

# Early Foreign Language Education and Metalinguistic Development: A Study of Monolingual, Bilingual and Trilingual Children on Noun Definition Tasks

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## 1. Introduction

Word definitions provide an interesting linguistic corpus for investigating cognitive, linguistic (semantic and syntactic), and metalinguistic aspects of human development. Even though they represent seemingly simple statements in their surface structure, they incorporate abstract relationships between concepts. The ability to formulate these relationships by means of language requires cognitive maturity and semantic knowledge as well as familiarity with the conventional syntactic form.

It is for this reason that word-definition tasks have long been used by test makers (Markowitz and Franz, 1983; Nippold, 1995) and researchers (Al-Issa, 1969; Benelli, Arcuri, & Marchesini, 1988; Bialystok & Majumder, 1988; Carlisle, Davis, & Spharim, 1999; Clark, 1973; Davidson, Kline, & Snow, 1986; Feifel, 1949; Feifel and Lorge 1950; Kikas, 1993; Litowitz, 1977; McGhee-Bidlack, 1991; Reichard, Schneider, & Rapaport, 1944; Skwarchuk & Anglin, 1997; Snow, 1990; Storck & Looft, 1973; Terman, 1916; Watson, 1985, 1995; Wehren, De Lisi, & Arnold, 1981; Wilson, 1975; Wolman & Barker, 1965) to measure and investigate different aspects of an individual's cognitive, linguistic and metalinguistic development.

According to Watson (1985) the most common types of definitions children give can be categorized semantically and syntactically into four groups: a) Functional (NP1 VERB) – e.g. *We eat bananas*; b) Perceptual (NP1 COPULAR) – e.g. *Bananas are yellow and tasty*; c) Transitional type (NP1 COPULAR SOMETHING THAT), which syntactically resemble a formal definition, but remain functional or perceptual in meaning – e.g. *Bananas are **something** that we eat*; and d) Formal definitions – NP1 is NP2 that – e.g. *A banana is a yellow curved fruit that grows on trees in tropical climates*. Formal definitions have also been described by the classical formula *X is Y that Z*, where X is the definiendum, Y is the superordinate term, and Z is one or more characteristic features of X (Markowitz and Franz, 1988).

The successful production of formal definitions reflects cognitive, linguistic and metalinguistic maturity. From a cognitive perspective, most metalinguistic tasks require both analysis and control of processing, however to different degrees. According to Bialystok & Majumder (1998), a word-definition task presupposes involvement of both processes of analysis and control; Analysis in the process of retrieving the superordinate category to which the defined word belongs, e.g. *A banana is a **fruit***. -- founded on explicit, organized and detailed linguistic knowledge; And control in providing the specific features that distinguish a certain word from the other members of the same superordinate category, e.g. *A banana is a **long curved fruit with yellow skin that grows on trees in tropical climates***.

## 2. Previous studies

Early studies (Al-Issa, 1969; Feifel, 1949; Reichard et al., 1944; Storck and Looft, 1973; Swartz and Hall, 1972; Terman 1916; Wolman and Barker, 1965) focused on the cognitive aspect

of word-definition performance and have overall concluded that the development of children's ability to give word definitions is a gradual process from the infantile (functional) type, characteristic of younger children or schizophrenic adults (Feifel, 1949) towards the more mature (superordinate) type that is attributed to children about or older than age 10 and normal adults.

The first researchers to apply both syntactic and semantic criteria in the analysis of word-definition responses were Litowitz (1977) and Watson (1985). What they have tried to point out was that both factors, syntactic and semantic, contribute to the mastery of the definition skill. For children to learn how to define words, they should acquire both the syntactic and the semantic conventions.

As a result, the attention of researchers started to change its focus from the cognitive to the linguistic aspect. In addition to the independent variable age that was employed in earlier research designs, the more recent studies tried to operationalize linguistic (Kikas, 1993; Litowitz, 1977; McGhee-Bidlack, 1991; Skwarchuk and Anglin, 1977, Watson, 1985, 1995), sociolinguistic (Wilson, 1975), and metalinguistic (Benelli, 1988; Bialystok & Majumder, 1998; Carlisle et al., 1999; Cummins, 1978; Davidson et al., 1986; Galambos & Goldin-Meadow, 1990; Galambos and Hakuta, 1988; McGhee-Bidlack, 1991; Snow 1990; Snow et al., 1991) concepts, which resulted in a number of new independent variables in word-definition research.

Studies that have investigated metalinguistic variables aimed to test the hypothesis that word-definition ability requires explicit instruction and practice in the semantic and syntactic conventions of a definition. Some of these studies involved monolingual subjects from the US (Wehren et al., 1981) and Northern Italy (Benelli, 1988), while others included French-English (Davidson et al., 1986; Snow, 1990; Snow, Cancino, De Temple, & Schley, 1991) and Spanish-English bilinguals (Carlisle, Beeman, Davis, & Spharim, 1999). Of these, the studies with bilingual subjects have contributed the most in the understanding of the metalinguistic nature of the word-definition ability. Although these studies used different designs, they altogether examined similar problems, such as simple or more complex relationships between L1 and L2 word-definition performance, L2 proficiency level, and the role of vocabulary knowledge in the language of the task (Carlisle et al. 1999).

Examining their findings and conclusions one can perceive a trend binding them together. That is, in the case of bilingual children the word-definition ability was stable across the two languages if they were both used at school, even when the two languages were not equally developed (Charkova, 1995; Davidson et al., 1986). However, if only one of the language codes was used at school, bilingual children gave better definitions in the language of formal instruction and could transfer the word-definition skill to the other only at a certain level of L2 proficiency (Snow, 1990; Snow et al., 1991). The best predictor of word-definition performance was vocabulary knowledge in the language of the task (Carlisle et al., 1999). Overall, directly or indirectly, studies with bilingual subjects have provided evidence in support of the view that sophisticated performance on word-definition tasks requires awareness of the structure of a formal definition, as well as the ability to analyze a word and abstract its category and characteristic features.

Further expanding this discussion from bilingual to multilingual subjects, empirical research seems rather insufficient. Most of the studies that have been carried out (Eisenstein, 1980; Sanz, 2000) examined the effect of knowing two languages on the acquisition of a third. Only a few (Klein, 1995; Thomas, 1988, 1990, 1992) have investigated this effect in a more specific metalinguistic aspect. For instance, Klein (1995) studied the acquisition of syntactic constructions in a Universal Grammar Model, suggesting significant metalinguistic advantage for the multilingual subjects.

In summary, it appears that no empirical research so far (at least to my knowledge) has attempted to compare monolingual with bilingual and multilingual children in their ability to define words. It seems logical that if an exposure to one/more foreign languages has a beneficial effect on children's performance on various metalinguistic tasks, such as (a) understanding the arbitrary relationship between a word and its referent (Ben-Zeev, 1977; Ianco-Worrall, 1972); (b) substitution of a nonsense word for an actual word (Rosenblum and Pinker, 1983); grammaticality

judgment (Galambos & Goldin-Meadow, 1990; Galambos and Hakuta, 1988); symbol substitution (Cromdal, 1999), then a similar effect may be revealed in their performance on word-definition tasks.

The above hypothesis may prove to be especially true for children who learn a second/third language in a school environment, where formal (dictionary) explanations of word meanings (definitions, synonyms, antonyms) are frequently used techniques in the teaching and learning of new vocabulary and lexical concepts. Experiments with bilingual and multilingual subjects are needed in order to better understand the effect of studying more than one language on children's linguistic and metalinguistic development. Another problem not sufficiently investigated refers to the relationship between L1 and L2/L3 word-definition performance and the typology of the languages involved. For instance, it can be hypothesized that the transfer of word-definition ability is dependent on the genetic distance between the subjects' L1s and L2/L3s. That is, the transfer of the word-definition ability from L1 to L2/L3 may be easier to achieve between languages that share genetic similarities as compared to languages that do not.

### **3. The study**

It is the purpose of the present article to contribute to this line of research by addressing issues that have not been sufficiently investigated so far and by using data from Bulgarian native speakers. The study involved a quasi-experimental design of a retrospective cohort type as the subjects were selected on the basis of the independent variable number of languages studied at school, which included three levels, monolingual, bilingual, and trilingual.

More precisely, the study compared monolingual with partially bilingual and partially trilingual subjects on their word-definition performance on L1. It also examined the relationship between L1 definition performance, L2/L3 proficiency and L2/L3 definition performance within the bilingual and trilingual groups. It attempted to answer the following research question, organized in two main sections. The questions in section one involved comparisons between the three groups, while these in section two addressed issues specific to the bilingual and trilingual subjects.

#### **Section One Questions**

1.0) Do children who study one or two foreign languages at school perform significantly better on a word-definition task in their L1 than children who do not study a foreign language?; 1.1) Do trilingual children perform significantly better than bilingual on a word-definition task in their L1?; 1.2) Is there a significant difference between monolingual, bilingual and trilingual children in the way they define abstract nouns?

#### **Section Two Questions**

2.0) How do L1 definition ability and L2/L3 proficiency predict the performance of bilingual/trilingual children on a word-definition task in their L2/L3?; 2.1) Do L2/L3 proficiency and L1 word-definition ability interact with each other when L2/L3 learners are faced with the task to define words in their second/third language? 2.2) Does the typology of the languages involved influence the transfer from L1 to L2/L3?

### **4. Methodology**

#### **4.1 Subjects**

The subjects in this study were 120 fourth grade Bulgarian students -- 40 monolingual, 40 bilingual, and 40 trilingual -- mean age 10.4 years, from three public schools in Bulgaria. The age group 10-11 was chosen because it has been identified by previous research as the age, when children's definitions transition from the functional and perceptual type to the more abstract formal one.

The designation of the three schools was not random because of the nature of the study, which required monolingual, bilingual and trilingual subjects. However, an equal number of subjects was randomly drawn from each of the three schools. The mean age of each group prior to the word-definition test was 10.5 years for the monolingual subjects, 10.4 for the bilingual and 10.4 for the trilingual.

Preliminary collected information revealed that the three schools enjoyed very high reputation and were considered as the three most difficult elementary schools in the area. They used an oral screening procedure to select their students out of bigger pools of candidates, while the rest of the elementary schools had general admission policy.

Since family income could not be used as an indicator of social status due to the disrupted economic system in Bulgaria at the time the data were collected, parent education level was considered as the best predictor of children's intellectual abilities. The school records revealed no real differences in parent education level for the three groups of subjects. All parents had received education above high school, or above 11<sup>th</sup> grade in the Bulgarian education context.

The curricula of the three schools were the same, based on state standards determined by the Bulgarian Ministry of Education. The only difference among them was in the number of foreign languages studied in fourth grade. In one of the schools no foreign language was taught until grade 4. In the other school one foreign language, English, was taught, starting from first grade, 5 days a week, one class period per day. In the third school, two foreign languages, English and Russian, were taught. English was introduced in grade 1, while Russian was introduced in grade 3. English was taught five days a week, 1 class period every day, while Russian was taught 4 days a week, 1 class period per day. None of the two foreign languages was used as a language of instruction in the other content areas. Subjects who did not meet the criteria for the number of languages identifying each group were left out of the study, and new ones were drawn until the groups were complete.

Preliminary collected information through researcher-conducted interviews and classroom observations revealed that there were no major differences in the methodology of teaching foreign languages in the bilingual and trilingual schools. Classroom procedures were entirely teacher-centered and involved traditional techniques of teaching target grammatical structures and new lexical items. New information was explicitly taught and practiced through various drills and other structured exercises.

#### *4.2 Instruments*

The instruments utilized in the present study included word-definition tasks and cloze tests in the respective foreign languages, English and Russian. The word-definition task consisted of 32 nouns, seven semantic groups of concrete nouns: fruit, animals, professions, relationships, furniture, public places, natural bodies and formations, and one group of abstract nouns, each group including four words.

The word-definition task was administered in three languages: Bulgarian, Russian, and English. Although the nouns differed for the three languages, they belonged to the same eight semantic categories identified above. To assure the validity of the word-definition tests, the words were selected according to Thorndike and Lorge's (1944) word list of the 30, 000 most frequently used words and with the help of the subjects' language teachers. The word-definition tasks were performed in a written form as this was considered appropriate for the formal nature of the task. To control for test effect, the word-definition tests in Bulgarian, Russian and English were administered at a time distance of three weeks.

The cloze tests in English and Russian were developed by two experts in each of the foreign languages under the guidance of the researcher, based on the students' foreign language curricula. The cloze tests aimed to test grammatical knowledge, including verb tenses, prepositions, relative pronouns, pronoun – noun reference as well as vocabulary knowledge. They were administered to the bilingual and trilingual groups, following the English and Russian word-definition tasks within one or two days.

### 4.3 Scoring

The word-definition data were first analyzed into superordinate (formal) definitions vs. all other lower types of definitions, including functional, perceptual, and functional-perceptual. Definitions of the functional, perceptual, and functional-perceptual types were excluded from the analysis as they were of no interest to this study since they do not fall into the category of formal (superordinate) definitions.

Superordinate definitions were identified on the basis of the classical formula *X is Y that Z*, where X is the definiendum, Y is the superordinate category, and Z is one or more characteristic features of X, which basically appears in two frames:

(a) Full frame – *X is Y that Z*, which usually occurs in three main syntactic structures: (1) NP<sub>1</sub> is NP<sub>2</sub> + a Relative Clause; (2) NP<sub>1</sub> is NP<sub>2</sub> + a nonfinite clause; (3) NP<sub>1</sub> is NP<sub>2</sub>, followed by more than one clause (complex sentence). The following example in English, Bulgarian, and Russian illustrate the structure in 3):

#### English

A dog is a domestic animal that barks with a fur coat, a tail, and four legs.

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#### Bulgarian

Kuchet-o e domashn-o zhivotn-o, koet-o  
Dog-the(NEUT) be-3sg domestic-3sg animal-3sg (NEUT) that-3sg

la-e s kozin-a, opashk-a i chetiri krak-a.  
bark-3sg with fur (FEM) tail (FEM) and four leg-pl (MASC)

\*\*\*\*

#### Russian

Sobaka – eto domashn-ee zhivotn-oe,  
Dog-3sg (FEM,NOM) this domestic-3sg (NEUT,NOM) animal-3sg (NEUT,NOM)

kator-oe laet, s sherst-ju, hvost-om i  
that-3sg bark-3sg with fur-(FEM, INSTR) tail (MASC, INSTR) and

chetuirj-mja lapa-mi  
four (INSTR) legs-3pl (FEM,INSTR)

(b) Reduced frame – *X is Y*, which syntactically can be represented as NP<sub>1</sub> is NP<sub>2</sub>, where NP<sub>2</sub> is an appropriate superordinate term preceded or/and followed by modifiers or complements that convey the most typical characteristic features of X. The example below shows the structure of a reduced frame in the three languages involved in the study.

English - A dog is a barking four-legged meat-eating domestic animal.

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#### Bulgarian

Kuche-to e laesht-o chetirikrak-o  
Dog-the(NEUT) be-3sg. barking-3sg(NEUT) four-legged- 3sg(NEUT) eating- 3sg

mesojadn-o domashn-o zhivotn-o.  
meat-eating-3sg(NEUT) domestic-3sg(NEUT) animal- 3sg(NEUT)

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### Russian

Sobaka – eto lajushch-ee chetveronog-oe  
Dog (NEUT) this barking-3sg(NEU, NOM) fourlegged-3sg(NEU, NOM)

plotojadn-oe domashn-ee zhivotn-oe.  
meat-eating-3sg(NEU, NOM) domestic-3sg(NEU, NOM) animal-3sg(NEU, NOM)

During the second coding the selected definitions were analyzed semantically and rated in view of distinguishing and characteristic features of the definiendum. Single definition scores were determined on a 5-point system, 5 being the highest, and 1 the lowest score. Cronbach's alpha test showed a level of agreement between raters of 0.97 for the Bulgarian and English definitions, and of 0.91 for the Russian definitions.

Applying these criteria to the word-definition data in English, Bulgarian, and Russian was considered appropriate as the only structural difference between Bulgarian, English and Russian in relation to the structure of formal definitions is observed in Russian, where the copula to be "*buiti*" is not explicitly used, but implied by a sentence dash. It is often followed by the demonstrative pronoun *this* (Russian *eto*) resulting in the formula *X – eto Y that Z*. In fact, the omission of the copula is a typical phenomenon in the present tense form of the Russian language. In this case, the word in predicative position, following the sentence dash, takes Nominative Case (Pulkina & Zakharova-Nekrasova, 1992).

In view of the morphology of the two foreign languages involved in the study, Russian is by far more inflected than English. There are six Cases in Russian: Nominative, Accusative, Genitive, Dative, Prepositional, and Instrumental. In addition, Gender and Number agreement morphology are observed in the noun, adjective and verb systems (Pulkina & Zakharova-Nekrasova, 1992). On the other hand, contemporary English has kept only a few overt Case markers. With the exception of the Genitive Case, nouns are not overtly marked for Case, regardless of their grammatical functions. Only the pronouns are marked for Case, where Case is associated with structural position (Napoli, 1993).

In regard to the complex morphological system in Russian, which presents a serious challenge to the foreign language learner, especially in the beginning stage of studying it, it was agreed between the raters that errors in case endings would not be taken in consideration when analyzing the Russian definition data.

## **5. Results**

The first coding of the data into "superordinate" definitions vs. "other" types or "no definitions" responses revealed similar percentages for the three groups of subjects. The results are presented in Table 1. Since the research interest in this study was on the part of the data reported under the heading "superordinate", the proportions reported under "others" were left out of the statistical analysis. All statistical procedures were performed at a level of significance,  $\alpha = .05$ .

The analyses of the research questions that involved comparisons of the three groups of subjects on their L1 word-definition performance were carried out through a one-way Analysis of Variance (ANOVA) with planned orthogonal contrasts. The independent variable, which presented a fixed-effect, was group with three levels, monolingual, bilingual, and trilingual. The dependent variable was measured by the degree to which subjects' definition responses reflected the most distinguishing and relevant features of the definiendum. Means and standard deviations for the three groups of subjects are presented in Table 2.

Table 1

Percentages of “superordinate” vs. “other types” or “no definitions”

| Group       | <u>Superordinate</u> | <u>Others</u> | <u>No</u> |
|-------------|----------------------|---------------|-----------|
| Monolingual | 79.74%               | 18.01%        | 2.25%     |
| Bilingual   | 82.5%                | 15.7%         | 1.8%      |
| Trilingual  | 84.62%               | 14.18%        | 1.20%     |

Table 2

Group means and standard deviations for Bulgarian definitions

| Group       | <u>N</u> | <u>Mean</u> | <u>St. Dev.</u> | <u>Minimum</u> | <u>Maximum</u> |
|-------------|----------|-------------|-----------------|----------------|----------------|
| Monolingual | 40       | 62.09       | 19.73           | 22.00          | 96.00          |
| Bilingual   | 40       | 80.08       | 16.28           | 44.50          | 114.00         |
| Trilingual  | 40       | 82.49       | 22.44           | 40.50          | 132.00         |

Two directional orthogonal contrasts were run. The first one contrasted the group of the monolingual children against the bilingual and trilingual groups taken together. The second tested the contrast between the bilingual and the trilingual children. The results are reported in Table 3.

Table 3

Results from planned orthogonal contrasts

| Contrast                     | <u>D</u><br><u>F</u> | <u>Contrast</u><br><u>SS</u> | <u>F</u> | <u>p</u> |
|------------------------------|----------------------|------------------------------|----------|----------|
| 1. Monol. vs. bil. and tril. | 1                    | 9824.001                     | 25.45    | .0001    |
| 2. Bil. vs. tril.            | 1                    | 116.403                      | .30      | .584     |

\*Contrast 1  $p < .0001$ ; \*Contrast 2  $p > .05$

The results from contrast one revealed evidence that bilingual and trilingual subjects performed significantly better than the monolingual children on the Bulgarian word-definition task,  $F_{(1,117)} = 25.45$ ,  $p < .0001$ . However, the contrast between the bilingual and trilingual groups on their L1 word-definition performance failed to find evidence that there was any significant difference between the two groups,  $F_{(1,117)} = .30$ ,  $p > .05$ .

Additionally, the three groups were compared on their word-definition performance for the category of abstract nouns. The statistical analysis involved a one-way ANOVA, which revealed no significant difference between the three groups,  $F_{(2, 117)} = 1.24$ ,  $p > .05$ . Table 4 presents a summary of the group means for abstract nouns.

Table 4  
Group means and standard deviations for abstract nouns

| Group       | <u>N</u> | <u>Mean</u> | <u>S</u><br><u>D</u> |
|-------------|----------|-------------|----------------------|
| Monolingual | 40       | 3.275       | 4.43                 |
| Bilingual   | 40       | 3.288       | 4.18                 |
| Trilingual  | 40       | 4.750       | 5.69                 |

$F(2, 117) = 1.24; p > .05$

The rest of the research questions that concerned the bilingual and trilingual groups were analyzed through the General Linear Model of Multiple Regression. Three models were run for each criterion variable, that is L2 definition performance of the bilingual group, L2 definition performance of the trilingual group, and L3 definition performance of the trilingual group. Model #1 calculated the coefficient of determination between the criterion variable L2/L3 word-definition scores and the predictor variable L2/L3 cloze test scores; Model #2 added to the equation L1 definition scores as another predictor variable; and Model #3 added the interaction between L2/L3 cloze scores and L1 word-definition scores as a third predictor variable. Tables 5, 6, 7, 8, 9 and 10 summarize the results for the bilingual and trilingual groups.

Table 5  
Means for L2 definition scores, L2 cloze test scores, and L1 definition scores of the bilingual group

| Variable            | Mean  | Std.<br>D. | N  |
|---------------------|-------|------------|----|
| L2 definition score | 27.95 | 12.63      | 40 |
| L1 definition score | 80.07 | 16.28      | 40 |
| L2 cloze test       | 42.00 | 20.08      | 40 |

Table 6  
Summary of R-square change

| Dependent variable  | Model #               | Model #1                | Model #2   | Model #3   |
|---------------------|-----------------------|-------------------------|--|--|
| L2 definition score | Variables in equation | L2 cloze test score (+) | L2 cloze test score (+)<br>L1 definition score (-) | L2 cloze test score (+)<br>L1 definition score (-)<br>L2 cloze * L1 definition (-) |
| F value             |                       | 212.94                  | 105.58   | 68.73  |
| Degrees of freedom  |                       | 1, 38                   | 2, 37  | 3, 36  |
| P value             |                       | .0001                   | .0001  | .0001  |
| R-square            |                       | <b>.848</b>             | <b>.850</b>  | <b>.851</b>  |
| R-square change     |                       | .848                    | .002   | .001   |

\*Note: The symbol (+) stands for significant effect,  $p < .05$ ; and (-) for lack of statistical significance,  $p < .05$ .

Table 7  
Means for L2 (English) definition scores, L2 cloze test, and L1 definition scores of the trilingual group

| Variable            | Mean  | Std. D. | N  |
|---------------------|-------|---------|----|
| L2 definition score | 21.85 | 11.28   | 39 |
| L1 definition score | 82.48 | 22.44   | 39 |
| L2 cloze test       | 47.89 | 19.84   | 39 |

Table 8  
Summary of R-square change

| Dependent variable            | Model #               | Model #1                | Model #2   | Model #3   |
|-------------------------------|-----------------------|-------------------------|--|--|
| L2 definition score (English) | Variables in equation | L2 cloze test score (+) | L2 cloze test score (+)<br>L1 definition score (-) | L2 cloze test score (+)<br>L1 definition score (-)<br>L2 cloze*<br>L1 definition (-) |
| F value                       |                       | 66                      | 32.39  | 22.14  |
| Degrees of freedom            |                       | 1, 37                   | 2, 36  | 3, 35  |
| P value                       |                       | .0001                   | .0001  | .0001  |
| R-square                      |                       | <b>.641</b>             | <b>.643</b>  | <b>.654</b>  |
| R-square change               |                       | .641                    | .002   | .011   |

Table 9  
Means for L3 (Russian) definition scores, L3 scores, and L1 definition scores of the trilingual group

| Variable            | Mean  | Std. D. | N  |
|---------------------|-------|---------|----|
| L3 definition score | 32.76 | 15.01   | 40 |
| L1 definition score | 82.48 | 22.44   | 40 |
| L3 cloze test       | 61.00 | 18.40   | 40 |

As seen from tables 6, 8, and 10, the results from all Regression Models #1 revealed that L2/L3 cloze test score was a significant predictor of the subjects' performance on the L2/L3 word-definition test [Bilingual group,  $F_{(1,38)} = 212.94$ ,  $p < .0001$ , R-square .848; Trilingual group for L2 (English),  $F_{(1, 37)} = 66$ ,  $p < .0001$ , R-square = .641; And trilingual group for Russian,  $F_{(1,38)} = 109.85$ ,  $p < .0001$ , R-square = .742.]

The addition of the predictor variable L1 definition score to the regression equations (all regression Models #2) did not contribute much to the R-square values, yielding very small R-square change, varying from .002 for L2 definition performance of the bilingual and trilingual groups and .004 for L3 definition performance of the trilingual group. The over-and-above contribution of this variable was consistently not significant in all three regression analyses ( $p = .45$  for L2 definition ability of the bilingual group;  $p = .73$  for L2 definition ability of the trilingual group;  $p = .52$  for L3 of the trilingual group).

The results of Regression Model #3 analyses, which added the interaction effect between L2/L3 cloze test scores and L1 definition score as a third predictor variable, showed that for L2 (English) definition performance of the bilingual and trilingual groups, L2 cloze test score had a significant over-and-above effect ( $F_{(1, 36)} = 5.55$ ,  $p = .025$  for the bilingual, and  $F_{(1,35)} = 11.91$ ,  $p = .0015$  for the trilingual). The over-and-above effect of L1 definition score and the interaction effect

in the same analyses were not significant. On the other hand, the results for the criterion variable L3 (Russian) definition score showed a different over-and-above effect of the predictor variables, that is L3 cloze score had no significant effect ( $F_{(1,36)} = .24, p = .6$ ), while L1 definition score had a significant effect ( $F_{(1,36)} = 5.66, p = .023$ ). The interaction effect was also significant,  $F_{(1,36)} = 7.44, p = .009$ .

Table 10  
Summary of R-square change

| Dependent variable            | Model #               | Model #1                | Model #2   | Model #3   |
|-------------------------------|-----------------------|-------------------------|--|--|
| L3 definition score (Russian) | Variables in equation | L3 cloze test score (+) | L3 cloze test score (+)<br>L1 definition score (-) | L3 cloze test score (-)<br>L1 definition score (+)<br>L3 cloze*<br>L1 definition (+) |
| F value                       |                       | 109.85                  | 54.31  | 44.99  |
| Degrees of freedom            |                       | 1, 38                   | 2, 37  | 3, 36  |
| P value                       |                       | .0001                   | .0001  | .0001  |
| R-square                      |                       | <b>.742</b>             | <b>.746</b>  | <b>.790</b>  |
| R-square change               |                       | .742                    | .004   | <b>.044</b>  |

## 6. Discussion

As reported in the previous section, in reference to the research questions concerning the comparison between the three groups of subjects on their L1 word-definition performance, the study found that the groups of the bilingual and trilingual children performed significantly better on the L1 word-definition test than the group of the monolingual children. However, there was no significant difference between the bilingual and trilingual groups in the level of superordination of their definitions in L1.

This result is consistent with the conclusions of studies that have found that bilingual children perform better than monolingual on various metalinguistic tasks, (Ben-Zeev, 1977; Cromdal, 1999; Galambos and Goldin-Meadow, 1990; Galambos & Hakuta, 1988; Ianco-Worrall, 1972; Rosenblum and Pinker, 1983). It provided evidence that early foreign language education has a beneficial effect on children's ability to define nouns.

In the first coding of the data (functional, perceptual, superordinate) the three groups of subjects produced similarly high percentages of superordinate definitions vs. other lower types of definitions (monolingual 79.74%, bilingual 82.50%, and trilingual 84.62%). Overall, the majority of children, regardless of which group they belonged to, were able to provide the superordinate categories of the defined words. The superior performance of the bilingual and trilingual children was mainly revealed in the second coding that rated the level of appropriateness of the modifiers or compliments of the head noun in Y or of the relative, or nonfinite clause, or complex sentence in Z of the classical definition formula X is Y that Z. Thus, it reflected a subject's ability to select the most relevant characteristics that define a particular superordinate term.

As mentioned before, according to Bialystok & Majumder (1998) a word-definition task requires activation of both processes of analysis and control. Analysis is involved in the retrieval of the superordinate term, and control in the selection of the most distinguishing features of the

defined word. In this sense, the present study found evidence that the bilingual and multilingual subjects demonstrated a higher level of control of attention, which is congruent with the conclusions of previous research (Cummins, 1978), according to which bilingual children have an advantage over monolingual on metalinguistic tasks requiring a high level of selective attention. Therefore, it can be argued that studying one or more foreign languages at school enhances a child's explicit or implicit awareness of the semantic features of a formal definition and enables them to select successfully the relevant from the irrelevant features that characterize a concept.

As regards the comparison between the performance of the bilingual and trilingual groups any hasty conclusions should be avoided, since the result of no significant difference between the two groups can have more than one interpretations. On the one hand, taking into consideration the fact that the subjects in this study were only partially trilingual, it can be speculated that at a more advanced stage of language proficiency, multilingual children may reveal a significant advantage over bilingual children in word-definition performance. On the other hand, another plausible hypothesis is that there may be a ceiling effect of the benefit of studying other languages on a child's ability to define words. That is, knowing any other language after the first second language may have little to add to that ability.

Overall, it is impossible to compare the answers to research question 1 with results from any other study since no previous research (to my knowledge) has attempted to compare monolingual, bilingual and trilingual subjects on a word-definition task in their L1. Obviously, replications of this study are needed before generalizations can be drawn. In future replications, I would recommend involving bilingual and trilingual subjects at a more advanced level of their L2 and L3 proficiency.

The lack of significant difference between the three groups on the quality of their definitions for abstract nouns supports the conclusions of McGhee-Bidlack's (1991) study that the ability to define abstract nouns is a late developing metalinguistic skill, usually not revealed before the age of 18. Since the subjects in the present study were between 10 and 11 years of age, it was expected in light of McGhee-Bidlack's findings that their definitions for abstract nouns would be of lower level than those for concrete nouns.

However, having in mind that the subjects in the present study were in the beginning stage of their L2 and L3 acquisition, it may be hypothesized that a more advanced level of bilingualism or multilingualism could have a facilitative effect on one's ability to define abstract nouns. Further research is needed in order to verify the results presented in this paper. Replication studies with subjects more advanced in their second and/third language are needed in order to understand the effect of bilingualism and multilingualism on one's ability to define abstract nouns.

The research questions concerning the groups of bilingual and trilingual children - as already stated before - were replications of the same regression analyses, the purpose of which was to investigate the relationship between the predictor variables L2/L3 proficiency (as measured by the respective cloze tests), L1 word-definition skill and the criterion variable L2/L3 word-definition performance. These analyses were carried out in order to complement previous word-definition studies with bilingual subjects (Davidson et al., 1986; Snow, 1990), which examined cross-language correlations. Moreover, in view of the fact that correlation coefficients are sample specific (McNeil, Newman, & Kelly, 1996), it was considered that the present study provided a unique opportunity to compare the coefficients of determination (R-squares) of three regression analyses of the same variables.

The regression analyses that investigated the predictive power of L2/L3 proficiency and L1 word definition skill on subjects' performance on L2/L3 word-definition tasks, revealed the crucial role that proficiency in the language of the task has for successful transfer of an already acquired word-definition skill. The bivariate correlation between L2/L3 proficiency and L2/L3 word-definition ability was significant for all Models #1, with values of R-square of 0.848, 0.641, and 0.742. In other words, 84% of the word-definition performance in L2 of the bilingual group was explained by their L2 proficiency; 64% of the word-definition performance in L2 of the trilingual group; and 74% of the word-definition performance in L3 of the trilingual group.

The over-and-above effect of this variable remained significant for all Regression Models #2 and #3 with the exception of Model #3 for Russian word-definition ability, where the over-and-above effect of L3 proficiency was not statistically significant. This result can be interpreted to mean that the subjects' proficiency in English was more important for their word-definition performance in English than their proficiency level in Russian was for their performance on the Russian definition task.

On the other hand, the over-and-above effect of L1 word-definition ability was not significant in all Regression Models #2, when its predictive power was examined in combination with L2/L3 proficiency. When the interaction effect was added as another predictor variable in all Model #3 analyses, this variable remained not significant for L2 word-definition performance of the bilingual and trilingual groups, but was significant for L3 (Russian) word-definition ability of the trilingual group.

The interaction between L2 proficiency level and L1 word-definition ability was not significant in the regression analyses for L2 (English) definition ability of the bilingual and trilingual groups, but was significant for L3 (Russian) word-definition ability. In other words, the interaction between English proficiency and Bulgarian definition skill was not statistically significant for the bilingual and trilingual group, whereas for Russian proficiency and Bulgarian definition skill it was significant. An insignificant interaction in a multiple regression analyses can be interpreted to mean that a particular relationship between the predictor variables and the criterion variable stays stable for any value of the variables involved. In the context of the present study, it meant that a subject who had a relatively high (above the 50<sup>th</sup> percentile) L2 (English) score and a relatively high L1 definition score performed relatively high on the L2 (English) definition task. The same was true for subjects who scored low (below the 50<sup>th</sup> percentile) on all of these variables. However, in the case of L3 (Russian) this relationship was not always maintained. Some subjects who had relatively low L3 test scores, but relatively high L1 definition scores, performed relatively high on the L3 definition task.

One plausible explanation for the different interaction results for English and Russian is the different correspondence these two languages have in relation to Bulgarian. Although English, Bulgarian, and Russian are genetically related by their common belonging to the Indo-European Family of Languages, Bulgarian is far more distanced from English than from Russian. Both being Slavic languages, despite the difference in their morphology, Bulgarian and Russian share a close lexical similarity. Since this cross-language transfer was mainly lexical, the results of this analysis indirectly support one of the conclusions of Carlisle et al. (1999) that word-definition performance is substantially accounted for by word-knowledge in the language of the task.

The observed transfer of the Bulgarian (L<sub>1</sub>) definition skill into the subjects' performance on the Russian definition task seems logical and expected in view of the lexical similarity that Bulgarian and Russian share. The English definitions were very simple, mainly of the type *A dog is an animal*, occasionally accompanied by a descriptive modifier or complement phrase. Overall, a large part of the English definitions were coded at the lowest level, between 1 and 2. On the other hand, the definitions in Russian were more successful at providing a richer repertoire of distinguishing features of the defined noun. In summary, the present study provided evidence that the transfer of L1 word-definition skill to L2/L3, where L2/L3 were acquired as foreign languages, was more successful in the case of genetically closer languages (Bulgarian and Russian) as compared to genetically more distanced ones (Bulgarian and English).

## 7. Conclusions and recommendations for future research

The results of the present study provided evidence in support of the beneficial effect of learning one or two foreign languages in elementary school on a child's ability to select the most appropriate semantic features that distinguish one noun from another. However, this positive effect of early foreign language education was limited to the class of concrete nouns. The quality of children's (age 10-11) definitions for abstract nouns did not reflect the same benefit.

Yet, to generalize these conclusions beyond the described population and conditions will not be correct, given the methodological limitations of the study, which examined only the age group of 10-11 year old fourth grade Bulgarian children in the context of the Bulgarian public school system. Broader conclusions will only be possible if replication studies are carried out both in the context of the present study and in the context of other countries and languages. Also, future research should aim to include bilingual and trilingual subjects of a more advanced level of proficiency. Another limitation arises from the fact that the number of semantic classes involved was restricted to seven categories of concrete nouns and one of abstract nouns. In order to increase the reliability and validity of the instrument, studies should aim to include the widest possible range of semantic categories.

In relation to the findings concerning the relationship between L2/L3 proficiency, L1 word-definition skill, and L2/L3 definition performance, the present study included subjects of a relatively low level of L2/L3 proficiency and for this reason the obtained values of the bivariate and multivariate coefficients of determination can not be generalized beyond the sample groups. Obviously, future replications with subjects of a more advanced L2/L3 proficiency are highly recommended. Also, having in mind that the L2 and the L3 in the context of this research were learnt as foreign languages at school, the conclusions can not be extended over to the case of bilingual and multilingual subjects who have “grown up” with these languages.

Since this study suggests that L2/L3 proficiency is the most powerful predictor of L2/L3 word-definition performance, it is recommendable for future research to decompose L2/L3 proficiency into its components and study their separate contribution to L2/L3 word-definition performance. Another important insight from this study relates to the role that the typology of the languages involved plays in the process of transfer of a word-definition skill from L1 to L2/L3. Studies involving L1s and L2/L3s, exhibiting lexical and syntactic similarity and contrast are needed to bring more clarification to this question.

In sum, the present study was a pioneer in the field since it aimed to examine for the first time the effect of two new independent variables - the number of languages that subjects study at school, and the typology of the languages involved - on the level of sophistication of the subjects' noun definitions. For this reason, its findings can not directly be compared to the conclusions of previous word-definition research, nor can generalizations be made outside the described population and context. Future replications or related studies are greatly needed in order to verify and further expand the results reported in this article.

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