

AN EXPERIMENTAL STUDY OF INTELLIGIBILITY
OF JAPANESE ENGLISH*

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Introduction

There seems to be a general shift of interest in research on error analysis from the categorization of errors committed by non-native speakers of the target language to the investigation of intelligibility of non-native speakers' speech judged by native speakers. Earlier studies (Schachter 1974, Scott and Tucker 1974), and others focused upon the types of errors and characteristics of learner's interlanguage. More recent research, however, concentrates more upon how these errors are perceived by the native speakers and which errors impede communication. There are some errors which are relatively more understandable for native speakers and there are other errors which are destructive to communication. Several researchers have attempted to establish hierarchies of error gravity for specific languages produced by native speakers of English: German (Politzer 1978, Delisle 1982), Spanish (Guntermann 1978, Chastain 1980), French (Piazza 1980, Ensz 1982). Error gravity in English has also been studied from the perspective of speakers from various other language backgrounds; Japanese speakers (Tomiyana 1980), Greek speakers (Hughes and Lascaratou 1982), non-native speakers of English (Vann, Meyer, and Lorenz 1984). Most of such research uses written samples which are either artificially created or taken from learners' compositions. Piazza (1980) is the only exception as she uses both written and tape-recorded sentences to measure comprehensibility of the degree of irritation experienced by French judges. Thus we felt the necessity of an in-depth study in the field of intelligibility of English presented in spoken rather than written form.

Objectives

The purpose of our study was twofold: (1) To analyze and classify the phonetic characteristics of English spoken by Japanese university students, (2) To measure the degree of intelligibility of non-native speech when presented to native speakers of English.

Procedure

We have phonetically analyzed and characterized five-minute speeches made by 80 Japanese university students. Excerpted from the speeches were 52 sentences in which words with non-standard pronunciation were included. 48 Americans, living in the suburb of Portland, Oregon, took part in this research as subjects. They were first asked to hear a single word excerpted from a sentence produced by a student, and then the whole sentence containing that word. They were instructed to transcribe the word and the sentence exactly as they heard them in their own home using their own tape recorder. Each word-sentence pair was heard only once.

Results and Discussion

1. The pronunciation errors committed by the informants (students) fell into six categories as shown below.

Examples:

Vowel Addition (abbreviated as VA) drɪŋk (drink) → dorɪŋku
taiɔd (tired) → taija:do

Consonant Addition (CA)

Vowel Substitution (VS)

Consonant Substitution (CS)

Consonant Deletion (CD)

Wrong Pause Insertion (WPI)

Wrong Accentuation (WA)

ri:dɪŋ (reading) → ri:dɪŋgu

bɔ:d (bird) → ba:d,

hard (hard) → hæ:d

θɪŋk (think) → sɪŋk,

bɪzi (busy) → bidʒi:

maɪld (mild) → mail,

ould (old) → o:l

Intə'næʃnəl (international)

→ inta:nəʃnəl

kɔ:mɔ:s (commerce)

→ komɔ:s

By surveying the judges' (natives') transcriptions, we found that they had heard the learners' English in many interesting ways. Let us give some examples below.

In the following examples, the words which the learners intended to say are shown on the left of the arrow, and the transcribed words on the right. The arrow means "was heard as."

(a) 21 future → preacher (15)*
teacher (7)
picture (4)

(* The number before each word is an item number. The number inside the parentheses indicates the number of natives who heard the intended words wrongly in this way.)

The Japanese /f/ sound is usually realized as bilabial fricative [ɸ]. This particular learner seems to have pronounced [ɸ] for /f/ of "future" with a strong puff of air. Accordingly many of the subjects heard this plosive as /p/ or /t/.

(b) 7 some → seven (17)
several (14)
summer (4)

"Some" is a word of one syllable, but was perceived as a bisyllabic words. This results from the fact that the learner produced [samu:] instead of [sʌm].

(c) 3 bird → bad (18)
bath (18)
but (3)

For Japanese learners of English, pronouncing an r-colored vowel /ɝ/ is quite difficult, so they often substitute the Japanese /a/ for it. The learner concerned followed this rule and also deleted the word-final /d/ to produce [ba:(d)].

(d) 25 work → oak (15)
walk (14)

In this case, the Japanese [o:] was substituted for /ɝ/. The spelling "or" in "work" must have influenced the pronunciation as this phenomenon is often observed in Japanese pronunciation of this word. Furthermore, pronunciation of the word-initial /w/ was so short and weak that it was not picked up by the judges.

(e) 10 runs → lunch (5)
lands (4)
plans (4)
lance (3)

It is often pointed out that Japanese learners are not good at distinguishing between /r/ and /l/ since Japanese does not have the /r/ - /l/ contrast in its sound system. The result here demonstrates this common tendency.

We could give more examples, but we believe that the examples above are enough to suggest some fundamental phonetic aspects of Japanese English. Here it is important to note that Japanese consonants are pronounced much weaker than English consonants, and that negative transfer often operates in learners' pronunciation. From the above analysis, we can posit that when the natives aurally come across a word which is difficult to understand, they tend to pick up even minute phonetic features (in other words, redundant features), and that they associate phonetically similar or interchangeable words with the word concerned, i.e., a wrongly pronounced word.

2. We established how correctly each word used in the experiment had been understood by the natives. The average rate of correct understanding for the words out of context and that for the words in context were 41.64% and 66.84% respectively, showing about a 25% increase in the rate of correct understanding (for details, see Appendix). 50 out of 52 items, showed an increase of the rate. The result of a chi-square test showed that the difference between the above two rates was statistically significant for 35 among the 50 items. From this result we concluded that the context in which each word was put enhanced the understanding of the word even if the word was not properly pronounced.¹

3. The rates were significantly different depending on whether the words were in or out of context. The words below are listed according to the extent of differences.²

| | | | OUT OF CONTEXT | IN CONTEXT | AVERAGE RATE | CHI- SQUARE | |
|------|----|-----------|-------------------|---------------|-----------------|----------------|-----------|
| (1) | 29 | months | CS | 16.7 | 95.8 | 56.3 | 61.122*** |
| (2) | 15 | three | CS | 14.6 | 83.3 | 48.9 | 45.395*** |
| (3) | 21 | future | VS | 27.1 | 87.5 | 57.3 | 35.803*** |
| (4) | 18 | could not | VA | 20.8 | 81.3 | 51.0 | 35.060*** |
| (5) | 52 | very | CS | 39.6 | 93.8 | 66.7 | 31.688*** |
| (6) | 40 | played | CS | 27.1 | 79.2 | 53.2 | 26.143*** |
| (7) | 50 | much | VS | 45.8 | 93.8 | 69.8 | 26.137*** |
| (8) | 2 | models | WA | 41.7 | 89.6 | 65.7 | 24.427*** |
| (9) | 12 | hard | CS | 18.8 | 68.8 | 43.8 | 24.381*** |
| (10) | 13 | old | CD | 20.8 | 70.8 | 45.8 | 24.168*** |

*** p<0.001

(The numbers here and in the tables that follow indicate the rates of correct understanding by percentage.)

We can see that the rates of correct understanding for the words out of context are rather low while the rates for the words in context are very high. This fact supports the view that whereas these words were improperly pronounced by the learners and had phonetically similar and interchangeable alternatives, they were in contexts that helped facilitate the natives' guess-work.

4. Shown below are the ten words with the highest average rates of correct understanding.

| | | | OUT OF CONTEXT | IN CONTEXT | AVERAGE RATE | CHI- SQUARE | |
|------|----|-----------|-------------------|---------------|-----------------|----------------|-----------|
| (1) | 31 | music | CS | 87.5 | 100 | 93.8 | 6.400* |
| (2) | 45 | office | WA | 85.4 | 100 | 92.7 | 7.551** |
| (3) | 22 | lawyer | VS | 79.2 | 97.9 | 88.6 | 8.317** |
| (4) | 14 | good | CS | 79.2 | 93.8 | 86.5 | 4.360* |
| (5) | 48 | sad | CS | 68.8 | 100 | 84.4 | 17.778*** |
| (6) | 17 | drink | VA | 77.1 | 91.7 | 84.4 | 3.872* |
| (7) | 8 | thirty | CS | 81.3 | 87.5 | 84.4 | 0.711 |
| (8) | 39 | continued | WPI | 81.3 | 85.4 | 83.3 | 0.300 |
| (9) | 42 | course | VS | 66.7 | 93.8 | 80.3 | 11.090*** |
| (10) | 36 | moved | VA | 70.8 | 89.6 | 80.2 | 5.315* |

***p<0.001 **p<0.01 *p<0.05

These words were incorrectly pronounced by the learners, but they had few phonetically similar and interchangeable words and were in contexts which aided understanding.³ We can assume that these conditions influenced the results.

5. The words below had the lowest average rate of correct understanding.

| | | | IN CONTEXT | OUT OF CONTEXT | AVERAGE RATE | CHI- SQUARE | |
|------|----|-------------|---------------|-------------------|-----------------|----------------|-----------|
| (1) | 24 | advertizing | WA | 0.0 | 0.0 | 0.0 | 0.000 |
| (2) | 7 | some | VA | 6.3 | 12.5 | 9.4 | 1.103 |
| (3) | 3 | bird | VS | 8.3 | 12.5 | 10.4 | 0.447 |
| (4) | 1 | Commerce | WA | 8.3 | 14.6 | 11.5 | 0.924 |
| (5) | 25 | work | VS | 10.4 | 16.7 | 13.6 | 0.801 |
| (6) | 51 | girls | CD | 12.5 | 20.8 | 16.7 | 1.200 |
| (7) | 26 | nineteen | CD | 14.6 | 22.9 | 18.8 | 1.094 |
| (8) | 10 | mild | CD | 12.5 | 33.3 | 22.9 | 5.897* |
| (9) | 37 | major | CS | 18.8 | 29.2 | 24.0 | 1.429 |
| (10) | 5 | runs | CS | 10.4 | 41.7 | 26.1 | 12.169*** |

***p<0.001 *p<0.05

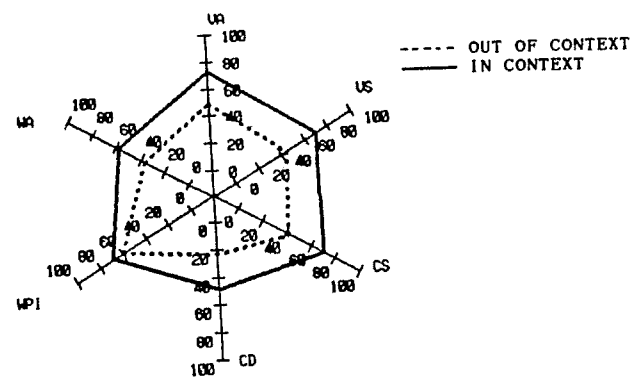
The learners pronounced these words very obscurely, which we suppose stimulated the natives' choice of phonetically similar and interchangeable words. Furthermore, some of them were placed in contexts which did not help the natives understand them.⁴ These two conditions seem to have worked negatively for the understanding of these words.

6. The relationship between the error types and the rates of correct understanding can be analyzed as follows.

| | NUMBER | OUT OF CONTEXT | IN CONTEXT | AVERAGE RATE | CHI- SQUARE |
|------------------------|--------|-------------------|---------------|-----------------|----------------|
| Wrong Pause Insertion | 2 | 59.4 | 67.7 | 63.5 | 1.439 |
| Vowel Addition | 7 | 49.4 | 72.6 | 61.0 | 38.060*** |
| Vowel Substitution | 11 | 44.1 | 69.7 | 56.9 | 70.379*** |
| Consonant Substitution | 20 | 42.2 | 70.6 | 56.4 | 88.868*** |
| Wrong Accentuation | 7 | 36.3 | 58.6 | 47.5 | 33.568*** |
| Consonant Deletion | 5 | 23.3 | 48.3 | 35.8 | 32.619*** |
| | | 41.6 | 66.8 | 54.2 | |

***p<0.001

Figure 1 The Relationship Between the Error Types and the Rates of Correct Understanding



The table above shows that consonant deletion has the highest rate of misperception; this means that the words which contained errors of consonant deletion were hardest to understand. This result coincides with O'Connor's view (1980: 24) that consonants contribute more to making English understandable than vowels do.

Vowel addition, on the other hand, has the highest rate of correct perception in context: 72.6% level. Additional vowels do not seem to be crucial obstacles for understanding of a word as long as a context is provided. Figure 1 shows visually the relations between the error types and the rates of correct understanding.

7. We also analyzed the data in terms of the subjects' achievement in the transcription task. The highest rate of correct answers was 91.19%; the lowest was 27.88%. Five of the subjects got over 70%.

In this research, the judges' age, educational level, and experience with English spoken by Japanese were recorded. Though a few answers were missing, we were able to analyze the relationship between each of these items and the average rate of correct answers supplied by the judges.

(a) No correlation was found between the rates of correct answers and age; ($r=-0.128$) However, there was a tendency for judges in their 20-30's to obtain relatively correct answer rates.

| AGE | NUMBER* | AVERAGE RATE |
|-----|---------|--------------|
| 60 | 2 | 52.4 |
| 50 | 7 | 51.1 |
| 40 | 14 | 51.5 |
| 30 | 19 | 58.8 |
| 20 | 2 | 64.4 |
| 10 | 3 | 48.7 |

(*The age of one subject is unknown.)

(b) The relationship between the rates of correct answer by the judges and their educational levels was also surveyed. The educational levels of the judges were classified into three groups; graduates of high school, university and graduate school.

| | Graduate School X=51.8(n=6) | University X=51.6(n=27) | High School X=60.8(n=13) |
|-----------------|--------------------------------|----------------------------|-----------------------------|
| Graduate School | - | - | - |
| University | t=0.017 | - | - |
| High School | t=1.103 | t=2.205* | - |

(Two are unknown.) *p<0.05

We found that the high school graduates had higher rates than the other two groups: the results of the t-test show that the average rate obtained by high school graduates is significantly higher ($p<0.05$) than university graduates. Natives with higher education do not necessarily understand the non-natives' English better.

(c) The relationship between the rates of correct answers by the judges and their exposure to English spoken by Japanese is reported below. The exposure was classified into four groups, i.e., much, occasional, little and none.

| | NUMBER | AVERAGE RATE |
|------------|--------|--------------|
| Much | 4 | 62.3 |
| Occasional | 11 | 53.6 |
| Little | 15 | 47.6 |
| None | 16 | 58.8 |

Those who had 'much' experience in Japanese English had the highest rate (62.3%). Another interesting point is that the subjects categorized into 'none' got a relatively high rate (58.8%). These subjects might have tried hard to catch what they heard because they had had no pre-vious experience with Japanese English.

Conclusion

First, we will outline our general conclusions and then briefly restate the major findings of our study. We found that when the native speakers aurally came across a word which was difficult to understand, they tended to, pick up even minute phonetic features, and that they associated phonetically similar or interchangeable words with the word concerned.

In addition, the context in which each word was put enhanced the understanding of the word even if the word was not properly pronounced. The rates of correct understanding for the words out of context are rather low while the rates for the words in context are very high. This fact supports the view that whereas these words were improperly pronounced by the learners and had phonetically similar and interchangeable alternatives, they were in contexts that helped facilitate the native speakers' guesswork.

Consonant deletion, moreover, had the highest rate of misperception; this means that the words which contained errors of consonant deletion were hardest to understand. Vowel addition, on the other hand, had the highest rate of correct perception in context.

Lastly, no significant differences were observed between the judges' age, educational level, or experience with the Japanese English and the rate of intelligibility.

Our specific findings are as follows:

1) The rate of intelligibility decreased when listening in single word units rather than in context. Listening in context boosted intelligibility by 25 percent.

2) Given a context, intelligibility of some of the words increased as high as 80%, although intelligibility of other words did not increase at all. This variability can be attributed to environmental factors such as the number of the words that could be substituted for or approximate the original word phonologically, and the relative clarity of the context.

3) Intelligibility increased when there were few or no words which could be substituted for or used to approximate the originals, even though they were not articulate. Moreover, words were more intelligible when they were in a context which encourage guessing. However, if the words were in a less clear context, the intelligibility was lower.

4) Through the analysis of the relationship between the error types and the rates of correct understanding, we found that errors of consonant deletion were the hardest to understand and that those of vowel addition were not crucial obstacles for understanding. Vowel addition, on the contrary, led to increased intelligibility.

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NOTES

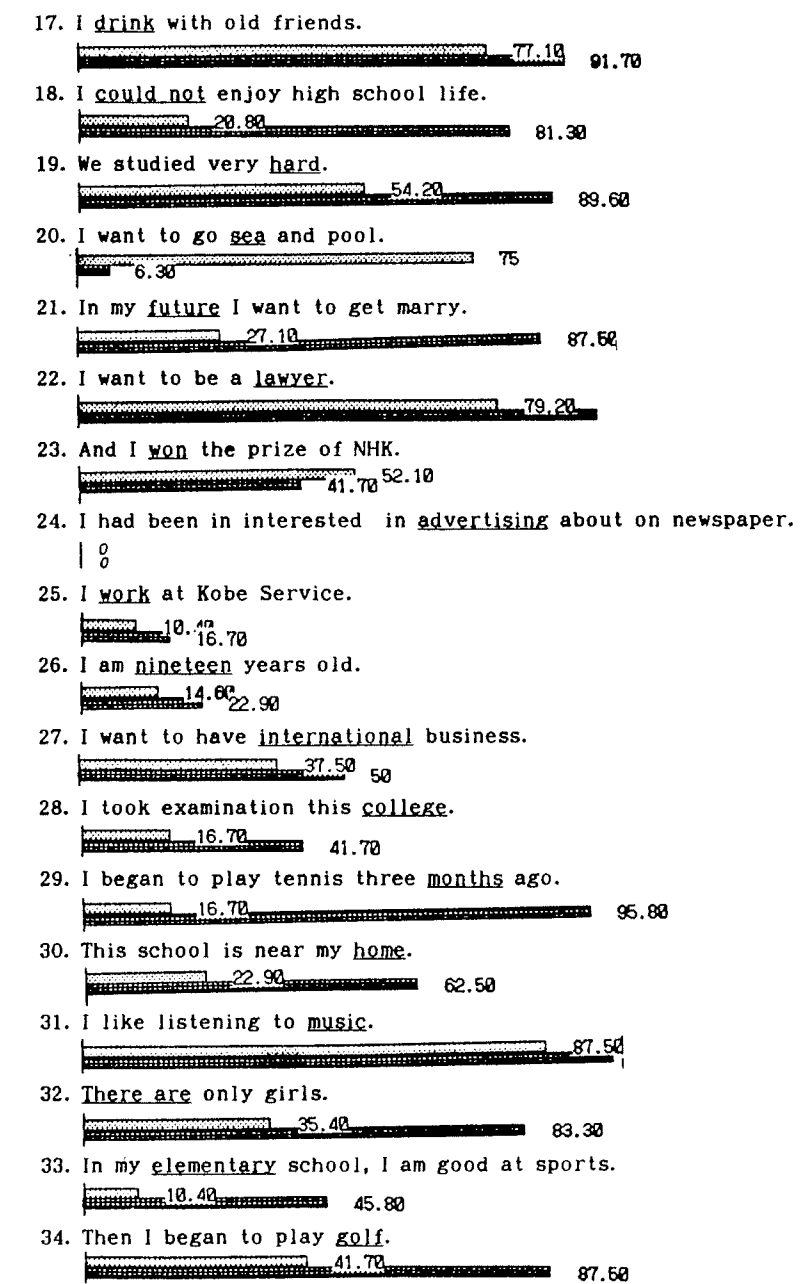
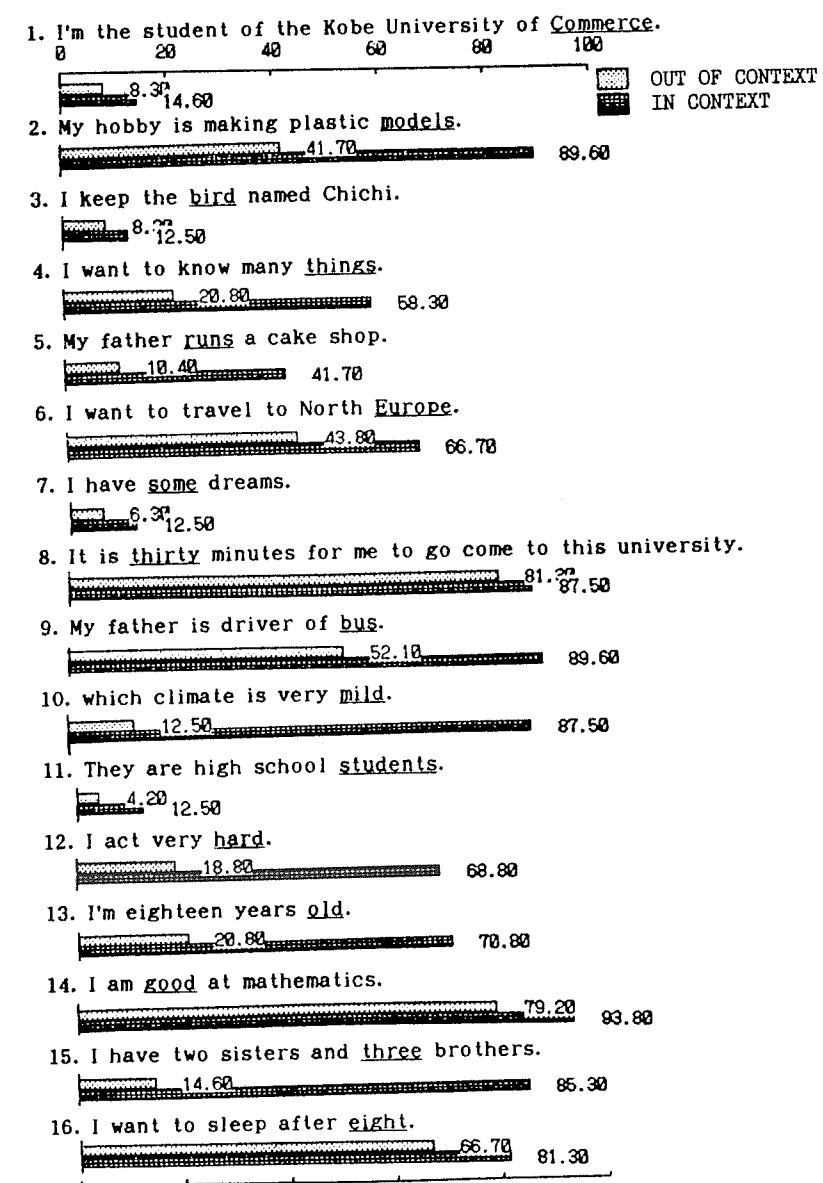
- 1 We confirmed this conclusion by using a written form of the cloze test for the words concerned. As a result we found that the rate for correct answers in the cloze test correlations moderately with the rate of correct understanding for the words in context ($r=.40$).
- 2 Note that in each of these words are included different types of errors, and that we took up only the errors which seemed crucial for the understanding of the word concerned.
- 3 The result of the cloze test for these ten items was 52 points (100%=100 points).
- 4 The average score on the cloze test for these words was 37 points.

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APPENDIX

Sample words and sentences spoken by Japanese university students and the average rates of correct understanding.



| | | |
|---|-------|-------|
| 35. I am <u>busy</u> with part-time job. | 70.80 | 85.40 |
| 36. I <u>moved</u> from Sannomiya to Suma. | 70.80 | 89.60 |
| 37. Last year I <u>major</u> in this class. | 18.80 | 29.20 |
| 38. And I <u>think</u> such many movement have good points. | 56.30 | 77.10 |
| 39. I <u>continued</u> to play judo. | 10.40 | 14.60 |
| 40. We <u>played</u> tennis. | 14.60 | 29.20 |
| 41. At last I enter this <u>university</u> . | 64.60 | 93.80 |
| 42. I study international business <u>course</u> . | 66.70 | 93.80 |
| 43. I'm <u>tired</u> with this club. | 66.70 | 72.90 |
| 44. attend class <u>a little</u> . | 62.50 | 72.90 |
| 45. I want to become an <u>office lady</u> . | 85.40 | 100 |
| 46. When I graduate from <u>this school</u> . | 56.30 | 93.80 |
| 47. I'm now in mandolin <u>club</u> . | 22.90 | 31.30 |
| 48. I'm very <u>sad</u> . | 68.80 | 100 |
| 49. My hobby is listening to music and <u>reading</u> . | 25 | 64.60 |
| 50. Thank you very <u>much</u> . | 45.80 | 93.80 |
| 51. I went to <u>girl's</u> school. | 12.50 | 20.80 |
| 52. My high school is <u>very</u> happy. | 39.60 | 93.80 |

Lilyana Grozdanova

If we want to describe the major difference between Standard Bulgarian (SB) and Standard English (SE) in negation, we can do this in two words – *polynegative* versus *mononegative*. Informative as this short description is, however, it does not cover the whole field in question. It refers to a sub-class of negative constructions which have been defined as „completely negative“ (Stoyanova 1984: 392).

The purpose of this paper is to outline complete negation as a possible source of superfluous negation in the Bulgarian-English Interlanguage.

It is common knowledge that, along with the mononegative SE, there is an active sub-standard variant, which is polynegative. As pointed out by Foster (1968: 148), both variants are rule-governed systems and native speakers are found to interchange them according to the register they choose to use. On the other hand, though polinegation is the SB rule, instances of mononegation are frequent in substandard Bulgarian. So, paradoxically, the speakers of two typologically different languages are capable of understanding and applying the same rules, namely, *neg*-reduplication and *neg*-reduction.

First, I shall try to show that, irrespective of the number of exponents, completely negative sentences have only one possible interpretation. Before doing this I must point out that there is no crucial difference between SB and SE in encoding propositional (verb) negation. Both languages employ one exponent to express one application of the semantic operator NEG. For instance:

- | | | | | |
|----|----|------|----------------------|-------------|
| 1. | a. | Ivan | <i>ne</i> tanzuva | s Marija. |
| | b. | John | did <i>not</i> dance | with Maria. |

Where the two languages diverge is in the case of complete negation as in (2.a), (2.b) and (3.a), (3.b) below:

- | | | | | |
|----|----|---------------|----------------------|-------------------|
| 2. | a. | Ivan | <i>ne</i> tanzuva | s <i>nikogo</i> . |
| | b. | John | did <i>not</i> dance | with anybody. |
| 3. | a. | <i>Nikoj</i> | <i>ne</i> tanzuva | s Marija. |
| | b. | <i>Nobody</i> | danced | with Mary. |

In SB „in the presence of one or more negative prowords the verb form is accompanied by the negative particle *ne*“ (Scatton 1984: 376), as in (2. a) and (3. a). SE, on the other hand, does not allow *neg*-reduplication, as illustrated in (2. b) and (3. b). When complete negation is expressed by discontinuous exponents such as *ne ... ni-/ni- ... ne* or *not ... any-* one might argue that there is a certain structural similarity. But the *neg*-incorporation rule (3. b) is valid only for English. Mononegative sentences like (4. a) and polynegative like (4. b) are considered ungrammatical in SB and SE respectively:

- | | | | | |
|----|----|-------|----------------------|----------------------|
| 4. | a. | *Ivan | tanzuva | s <i>nikogo</i> . |
| | | *Ivan | did not dance | with anybody." |
| | b. | *John | did <i>not</i> dance | with <i>nobody</i> . |

Assuming a common underlying semantic structure for pairs like (2. a & b) and (3. a & b), it is essential to find out which of the two possible expression rules is instrumental in shaping their surface structures – the *neg*-reduction rule or the *neg*-reduplication rule. This, in turn, will reveal an important fact pertinent to language acquisition, namely, which of the resulting constructions reflect the underlying structure more directly – the mononegative or the polynegative.

As shown in an earlier publication (Grozdanova, in press), there is a significant dependency between the value of the arguments and the related predicate in a proposition. If either or both arguments are assigned zero-value, they preclude the potential possibility for the predicate to have any other value but zero. Translated in terms of natural categories (Bates