS

The native speaker evaluation used here in the comparison with the lexical density and variation counts is that of an academically trained but non-teaching person. The decision not to use a teacher of English as a foreign language for the comparison was made to avoid the dominance of error as the basis for the evaluation. A study is in progress to compare the opinions of different categories of native speakers on the 36 essays.

3. RESULTS

3.1 LEXICAL DENSITY

Ure's study (1971: 445 - 449) was carried out on 34 spoken and 30 written texts in English by native speakers. She found that all but two of the spoken texts had an LD of under 40%, while all the written but two had a density of 40% or more. After further consideration, the spoken texts with a high LD could be grouped with most of the written texts, in that there was no verbal response to the speaker, or any perceptible non-verbal response of a kind to make him adjust his language. This response, feedback, was present in the written text with the lowest density. Feedback was present in all texts with LD of 36% or under. This leads us to presume that the LD counts for these essays, if they had been written by native speakers, would all lie above 36% and probably show a majority over 40%.

The results of the LD count in this investigation are as follows:

Median LD	38.66%
Lowest Quartile	30.36% — 36.09%
Highest Quartile	41.31% — 47.15%

33.33% of the students' texts lie under the level for texts without feedback.

72.22% lie under the 40% border.

38.88% lie between 37% and 39%.

The result for the 3 native speakers in this investigation is as follows:

Native speaker A	50.45%
„ „ B	46.56%
„ „ C	48.54%

The results show that the Swedish students' lexical density lay under the predicted level for native speakers, in the majority of cases. Only one Swedish student had an LD higher than the lowest level gained by a native speaker in this study.

3.2 LEXICAL DENSITY INCLUDING ERROR WORDS

The question of error crops up again. The native speakers' work contained little or no error and there was therefore no loss of density on that account. The Swedish students' texts were counted again to see if the result would be higher when all words, even error words, were included. This count shows the LD intended by the student in contrast to the LD actually gained.

The results are as follows:

6 students gained sufficiently high values to cross the 36% border, leaving only 16% below the feedback line.

1 student had a drop in density which brought him below the 36% border, leaving a total of 6 out of 36, or 16.6% below the feedback line.

5 students gained sufficiently high values to cross the 40% border, making the 40% and over group the biggest, with 16 out of 36, or 44.4% of the texts.

This result is nearer the predicted result for native speakers for written texts in general, without feedback, but only one more text reached the level of the lowest of the 3 native speakers on this particular subject.

3.3 EVALUATION

3.31 LIMITATIONS OF A LEXICAL DENSITY COUNT

Lexical density alone was shown to be an insufficient measure of the relative quality of the texts, due to two factors:

- 1) The number of errors.
- 2) The lack of variation in the lexis of certain texts.

An essay is supposed to show the student's ability to write English. A certain amount of accuracy must therefore be a basic requirement, before other evaluations are made. According to a lecturer in the English Department of the University of Lund, three serious errors, type concord, tense or of similar gravity, are automatically regarded as reasons for failing an essay. Judged by this standard, 14 of the 36 essays would be failed due to error. An LD count on these 14 showed the following results:

LD without error words:

Below 36%	6 essays
Above 40%	1 essay

LD with error words:

4 moved from below 36% leaving 2 essays	
3 moved into the category above 40% leaving 4 essays	
The average LD for all essays (without error words)	38.51%
„ „ „ „ the 14 „ „ „ „	36.81%
„ „ „ „ all essays (with error words)	39.33%
„ „ „ „ the 14 „ „ „ „	37.88%

This shows that the group failed due to error had also a comparatively low count, suggesting that they were weak in both grammar and vocabulary.

3.32 VARIATION COUNT

The variation count gives a valuable check on the LD. In certain cases the language may seem poor, in spite of a high density. The high value may have been gained by a large-scale repetition of a limited vocabulary. This will be shown up by a low variation count.

As the essays are of different lengths, the figures giving the variation for each are not strictly comparable. The presumption must be that a high figure is easier to gain in a short essay than in a long. In an attempt to eliminate this factor the essays were divided into groups according to the number of lexical words. The average type/token percentage was counted for each group and each member of the group was judged low, average or high on variation in relation to this figure.

No. in group	No. of lexical words	Av. variation count
A : 3 essays	- 59	78.69%
B : 15 „	60 - 118	74.83%
C : 10 „	119 - 178	69.14%
D : 8 „	179 - 238	65.03%

An essay judged for the purposes of this investigation to have an average lexical variation has the group average ± 2 . Figures above this are judged high and below this, low.

All the three native speakers showed a very high lexical variation.

Native speaker A	: 96.43% (Group av. 78.69%)
„ „ B	: 90.16% („ „ 74.25%)
„ „ C	: 86% („ „ „)

3.33 AGREEMENT WITH SPONTANEOUS EVALUATION

The presumption is now that essays which have both a high LD and a high lexical variation, combined with a lack of error, should make a better impression on the reader than one with a low value in one or both.

The evaluations given here for comparison with the results of the theoretical investigation are those of the academically trained native speaker.

The essays were judged by a 3-point scale.

- 1: very poor
- 2: average
- 3: very good

Group 1 does not include those eliminated due to a high rate of error, leaving 4 essays judged very poor due to other factors.

Group 1	LD up to and including 36%	LOW variation
1	+	-
2	+	+
3	+	-
4	-	+

Only one essay in this group has an LD above 36%. The actual figure is 37.97%, but it is in combination with low variation.

Group 3	LD above 40%	HIGH variation
1	-	+
2	+	-
3	+	+
4	+	+
5	+	+

Group 3 shows a high LD in each case but one, which is combined with a particularly high lexical variation. In fact, 4 of the 5 in this group have well above average in this feature.

Although essays with high LD and average or high variation rate are not always judged to belong to the highest group, all in group 3 displayed one or both of these features. Similarly, all essays in group 1 have either low LD or low variation.

3.34 LENGTHS OF ESSAYS

The 4 essays in group 1 were shorter on average than those in groups 2 or 3

GROUP	AVERAGE NO. OF WORDS
1	205
2	349
3	301

It is difficult to say as yet, whether the short length influenced the reader to give a low evaluation, or whether it is, in fact, a symptom of a bad essay.

4. CONCLUSIONS

This small scale investigation has shown that part of the difference between the written work of native speakers and foreign students can be identified in terms of lexical density and variation. It is not simply a matter of different degrees of grammatical correctness. On both counts the native speakers in this study had high results. Their language was richer in lexis and more varied, which suggests that more stress needs to be placed on the study of vocabulary in teaching English as a foreign language.

It is evident that these two counts do not cover the whole field of lexis. A study, based on frequency lists, to determine the level of difficulty of the words used might explain why all essays with high LD and average variation were not judged better than average. The words used may have been too general, without being sufficiently wrong to be judged as error.

Counting LD is not intended to function as a method of essay evaluation. It is rather a check to see if other methods of evaluation can be backed up statistically. In this study the theoretical evaluation coincided with the

spontaneous, in that all essays judged very good had high values in one or other of the counts. Similarly, all in the very poor group had low values in one or both. A more detailed evaluation by a larger number of native speakers is in progress.

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