

Chapter 7

Productivity and Lexical Diversity in Native and Non-Native Speech: A Study of Cross-cultural Effects

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Introduction

We all know highly talkative persons and very silent ones. Recent explorations in linguistics indicate that the degree to which one is talkative or silent is not only a matter of personality, topic or conversational context, but is also shaped by linguistic and cultural conventions (Lehtonen & Sajavaara, 1985; Sajavaara & Lehtonen, 1997). Scandinavians are less talkative than the Anglo speakers in the US. Sajavaara and Lehtonen (1997: 270) point out that in Scandinavian culture 'talkativeness is an indication of slickness, which serves as a signal of unreliability'. The silence of the Finns is disorientating for Americans and confusing for Arabs who are 'liable to think that something is definitely wrong' (Sajavaara & Lehtonen, 1997). Similarly, some people use a richer and more colourful vocabulary than others. The present study will investigate whether language and culture affect productivity and lexical diversity in the speech of monolinguals, and whether the degree of language proficiency and acculturation determines this variable in the speech of second language (L2) users. The study will compare productivity and lexical diversity in narratives elicited with the help of the same stimuli from Russian and American monolinguals, from Russian/English bilinguals speaking Russian, from Russian/English bilinguals speaking English as an L2 and from Russian/English bilinguals speaking English as a foreign language (FL).

Literature Review

Productivity and lexical diversity have both been the subject of much investigation in psychology, applied linguistics and psycholinguistics. In what follows, we will discuss the definitions of the two constructs, and the

key studies that illuminate the factors which may influence productivity and lexical diversity in the speech of monolingual and bilingual individuals.

Productivity

Different authors use slightly different measures of 'productivity' in their work, depending in particular on whether they deal with the spoken or the written language. In the study of written discourse, Lauren (1987) defines productivity as the average length in words and/or the average number of sentences per essay. Since the focus of our work is on spoken language, we will limit our review to studies that deal with oral production. In the study of spoken discourse, productivity is often seen as a combination of three factors: the total number of lexical tokens produced by the individual, the number of different token types, and the type/token ratio of different word classes, which varies as a function of sample size (Carroll, 1960; Fielding & Fraser, 1978).

Whether measured in words, clauses or utterances, productivity measures are routinely included in oral language production tests (Vorster, 1980). Lennon (1995) chose three measures as indicators of productivity: total number of word tokens, number of T-units, and number of words per T-unit. T-units are commonly defined as 'the shortest possible units which are grammatically allowable to be punctuated as sentences. The T-unit can be described as one main clause plus whatever clauses, phrases and words happen to be attached to or embedded within it' (Larsen-Freeman, 1983: 288). We suggest that the total number of words is the best measure of productivity, as words are easier to define than T-units or utterances (Dewaele, 2000).

Over the years, studies conducted with monolingual and bilingual participants have established that productivity is related to a number of psychological, socio-biographical, and situational variables, some of which impact on productivity in both the L1 and L2. Among psychological variables, shyness, low sociability, introversion and anxiety were shown to influence productivity. Schmidt and Fox (1995) found that shy participants, and participants with low self-ratings on sociability, rated themselves significantly lower on amount of talking during the dyadic interaction and lower on extroversion when compared with the other participants. In some situations anxiety may have a disruptive effect on the interviewee's verbal fluency, leading to increased pauses and decreased speech rate (Markham & Darke, 1991). In other contexts, when the L2 speaker is not dealing with highly novel speech responses that require complex decision making, anxiety arousal tends to increase productivity and to accelerate speech rates (MacIntyre & Gardner, 1994).

Situational variables have also been linked to productivity. One such variable is the opportunity to plan one's contribution to the discourse. Comparing samples of unplanned spoken language (such as dinner table conversations) of two adult speakers of English with samples of their planned spoken language (class lectures and prepared talks), Danielewicz (1984) found that an opportunity to plan one's speech contributes favourably towards productivity and complexity (words, dependent clauses, coordinate clauses, nominalisations, attributive adjectives, and participles per idea unit).

A second situational variable shown to influence productivity, both in the L1 and in the L2, is the interlocutor's behaviour. In Siegman's (1980) study of L1 English, when a male interviewer was interviewing a female interviewee, interviewer warmth seemed to inhibit productivity, measured as the number of words per response. Similarly, Giles and Hewstone (1985) demonstrated that the relationship between the participants affects speech patterns evoked in L1 English. Thus, participants who like each other display more verbal productivity and self-disclosure; they also display less silent pausing than do people less positively predisposed towards each other.

L2 speech has also been shown to be affected by a number of socio-biographical factors, such as the level of proficiency in the L2, which determines productivity up to a certain point. Beginners are generally less productive but, once L2 users reach an intermediate level, their productivity becomes more independent of their proficiency level (Noyau *et al.*, in press). There is uncertainty, however, about the precise point at which the linear relation between proficiency and productivity fades. The studies by Lennon (1995) and De Lorenzo Rossello (2001) conducted with highly advanced learners revealed very different patterns. Lennon's (1995) sample consisted of four German learners of English who had learned English at school for periods ranging from 7 to 14 years and were majoring in English at university. Their scores on the British Council's English Language Battery (ELBA test) ranged from 78 to 92 out of a possible 120. Learners were asked to narrate the same picture story in English before and after a two-month period at Reading University. They were found to produce longer stories after having spent a period in England (see also Raupach, 1987; Towell, 1987). This increase in productivity (ranging from +3% to +50%) was linked to reduction in morphological, syntactical and lexical errors. De Lorenzo Rossello (2001) also used narrations of picture stories, but with a cross-sectional corpus, comparing productivity in the L1 with productivity in the L2. She found that advanced Spanish learners of

French and advanced French learners of Spanish produced longer stories in their L2 than in their L1.

The effect of cultural familiarity on productivity was demonstrated in van Hell *et al.* (in press) who found that children from Turkish and Moroccan origin living in the Netherlands produced longer stories about Ramadan than did monolingual and monocultural Dutch children, who in their turn produced longer stories about Carnival. No differences emerged between the groups in culturally 'neutral' stories (about the playground). The authors conclude that when speaking about a culturally familiar topic children 'can retrieve a richer constellation of concepts from memory (in terms of number and of covariances among concepts), which not only results in longer stories, but also enhances connectivity in discourse' (van Hell *et al.*, in press: 17). Low familiarity with the cultural context does not always affect the level of temporal resolution, however. The speaker can construct a global representation of the macro-event, containing a simple but complete succession of observed actions, without referring to background information, causes or intentions. The reverse is also true, as someone familiar with a culture-specific event may not feel the need to describe it in detail.

In sum, we can see that in both the L1 and the L2 productivity can be affected by psychological factors such as shyness, sociability, introversion and anxiety, and by situational factors such as the opportunity to plan one's contribution, and the behaviour of the interlocutor. In addition, in L2 speech, productivity may be influenced by socio-biographical factors such as the level of L2 proficiency and cultural familiarity with the topic.

Lexical diversity

Lexical diversity, often linked to productivity, has also been studied under many guises and many forms. As with productivity, definitions of lexical diversity also differ in various studies. Most often, however, lexical diversity is measured through a type-token ratio (TTR), which compares the number of different words (types) with the number of total words (tokens). In both oral speech and writing, lexical diversity has been found to vary according to L1 background, L1-L2 proximity, age, L2 proficiency (Laufer, 1994; Laufer & Paribakht, 1998), FL or L2 learning context (Meara *et al.*, 1997), and also to the interaction of multiple cognitive, stylistic, situational and textual constraints (Dewaele, 1993). Many scholars emphasise the impact of lexical diversity in L1 on listeners' judgements about the speaker's personality and intellectual capacities (Bradac *et al.*, 1976; Bradac, 1982). Bradac and Wisegarver (1984) found that limited lexical diversity in native English speech extracts caused negative evaluations of the speaker's

communicative competence and led the listeners to misjudge the speaker's socio-economic class. The researchers also observed that listeners quickly noticed above-average levels of lexical redundancy (i.e. low lexical diversity) in the speech extracts.

Recently, the phenomenon of lexical diversity has also attracted the attention of second language acquisition (SLA) researchers. One group of researchers based in the University of Paris X-Nanterre and led by Colette Noyau, has approached the phenomenon of lexical diversity and productivity in L1 and L2 from a perspective developed by Langacker (1987). Noyau and Paprocka (2000) analysed retellings of film extracts in Polish and French by six Polish learners of French. The authors focused on the organisation and the structure of micro-events that reflected the learners' perception, conceptualisation and formulation of the macro-event. In their analysis, they investigated two dimensions of lexical diversity which they termed the amount of granularity and the condensation of the information. Granularity, which can be temporal or lexical, is of particular interest for the present study. Temporal granularity is defined by Noyau *et al.* (in press) as a 'qualitative dimension which characterises the ways in which, in texts, a complex dynamic situation will be conceptualised'. A high degree of granularity entails the presentation of a detailed series of micro-events, while a low degree (reduced partitioning) presents the event from a macro perspective, where the different components are fused as either one single event, or a limited number of events. The authors explain that the linguistic means for choosing a specific degree of granularity are the lexical items for situations (states, activities, events, actions). Lexical granularity is reflected in productivity and lexical diversity values, as higher levels of resolution will result in longer and more fine-grained retellings with more specific (and low-frequency) words. From this perspective, the dynamic situation viewed in the extract (macro-event) can be reproduced in a sequence containing a variable number of micro-events. For example, a scene depicting a person entering a house can be described minimally as 'X entered', or maximally as 'X turned the doorknob, pushed against the door, stepped inside, closed the door behind him/her'. Similar resolution levels can be chosen lexically. A speaker may opt for specific words that provide extra detail rather than using high frequency words with a more generic meaning. Compare 'he looked at the trees' with 'X contemplated the eucalyptus and the pine trees in the garden'.¹

Noyau and Paprocka (2000) note, as did researchers before them (Rosch, 1978), that both conceptual and linguistic factors may affect the resolution level. A gardener is more likely to give more detailed information because his/her expertise allows him to distinguish different types of trees.

Similarly, familiarity with the domain, which can be culturally determined, will affect resolution level, albeit not necessarily in a linear fashion.

Of particular importance is the level of L2 proficiency. Comparing the retellings of Chaplin's *Modern Times* extracts in Polish L1 and French L2, Noyau and Paprocka (2000) discovered higher levels of lexical resolution in the L1 extracts, including a wide range of verbs of movement specifying manner and orientation of the movement. This finding confirms earlier research which found lower levels of lexical detail in L2 extracts compared with L1 extracts (Sanz, 1999; Schneider, 1999). Noyau *et al.* (in press: 2) suggest that 'the degree of granularity increases with the development of lexical items for expressing events in the L2, becoming in the more advanced stages a free variable giving the speaker greater leeway when faced with the situational constraints imposed by the particular communicative task'. The granularity curve levels out at more advanced stages because the speaker is better able to make use of condensation in order to produce more coherent texts.

There seems to be little doubt that beginners use a greater proportion of high- rather than low-frequency words (Laufer, 1991; Linnarud, 1986). A limited lexicon forces less proficient speakers to categorise processes in basic terms (*to do, to go*) and prevents them from offering great lexical detail in descriptions (Noyau & Paprocka, 2000). Advanced learners move more freely on the granularity continuum, and their choices will be determined by sociocultural background, task, interaction constraints and desired stylistic effects. This advanced group displays high levels of both inter-individual variation (Noyau & Paprocka, 2000) and intra-individual variation: less advanced speakers tend to stick to a certain degree of granularity and condensation from the beginning to the end of the extract (De Lorenzo Rossello, 1999).

Degree of granularity may also be affected by typological differences. Noyau *et al.* (in press) argue that Swedish is a more fine-grained language compared with French, where the structuring of narratives relies more on the ordering of events. A comparison of film-retellings in Swedish and French (Kihlstedt, 1998) revealed that the Swedish corpus contained twice as many connectors as the French corpus, despite being roughly equivalent in size. A similar comparison showed that Spanish learners of French used a lower degree of granularity than did a control group of native speakers of French, breaking their account down in fewer episodes, fewer utterances and fewer clauses. Noyau *et al.* (in press) argue that this difference is due to the Spanish speakers' focus on aspectual distinctions (perfective/imperfective) in the event structure of oral accounts, while French native speakers would prefer segmentation into sequences along the time axis.

(see also De Lorenzo Rossello, 2001). This transfer of granularity values was also found in the reverse direction, with French learners of Spanish using significantly higher degrees of granularity than did a control group of Spanish native speakers. Degree of granularity appears to be language-specific, and the language learner's aim must be 'to acquire the degree of granularity specific to the target language' (Noyau *et al.*, in press: 21). This culture-specific granularity will obviously always be context-specific and will vary from individual to individual. Given the dynamic nature of multilinguals' linguistic systems (Herdina & Jessner, 2002; Cook, 1992), we may also expect changes in the degree of granularity of their output.

Psycholinguistic studies have shown that the choice of degree of granularity or lexical richness entails a clear cognitive cost. Scherer (1979), Roelofs (2002) and Roodenrys *et al.* (1994) found that processing longer words requires more effort both in terms of the demands made on cognitive processing (including naming latencies), and on the precision of articulation in speaking. Chincotta and Underwood (1998) found that within-language memory span was greater for short items than for long items, which the authors interpret as an indication that bilingual short-term memory capacity is sensitive to the effects of word length in both the dominant and the non-dominant language. This suggests there is a trade-off between fluency and lexical diversity. Dewaele (1993) found significant negative correlations between lexical richness scores and measures of fluency in the formal situation. He argued that when more cognitive resources are diverted to lexical searching, the speech production slows down, and filled pauses become more frequent. Dewaele and Furnham (2000) showed that introverts and extroverts make different choices in the trade-off between fluency and lexical diversity, but only in situations of stress. While no link was found between lexical diversity (measured with 'Uber') and extroversion in the informal situation, a significant negative relationship appeared in the formal situation. This suggested that when talking under pressure introverts use a much richer vocabulary (with longer low-frequency words), whereas extroverts opt for shorter high-frequency words and spend less time and energy on this task in the speech production process.

In sum, we can see why lexical diversity and, to a lesser degree, productivity have been considered to be extremely complex variables. The numerous lexical indices that have been proposed over the years testify to the difficulty, but also to the desire to capture this elusive variable. Because both productivity and lexical diversity have complicated relationships with different sociobiographical, linguistic, cultural, psychological, and situational variables, they present an irresistible challenge for researchers.

The Research

Design and methodology

Our corpus of film retellings in English and Russian produced by monolinguals and two types of bilingual was used to investigate cross-linguistic and cross-cultural effects (as well as possible gender effects) on productivity and lexical diversity.

The presence of monolingual controls, two populations of bilingual speakers, and equal proportions of male and female participants allow us to tackle questions that were previously unanswered.

Three-way univariate analyses of variance (ANOVAs) were used to test for statistical significance between means and for possible interaction effects. These analyses also yielded eta-squared values, which give a measure of effect sizes. Type of material was included as an independent variable in the design (see section on procedure) in order to verify that it did not unduly affect the dependent variables. Fisher's PLSD tests allowed us to compare the values of the bilingual groups with the two control groups of native speakers in Russian and English. The design permits us to check possible effects of the first language on the second, as well as effects of the second on the first.

Participants

Two hundred and fifty-eight subjects (129 females and 129 males, aged between 18 and 31), participated in the experiment. All were middle-class urban adults, recruited in two universities, one in Russia and one in the US. The subjects were divided into five groups:

- (1) 75 monolingual speakers of Russian (35 females and 40 males, aged between 18 and 26), students at the University of St Petersburg, St Petersburg, Russia.
- (2) 80 monolingual speakers of English (40 females and 40 males, aged between 18 and 26), students at Cornell University, Ithaca, NY, United States.
- (3) 36 L2 users of English (22 females and 14 males, aged between 18 and 31), students at Cornell University, Ithaca, NY, United States. All were L2 users, or late bilinguals, who learned their English post puberty (mean age of arrival 16); some came as immigrants, some as students. The amount of time spent in the US by these participants ranged between 1.5 and 14 years, the majority, however, spent between 3 and 8 years in the US. All students were fluent enough in English to be enrolled in regular undergraduate and graduate classes; none was

enrolled in the Intensive English Language Program. All the subjects in the study were administered a sociobiographical questionnaire in order to determine the frequency and degree of contact they had with the target language and culture – the variables that have been found to have significant effects on the level of sociolinguistic competence (Dewaele & Regan, 2001, 2002; Grabois, 1999). All of the subjects in this group were interviewed in English.

- (4) 31 L2 users of English (16 females and 15 males, aged between 18 and 31), with the same profile as the group above, were interviewed in Russian (for a detailed description of this population see Pavlenko's chapter, this volume).
- (5) 36 learners of English as a foreign language (FL learners) (16 females and 20 males, aged between 18 and 26). All subjects in this group had taken English at a high school level (3–5 hours a week) for up to 6 years, and then at the university level for up to 4 years. All were enrolled in advanced upper-level English classes at the University of St Petersburg, where they were recruited. None of the participants had ever visited an English-speaking country or had any long-term contact with native speakers of English.

Linguistic material and procedure

The narratives in the study were elicited with the help of four 3-minute long films, made by the researcher (for a detailed description of the elicitation materials, see Pavlenko's chapter in this volume). Each participant was shown one film only. Then they were asked to retell what they saw, speaking directly into the tape recorder. The tape-recorded narratives were subsequently transcribed and coded at the word level.

Four 3-minute long films, with a sound track but no dialogue, were used for narrative elicitation purposes (see Pavlenko's chapter in this volume for a discussion of narrative elicitation as a method of data collection).

The dependent variables

Total number of words

This is the total number of word tokens produced in a speech extract.

Lexical diversity

Measuring lexical diversity in extracts of different length is relatively difficult (Baayen & Tweedie, 1998; Cossette, 1994; Jarvis, 2001; Wimmer & Altmann, 1999). The length of the extract tends to be negatively correlated with lexical diversity (i.e. the longer extracts will have lower values for lexical diversity). Formulae that do not compensate for this effect, such as

the simple type/token ratio (TTR), are therefore of little use if extract length is not identical (Vermeer, 2000; Vorster, 1980). There are three solutions: first, using extracts of similar length (generally 1000 words), and applying the TTR (Biber, 1988); second, determining the proportion of low-frequency words in an extract (Laufer, 1994; Laufer & Nation, 1995; Meara & Bell, 2001); third, using formulae that provide a close fit with the TTR curve. The most popular formulae are Herdan's index C, Guiraud's index R, Zipf's Z, Malvern and Richard's D and Dugast's U (see Jarvis, 2001 for an in-depth discussion).

In the present study, lexical diversity was measured with Dugast's (1980, 1989) Uber formula, which is an algebraic transformation of TTR:

$$\text{Uber index} = U = \frac{(\log \text{tokens})^2}{\log \text{tokens} - \log \text{types}}$$

This formula provides a relatively accurate measure of lexical variation (Dewaele, 1993; Tweedie & Baayen, 1998). Vermeer (2000), however, argues that, although the Uber index is an adequate measure for early stages of vocabulary acquisition, it loses its validity from 3,000 words upwards. She suggests that more effective measures of lexical diversity should be based, not on the distribution of or the relation between the types and tokens, but on the degree of difficulty of the words used, as measured by their (levels of) frequency in daily language input.

The careful methodological study by Jarvis (2001) suggests that Uber is sufficiently valid for the type of analysis we wish to pursue. He compared the accuracy of five lexical diversity measures in terms of their ability to model the TTR curves of written texts (ranging from 70 to 420 words) in native and non-native English. The corpus in his study consisted of narratives written by the participants after viewing an 8-minute segment of Chaplin's silent film *Modern Times*. Participants included 140 Finnish and 70 Finland/Swedish adolescent learners of English living in Finland, and another 66 native English-speaking adolescents living in the US. After lemmatising the words in each narrative, Jarvis calculated and recorded TTR ratios at 20 evenly spaced measurement points. In order to smooth the curve, he averaged the TTR values at each measurement point with the TTRs of the two immediately preceding and the two immediately following token points (Jarvis, 2001: 67). Goodness of fit was then calculated between the TTR curves of each text and the curves of the five formulae using the chi-square function for non-linear least-squares curve fitting (Jarvis, 2001: 70). The rankings produced by the D (Malvern & Richards, 1997) and U formula are the most similar (Jarvis, 2001: 70), and turned out to be the most accurate (Jarvis, 2001: 71) with rejection rates of

less than 5%. Considering other properties of both formulas, Jarvis (2001: 72) concludes that Uber 'may be a better overall index of lexical diversity than D is'. Uber may also be best suited for relatively small samples, whereas the D measure is especially useful when dealing with very large samples (McKee *et al.*, 2000).

Hypotheses

- (1) Productivity and lexical diversity are independent dimensions.
- (2) Productivity:
 - (a) Lexical productivity in our film-retellings is subject to cross-linguistic and cross-cultural lexical differences.
 - (b) Factors such as gender and type of material may also affect productivity.
 - (c) If L1 and L2 values for productivity differ systematically, co-existence of two languages in one mind may bring them closer together.
- (3) Lexical diversity:
 - (a) Lexical diversity in our film-retellings is subject to cross-linguistic and cross-cultural lexical differences.
 - (b) Factors such as gender and type of material may also affect lexical diversity.
 - (c) If L1 and L2 values for lexical diversity differ systematically, co-existence of two languages in one mind may bring them closer together.

Results

Hypothesis 1: The independence of productivity and lexical diversity

To check the robustness of our Uber measure, we correlated total number of words per narrative with the Uber values. No such correlation appeared: $r(257) = 0.01$, $p = ns$. It can therefore be assumed that in our data Uber values are not influenced by narrative length.

Hypothesis 2: Productivity

In order to see whether factors such as speaker group, gender, and type of material may have affected the number of words produced in the retellings, we performed a three-way ANOVA. This also allowed us to check for any interaction effects. The complete set of results is presented in Table 7.1

Table 7.1 Results of the three-way ANOVA on number of words produced

Source	Degrees of freedom	F	p	η^2
Gender	1	0.06	0.799	0
Material	3	1.05	0.372	0.014
Group	4	3.11	0.016	0.053
Gender * Material	3	1.17	0.321	0.016
Gender * Group	4	1.02	0.400	0.018
Material * Group	11	0.76	0.675	0.037
Gender * Material * Group	11	0.28	0.989	0.014

R-squared = 0.140

The results suggest that neither gender nor type of material is linked to productivity. A significant effect did emerge for speaker group. However, the strength of this effect (the eta-squared value, η^2) is modest, as it accounts for 5.3% of the variance in the data. No interaction effects exist between the independent variables. The global R Squared value of 0.14 suggests the existence of a medium effect size (Cohen, 1992).²

A look at the means for the different groups shows that the extracts of the Americans (and especially the males) were the longest (see Figure 7.1).

A post-hoc analysis of variance (Fisher's PLSD) for speaker group confirmed that there are significant mean differences between American monolinguals and monolingual Russians ($p < 0.012$), the L2 users speaking Russian ($p < 0.012$), the FL users speaking English ($p < 0.010$), but not the L2 users speaking English ($p = ns$). This suggests that the latter group has moved close to American norms. The analysis of the mean differences also allows us to compare the position of the bilinguals speaking Russian with that of the monolingual Russians. It appears that the mean difference between both groups is -9.52 which is not significantly different. A comparison of the values of bilinguals speaking Russian and the bilinguals speaking English is equally non-significant although the mean difference is larger (-29.1).

Hypothesis 3: Lexical diversity

Following the same procedure as before, we performed a three-way ANOVA in order to determine whether factors such as speaker group, gender and type of material may have affected the lexical diversity in the retellings. The complete set of results is presented in Table 7.2.

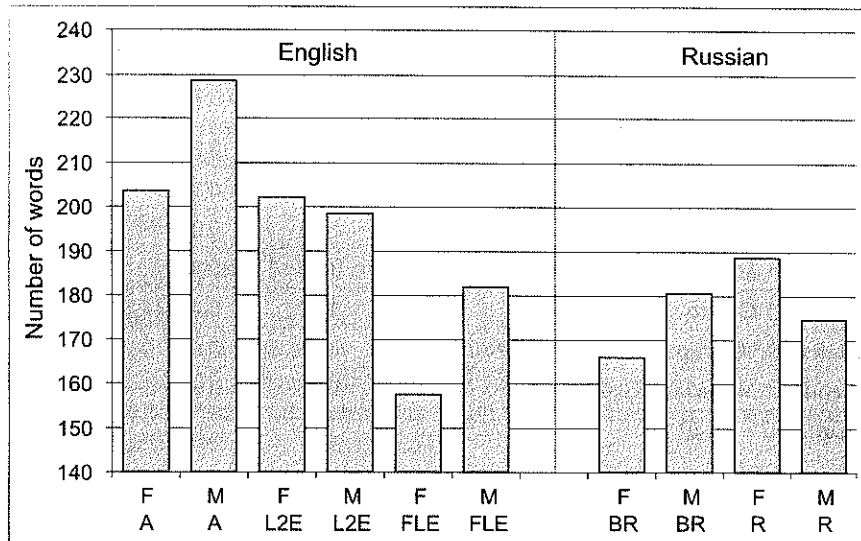


Figure 7.1 Mean number of words in English and Russian produced by female (F) and male (M) speakers in the five speaker groups

A = American monolinguals, L2E = English Second Language speakers, FLE = English Foreign Language speakers, BR = Bilinguals speaking Russian, R = Russian monolinguals)

Table 7.2 Results of the three-way ANOVA on values of Uber

Source	Degrees of freedom	F	p	η^2
Gender	1	3.92	0.049	0.018
Material	3	1.72	0.162	0.023
Group	4	26.87	0.000	0.328
Gender * Material	3	0.59	0.619	0.008
Gender * Group	4	0.42	0.793	0.008
Material * Group	11	0.75	0.682	0.037
Gender * Material * Group	11	1.22	0.27	0.058

R-squared = 0.413

The results suggest that gender and speaker group are significantly linked to lexical diversity. Type of material failed to reach statistical significance. The effect size for gender is limited, as it accounts for less than 2% of

the variance in the data. The effect for speaker group is much stronger, accounting for more than a third of the variance. No interaction effects exist between the independent variables. The global *R*-squared value of 0.41 indicates a very large effect size (Cohen, 1992).

A comparison of the means of the different groups shows that lexical diversity values for the extracts in English are lower than for those in Russian (see Figure 7.2).

A post-hoc analysis of variance (Fisher's PLSD) of the effect of speaker groups confirmed that there are significant ($p < 0.0001$) mean differences between the different groups except between the American monolinguals and the English L2 speakers.

The difference between the FL and the L2 users interviewed in English was significant ($p < 0.010$), with the L2 speakers being closer to the American monolingual value and the FL speakers being further away from both the American L1 and the Russian L1 values. The difference between monolingual and bilingual Russians speaking Russian was not significant ($p = ns$).

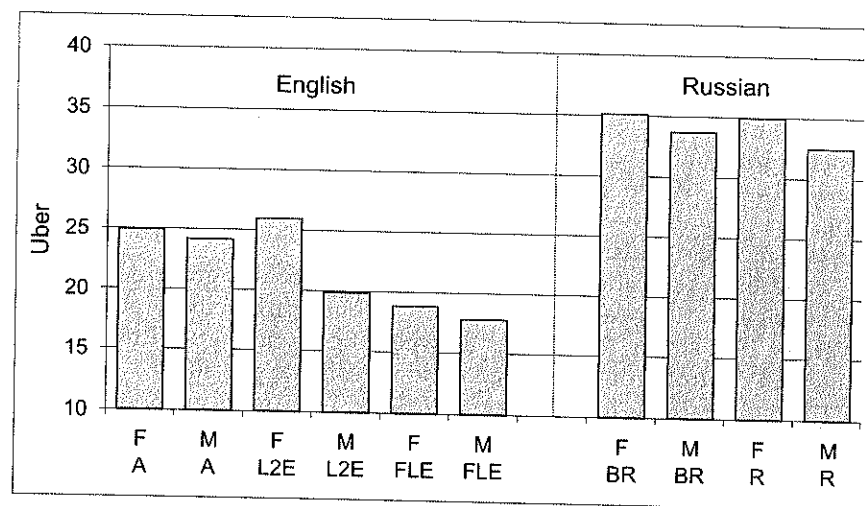


Figure 7.2 Lexical diversity values in English and Russian for female (F) and male (M) speakers in the five speaker groups

A = American monolinguals, L2E = English Second Language speakers, FLE = English Foreign Language speakers, BR = Bilinguals speaking Russian, R = Russian monolinguals

Discussion

As lexical diversity is difficult to measure intrinsically (i.e. without referring to external sources such as frequency lists), our first hypothesis concerned the methodological robustness of Uber, our lexical diversity measure. To make sure that this measure was not unduly influenced by extract length, we correlated it with number of words. The Pearson '*r*' was close to zero, thereby establishing the fact that in the present corpus our measures of productivity and lexical diversity are independent.

Earlier, we have shown that productivity and lexical diversity are affected by a large number of independent variables (personality, culture, language and situation). In the present study, one such variable may have been the type of material, but the ANOVAs revealed that this factor did not affect either productivity nor lexical diversity.

Gender was not linked to productivity, but emerged as a significant but weak effect in the analysis of lexical diversity. The finding that female speakers across the different groups tended to provide more lexical detail is interesting, but should not be overstated. A similar difference emerged in the analysis of the emotion vocabulary of 40 monolingual speakers of English and 40 monolingual Russians – but not the 34 bilinguals – in a part of the present corpus (Dewaele & Pavlenko, 2002). Monolingual female speakers were found to use a wider variety of emotion words and to produce them in greater numbers. One possible explanation is that the female participants found the film extracts, which in all four cases had female protagonists, more interesting, prompting them to retell them in greater detail. When the whole corpus was considered, the strongest difference was observed among the English L2 speakers, followed by the Russian monolinguals.

Of the factors considered in the present study, speaker group emerged as the strongest. It appeared to be linked to both productivity and lexical diversity. The strong differences between the monolingual Russian and American control groups allowed us to investigate possible L1 effects on the L2, and vice versa in the bilingual groups. The American monolinguals in the study produced significantly longer extracts than did the Russian monolinguals. Interestingly, the Russian bilinguals speaking English as an L2 approximated the values of the Americans – suggesting that they have internalised culture-specific values that regulate productivity in English in the context in question – while the Russian bilinguals speaking Russian as an L1 approximated the values of the Russian monolinguals. This suggests that the process of second language socialisation had not altered their productivity in Russian. In other words, there was no obvious effect of the

L1 on the L2, nor any visible effect of the L2 on the L1. The low productivity values of the Russian FL speakers could be an indication that they are unfamiliar with cultural requirements regulating productivity in American English. The values could also be indicative of a lower level of proficiency in English (Dewaele, 2001; Hyltenstam, 1988; Laufer, 1991).

It thus seems that as far as productivity is concerned there is no L2→L1 effect in our study and that our bicultural study participants follow different rules when speaking different languages.

A similar pattern emerged in the analysis of lexical diversity. Here again the Russian and American monolinguals stand clearly apart. Russian bilinguals speaking Russian as an L1 approximate the values of the Russian monolinguals (hence no L2 effect on the L1), and the acculturated Russian bilinguals speaking English as an L2 approximate the values of the Americans (hence no L1 effect on the L2). The lower lexical diversity values of the FL speakers (below those of the Americans and the L2 speakers) might again point to low proficiency and a limited lexicon. Dewaele and Pavlenko (2002) found that these English FL speakers produced a more limited range of emotion words than did the English L2 speakers and the English L1 speakers.

We see the statistical differences uncovered in the output as reflections of pragmatic and conceptual differences at a higher level. While it is possible that the Americans were more interested in the films (which, in turn, increased their productivity), it is much more likely that American subjects – and Russians assimilated to the L2 community – may have a different interpretation of a retelling task and thus of Grice's (1975: 45) maxim of quantity i.e. 'Make your contribution as informative as is required (for the current purposes of the exchange). Do not make your contribution more informative than is required', i.e. a judgement about the appropriate amount of information in retelling the film. The possibility that cultural factors influence speakers' interpretation of Grice's maxim with regard to context was initially introduced by Hall (1976). He distinguished low-context situations, where communication is explicit and overt, and facts are stated exactly and in detail, from high-context situations where communication is implicit, and information is conveyed more by the context than by the verbal expression. Hall introduced this concept primarily to distinguish different types of cultures (e.g. American and Northern European cultures are typically low-context, while Mediterranean and Eastern cultures are high-context). While we disagree with the level of oversimplification present in such assumptions, we believe that Noyau's conceptual framework (Noyau & Paprocka, 2000; Noyau *et al.*, in press) offers a new and interesting approach to the study of the effect of morphosyntactic and

cultural factors on the resolution level (in other words, the amount of information provided by the speaker and its specificity). Clearly, to confirm the findings of the present study, a series of cross-linguistic comparisons needs to be carried out in a variety of contexts and a range of genres.

With regard to lexical diversity, the differences between monolingual Russians and monolingual Americans could be related to typological differences between the languages. Pavlenko (2002) showed that, owing to different conceptualisations of emotions in the two languages and cultures, Russian monolinguals provided more fine-grained descriptions of emotions through a wide range of adjectives rather than through a small number of verbs as Americans did. Further research may enquire whether some cross-linguistic differences between English and Russian, whether in encoding of emotions or in tense and aspect or verbs of motion, may lead to differences in granularity in particular areas. A complementary explanation for the differences in lexical diversity could be a different interpretation of Grice's (1975: 46), maxim of formulation 'Be perspicuous. Avoid obscurity of expression. Avoid ambiguity. Be brief (avoid unnecessary prolixity)' (i.e. a judgement about the appropriate formulation of information in retelling the film). Here again one could argue that linguistic and cultural conventions regulate the expected formulation of information (i.e. lexical diversity or granularity) produced in specific circumstances. Since the Russians outperformed the Americans in terms of lexical granularity, we can hypothesise that, in this particular situation, linguistic and cultural conventions called for different levels of specificity in the two cultures.

With regard to a more general monolingual/bilingual comparison, our results suggest that bilinguals do not surpass monolinguals in terms of quantity in a film-retelling task. This seems to contradict findings that bilinguals are more productive because they are able to make a greater number of connections between concepts and lemmas in two languages (Baker, 2000; Cook, 2001). On the other hand, it is quite possible that the short and focused task with no planning time did not encourage creativity. The present findings add a new dimension to Pavlenko's (1999) findings on cultural competence. She found that in the process of second language socialisation, Russian L2 users of English may transform their conceptual representations and internalise new concepts and linguistic frames. As a result, at times their linguistic performance in L1 is subject to L2 influence. In contrast, it appears that the productivity and lexical diversity values of our bicultural study participants have been modified in English but not in Russian, suggesting that these features may not be subject to change in the way that conceptual representations are.

Conclusion

To sum up, it appears that acculturated L2 users can approximate native-speaker values in productivity and lexical diversity in the target language without losing the original values in their L1. This means that in the process of second language socialisation conceptual restructuring is taking place, as Pavlenko (this volume) demonstrated, but that some areas of pragmatic knowledge are either unaffected or less affected by L2 influence. This may give an original view of Cook's idea of multi-competence, namely that 'L2 users' knowledge of the second language is not the same as that of the native speaker' (Cook, 2001: 195). An individual's multi-competence is not a fixed, ideal end-state. It is in a constant state of flux both within and between individuals (two persons will never have isomorphic multi-competence). Metaphorically one could compare the languages in contact in the individual's mind to two liquid colours that blend unevenly, i.e. some areas will take on the new colour resulting from the mixing, but other areas will retain the original colour, while yet others may look like the new colour, but a closer look may reveal a slightly different hue according to the viewer's angle. Multi-competence should be seen as a never-ending, complex, non-linear dynamic process in speaker's mind. This does not mean that parts of the system cannot be in equilibrium for a while; but a change in the environment, i.e. a change in the linguistic input, may cause widespread restructuring with some 'islands' remaining in their original state (see also Larsen-Freeman, 2002). The lack of L2 effects on the L1 in the present study suggests that, as far as productivity and lexical diversity are concerned, original colours may survive in their new environment.

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Notes

1. Resolution levels are independent of the chronological sequence and the events may be narrated in or out of sequence.
2. According to Cohen (1992), squared partial correlation values between 2 and 12.99% suggest small effect sizes, values between 13 and 25.99% indicate medium effect sizes, and values of 26% and greater suggest large effect sizes.

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