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SALIENCE OF SEMANTIC FEATURES IN THE RUSSIAN VERBS OF MOTION

by 

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The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research for acceptance, a thesis entitled Salience of Semantic Features in the Russian Verbs of Motion submitted by Larissa Anatolievna Bondarchuk in partial fulfillment of the requirements for the degree of Master of Arts in Slavic Linguistics.

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DEDICATION

To my wonderful daughters, Katerina and Mihaela,
for their love and support.

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ABSTRACT

The Russian verbs of motion constitute a small subset which present special difficulties for foreign learners. The main purpose of the study was to assess the relative salience of the main semantic features which distinguish these verbs and their use. Eight nonprefixed verbs were tested, as well as eight of their corresponding prefixed forms. Participants were of three language background types: Russian (and/or Ukrainian); Bulgarian, and non-Slavs, mostly native English speakers. The test instrument was a simple sorting task, in which the participants repeatedly sorted the verbs on the basis of their meanings.

The results showed no significant differences between the language groups, but there were differences among the features. For the three features shared by all of the verbs, the definite/indefinite distinction proved to be the most salient, while the towards/away feature also proved to be highly transparent for the prefixed forms. The significance of these findings is discussed.

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CHAPTER ONE

INTRODUCTION

1.1. Background and general description of the study

The Russian verbs of motion constitute a small but interesting subset of verbs, which present special difficulties for foreign learners of the language. This is not, however, because of the morphology of these verbs themselves, as the verbs of motion are no different from this point of view from any other (regular) verbs: They represent the same two main conjugations and form their tense and aspectual forms in the same way as most other verbs. What makes these verbs special and difficult is the semantics of their use, which introduces distinctions (such as definite vs. indefinite and travel by self-locomotion vs. travel by vehicle) that are not relevant for other verbs in the language. The main purpose of this study was to assess the relative salience of such semantic features for native speakers of the language, as well as to contrast them with more general features (such as perfective vs. imperfective aspect and transitive vs. intransitive valency) which run through the entire inventory of verbs in the language. A secondary goal was to explore the same problem for two groups of speakers who have learned Russian as a foreign language, in order to determine whether language

background has a significant effect on the way that these features relate to one another. The two groups of non-native Russian speakers chosen for this purpose were (1) native speakers of Bulgarian, which is another Slavic language and thus shares many of the formal features of the Russian verbs, but which lacks the special category of verbs of motion, and (2) native speakers of non-Slavic languages, such as English, whose verbs are not only formally different from Russian but also manifest only the transitive-intransitive feature of the four that were the main focus of this study.

1.1.1. The problem of aspect in Russian

The problem of aspect is a notorious one from the standpoint of students of Russian as a second language, particularly for those who do not have a perfective vs. imperfective distinction in their own native language. To begin with, foreign learners are compelled to learn a double set of forms for essentially every verb, but the problem goes much deeper than that. The crux of the problem is learning to choose the correct aspectual form for each new situation. To read the accounts provided in standard Russian textbooks for foreign learners, the choice might seem simple enough: Choose the perfective form when a single, completed action is being described, and the imperfective form otherwise (as in the case of a repeated or habitual action).

However, in practice, the decision on which aspectual form to use is not always so straightforward, as generations of foreign learners can well attest.

The study of the problem with the Russian verbs of motion is important for theoretical reasons and because of the potential practical implementations of the results. Thus, knowledge of the most salient features of the verbs of motion in Russian might help in more efficient and productive teaching.

1.1.2. The compound problem of the verbs of motion

As if the problem of aspect were not enough, this problem is compounded many times over in the case of the Russian verbs of motion, if only because two entirely novel semantic distinctions are introduced that are unique to this small class of verbs. Furthermore, not all verbs that denote movement are a part of this group; thus, for instance, the verb 'to move' *dvigat'sja* does not belong here. The term "verbs of motion", in fact, refers to a specific set of only 14 pairs of verbs (and their derivatives), a complete list of which is given in the Russian column of Table 2 on p. 12 below. In their simple or nonprefixed form (as shown in the table), these verbs are all imperfective. What distinguishes each pair is a feature that is variously called definite vs. indefinite (or unidirectional vs. multidirectional), indicative of the fact that

the verbs in the first column are all used to indicate single specific motions in one direction, while those in the second column are to indicate habitual motions or motions in more than one direction. We will refer to this feature as definite/indefinite (abbreviated D/I) in this thesis. In addition, a distinction is also made among these verbs in terms of the kind of transportation means involved, i.e., by means of a vehicle or by self-locomotion (on foot). We will refer to this feature as vehicle/nonvehicle (V/N). Finally, the standard distinction between transitive and intransitive valency is also involved for these verbs (cf. 'go' vs. 'carry [something]'), and we will refer to this feature as transitive/intransitive (T/I). For the prefixed verbs of motion, a fourth feature is also involved, depending on the meanings of the prefixes themselves (see section 2.1 below).

1.1.3. Some personal observations

My interest in this group of verbs arose during a Ukrainian course that I was taking as a student. I was struck by the fact that English learners of the language had difficulties in using these verbs in Ukrainian; they often confused the form, choosing the definite instead of the indefinite form of verb and vice versa. Having Russian as my first language, I had no problem with those verbs. Almost all the Slavic languages, except Bulgarian and

Macedonian, have a group of separate verbs that distinguish unidirectional and multidirectional movement. Native speakers of these languages acquire these verbs in their early childhood; therefore, they have no difficulties in using them, and they tend not to separate these verbs into a distinctive category. Observing those students in the Ukrainian course, I thought of possible difficulties for L2 learners of Russian. My speculations were confirmed by feedback from those speakers of English who had taken several courses of Russian. Students expressed their difficulties in learning the Russian verbs of motion and this was the main stimulus for me to study this problem.

I had another interesting observation upon meeting with a 23-year-old man who had spent two years in Bulgaria. Currently a student at the University of Calgary, he is taking a Russian course for beginners. His knowledge of Bulgarian is on the intermediate level, and I assumed that this knowledge of another Slavic language would help him. However, he also complained about having problems with the Russian verbs of motion. As I later realized, the explanation came when I did a parallel comparison of verbs of motion in several Slavic languages (Russian, Ukrainian, Polish, and Bulgarian) and discovered that Bulgarian was the only language in that group that did not distinguish between multidirectional and unidirectional

verbs of motion. This explains why it was difficult for the student to learn the Russian verbs of motion.

1.1.4. Some terminological distinctions

In this study, I will use the term 'Slavic background' to denote speakers with native competence in either Russian or Ukrainian. The term 'verb(s) of motion' is used for any or all of the fourteen pairs of verbs that form the "problematic group" listed in the Russian column in Table 2. By the expression 'unidirectional' and 'multidirectional', I mean the contrast between an action performed either in one way at a given period of time towards a specific object vs. a habitual action or a round-trip movement in more than one direction. For my study, the use of these terms implies that speakers who study Russian as their second language must learn and understand these concepts, if they are to use the proper motion verbs in Russian and to distinguish them from one another. Dr. Hornjatkevyč (forthcoming) offers his term for the VoM – autodynamic (movement on one's own power) and allodynamic (movement under someone else's power).

1.2. Overview of the literature

The existing literature that deals with the verbs of motion in Russian, Ukrainian, and Bulgarian is more descriptive than analytical. However, it is possible to divide the available sources into three main categories:

(1) academic textbooks, school manuals, and dictionaries intended for native speakers of Russian, Ukrainian, or Bulgarian;

(2) textbooks and course books intended for L2 learners;

(3) scientific literature, periodicals, and monographs on linguistic analysis intended for professionals.

Typically, the academic textbooks, school manuals, and dictionaries for native speakers do not distinguish the verbs of motion from other verbs. Since native speakers acquire them in their early childhood unconsciously and later use them easily, the verbs of motion are treated as ordinary regular verbs. Vinogradov (1971:447) analyzes some verbs of motion as any other verb in Russian: *bresti, bredu, brël* 'to wander', *sest', sjadu, sel* 'to sit'. In several books, verbs like *idti* 'to go', 'to walk', and *exat'* 'to drive a car, bike, vehicle', etc. are classified as unproductive in the morphological verb system, because they do not change their form like other "regular" verbs (Vinogradov, 1971; Rosenthal, 1979; Juščuk, 1979). However, they are not isolated into a separate category "verbs of motion" (Vinogradov 1971:452),

as would have been a case in a textbook for students learning Russian as their L2. Vinogradov characterizes the verbs *letet'* 'to fly', *plyt'* 'to swim', *nesti* 'to carry' as "definite motion verbs", but does not use the terms unidirectional or multidirectional. In sum, the literature targeted for native speakers does not make any distinction between verbs of motion and the rest of the verbs in Russian. Moreover, native speakers often are not overtly aware of this category at all, as they do not have any difficulties in using these verbs.

On the other hand, for non-native speakers this group of verbs can be very difficult to learn, and some authors even call these verbs "anomalies within the Russian verbal system" (Launer 1987:77). Therefore, I recognize this category in the literature, which relates to those who study Russian as a foreign language. From these books it is very clear that Russian verbs of motion are "special", and that learners should pay more attention to them, unless they have a Slavic background or some familiarity with another Slavic language. A special note should be made in regards to the comparison and juxtaposition of all Slavic languages: When Bulgarian is being compared and opposed to other Slavic languages, the Macedonian language falls into the same category with Bulgarian, as it also lacks this special category of verbs.

As Judina (1964) and Rožkova (1964) noted, in most of the Slavic languages there is a correspondence with the Russian verbs of motion, and there will be no difficulties for most Slavs to learn these verbs. However, in Bulgarian there is only one verb pair that has parallels to the Russian pair *idti – xodit'*, and this is the verb pair *otivam – xodja* (Rožkova 1964:42).

The last literature category is aimed at linguists, both scholars and students who learn the languages professionally. It is the most dynamic, developing part of the works dealing with the study of the verbs of motion.

Townsend (1994) compares the verbs of motion in four Slavic languages: Russian, Polish, Czech, and Serbo-Croatian, as well as citing several forms from Bulgarian. His general conclusion about these verbs is that there is a "decreasing elaboration of declension and increasing elaboration of conjugation as we move along the conventional axis of East to West to South Slavic" (Townsend 1994:276). He shows very clearly the similarities and distinctions in verbs of motion in these languages. However, nothing has been said in this aspect about the Bulgarian language, which does not have a full set of verbs of motion parallel to Russian. Wertz (1979) proposes a novel way of teaching verbs of motion in Russian and criticizes old teaching methods, in which these verbs were described as following a single pattern and treated as "exceptions to the basic rules of aspect

formation" (Wertz 1979:53). Instead, he suggests that this category of verbs should be presented as "normal" Russian verbs, which they indeed are from the standpoint of their conjugation. Wertz shows a visible simplification in the teaching and presentation of verbs of motion, where the key distinctions are between the stem types only.

Interestingly, textbooks of "the older generation" such as Clark (1967) do not categorize verbs of motion as a separate, distinct group, but include them into a group of "irregular verbs" along with such verbs as *moč'* 'to be able' and *sidet'* 'to sit', which are not verbs of motion at all. Therefore, there is no clear specification of verbs of motion in these older works and this is an ambiguous category for L2 learners. However, textbooks of the "new generation" (Nummikoski 1996; Pexlivanova and Lebedeva 1990; Humesky 1999) make this distinction clear and all have a separate lesson on the verbs of motion. Oddly, the textbooks for students learning Bulgarian as their second language (L2) typically present the verbs of motion as a separate category, despite the fact that there is no general distinction between unidirectness and multidirectness in this language (see Table 1).

It is obvious that the Bulgarian verbs given in this table have little to do with unidirectness or multidirectness, features that are intrinsic to the Russian verbs of motion. Rather, they are given in the textbook for L2

learners as an imitation of the Russian textbooks for foreign students, or as a part of policy of following the pattern of the Russian educational system.

Table 1. "Verbs of motion" in Bulgarian (Ghinina *et al.* 1965)

Verb	Preposition	Interrogative Pronoun
otivam 'to go' (unidirectional)	*v* 'in', *na* 'on'	*kyde* 'where'
xodja 'to go (multidirectional)	*v* 'in', *na* 'on'	*kyde* 'where'
vyrvja 'to walk'	*po* 'along'	*kyde* 'where'
trygvam 'to leave'	*ot* 'from', *za* 'for'	*otkyde* 'from where', *zakyde* 'where'
pytuvam 'to travel'	*za* 'to', *ot* 'from', *do* 'to', *ot-do* 'from-to'	*zakyde* 'where', *otkyde* 'from where', *dokyde* 'to where'
minavam 'to go through', 'to cross', 'to pass by'	*prez* 'through', *po* 'on', *kraj* 'near by'	*prez kyde* 'through what', *kyde* 'where'
pristigam 'to arrive'	*v* 'in'	*kyde* 'where'
stigam 'to reach'	*do* 'to'	*dokyde* 'to where'
vlizam 'to enter'	*v* 'in', *prez*, 'into', 'through'	*kyde* 'where', *prez kyde* 'through what'
izlizam 'to go out'	*ot* 'out of'	*otkyde* 'from where'
vryštam se 'to return'	*ot* 'from', *v* 'in', 'into'	*otkyde* 'from where', *kyde* 'where'
byrzam 'to hurry'	*za* 'for'	*zakyde* 'where'

This table shows clearly that the Bulgarian language, unlike other Slavic languages, stands out with its verb system, where there is no general

distinction between verbs with one-time motion or habitual movement, or unidirectional vs. multidirectional motion (see Table 2).

Table 2. Verbs of motion in English, Bulgarian, Ukrainian and Russian

ENGLISH	BULGARIAN	UKRAINIAN		RUSSIAN	
Meanings	Unidirectional/ Multidirectional verbs (unified)	Uni-directional verbs	Multi-directional verbs	Uni-directional verbs	Multi-directional verbs
'to go, to walk'	*vyrvja, xodja, ida, otida*	*ity*	*xodyty*	*idti*	*xodit'*
'to travel, to ride'	*pytuvam, xodja s vlak, otivam s kola*	*jixaty*	*jizdyty*	*exat'*	*ezdit'*
'to run'	*tičam, bjagam*	*bihty*	*bihaty*	*bežat'*	*begat'*
'to fly'	*letja*	*letity*	*litaty*	*letet'*	*letat'*
'to swim, to float'	*pluvam, plavam*	*plysty*	*plavaty*	*plyt'*	*plavat'*
'to carry'	*nosja*	*nesty*	*nosyty*	*nesti*	*nosit'*
'to convey, to transport'	*vozja*	*vezty*	*vozyty*	*vezti*	*vozit'*
'to lead'	*vodja*	*vesty*	*vodyty*	*vesti*	*vodit'*
'to climb'	*katerja se, lazja*	*lizty*	*lazyty*	*lezt'*	*lazat'/ lazit'*
'to crawl'	*pylzja*	*povzty*	*povzaty*	*polzti*	*polzat'*
'to drag'	*vlača, vleka*	*taščyty*	*taskaty*	*taščit'*	*taskat'*
'to drive, to chase'	*gonja, pydja*	*hnaty*	*hanjaty, honyty*	*gnat'*	*gonjat'*
'to roll'	*tyrkaljam*	*Ø*	*kataty**	*katit'*	*katat'*
'to wander'	*brodja*	*bresty*	*brodyty*	*bresti*	*brodit'*

*NOTE: Since the verb *kataty* 'to roll' does not have a unidirectional counterpart, it should not be considered as a verb of motion in Ukrainian, according to our definition.

This table illustrates similarities between Ukrainian and Russian, on the one side, and differences between Bulgarian and Russian, on the other. In this respect, Bulgarian is analogous to English, where there is no distinction between unidirectness and multidirectness of motion.

The verbs of motion in Russian are not different from 'regular' verbs morphologically, as they can take the same prefixes and suffixes:

Verbs of motion: *nesti* 'to carry' (by foot); *v-nesti* 'to carry (in)'; *ot-nesti* 'to carry (away)'; *vy-nesti* 'to carry (out)'; *nes-la* 'carried' (past, fem., sing., imperf.); *nes-li* 'carried' (past, pl., imperf.).

'Regular' verbs (no motion): *pisat'* 'to write'; *v-pisat'* 'to write (in)'; *ot-pisat'* 'to write (back)'; *vy-pisat'* 'to write (out)'; 'to issue' [a document]; *pisala* 'wrote' (past, fem., sing., imperf.); *pisali* 'wrote' (past, pl., imperf.).

The imperfective verbs of motion are also conjugated according to the same pattern as the 'regular' imperfective verbs:

Table 3. Conjugation of the Verbs of Motion

	1st person	2nd person	3rd person
Sg.	*ja id-u* 'I walk'	*ty id-ë-š* 'you walk'	*on/ona id-ë-t* 's/he walks'
Pl.	*my id-ë-m* 'we walk'	*vy id-ë-te* 'you walk'	*oni id-u-t* 'they walk'

Alike, 'regular verbs' have the same model for conjugation (Table 4):

Table 4. Conjugation of the 'Regular' Verbs

	1st person	2nd person	3rd person
Sg.	*ja plet-u* 'I braid'	*ty plet-ë-š* 'you braid'	*on/ona plet-ë-t* 's/he braids'
Pl.	*my plet-ë-m* 'we braid'	*vy plet-ë-te* 'you braid'	*oni plet-u-t* 'they braid'

What does distinguish the verbs of motion from other verbs is their semantic and syntactic properties. More specifically, they make distinctions related to the purpose of movement, as between motion in one or more directions, or between a single act and repetitive movement. Such verbs as *idti* and *xodit'* also contrast their direct meaning 'to walk' with an indirect, figurative meaning related to time, transport or conversation: *vremja idët bystro* 'time goes (passes) quickly', *étot avtobus xodit v gorod každoe utro* 'this bus goes to the city every morning', *reč' idët o novom plane* 'the conversation is about new plan [or: we are talking about new plan]'.

There is also a definite correlation between those Slavic languages with elaborate case systems for nouns and adjectives (Russian, Ukrainian, Polish, etc.) and those having verbs that distinguish between unidirectness and multidirectness of motion. Syntactically, in all of these Slavic languages the case system serves as a means for governing the parts of the sentence.

On the other hand, the conjugation of the verbs in these languages is relatively simple. By contrast, in Bulgarian and Macedonian (Slavic group) and English (Germanic group), there is no general distinction between unidirectness and multidirectness of motion. As de Bray (1980) noted, however, Bulgarian and Macedonian also differ from other Slavic languages in that they have lost the case system, although some traces of some oblique cases, such as dative, can still be found in folk songs and poetry. On the other hand, during its development, the Bulgarian language elaborated and enriched the conjugational system (De Bray 1980:113). In short, the main difference between Bulgarian and Russian verbs system is in that that the Russian verb has two conjugations, three aspects and three tenses, while the Bulgarian verb has three conjugations, four aspects and nine tenses (Babov: 1988).

De Bray distinguishes the following categories in the Bulgarian system of tenses: simple tenses – the present, the imperfect and the aorist; compound tenses – future, future of renarration, future perfect, past future perfect, the compound past or perfect, compound past in renarration, the pluperfects, pluperfect of renarration, the conditional mood, the past conditional. Also, the verbs of motion are noted under the label of "Verbs of Going and Conveying". They, however, are discussed not in the "Russian

sense", that is as "problematic verbs with distinction in regards to unidirectness and multidirectness". Instead, De Bray gives examples with the following Bulgarian verbs: *vyrvja* 'to go on foot', *xodja* 'to go regularly', *otivam* 'to go away', *izlizam* 'to go out', *doxaždam* 'to come', *vodja* 'to lead', *vozja* 'to convey', *nosja* 'to carry'. Even though the first two verbs are the only ones that involve a distinction between unidirectionality and multidirectionality of motion (as in Russian *idti-xodit'*), De Bray does not bring this distinction out. No doubt he refrains from doing so because this is the only historically remaining pair in Bulgarian, which makes them unique and 'irregular' in this respect rather than reflecting a broader tendency in the language.

Vaimberg (1983:71) discusses the semantic structure of the verbs of motion in Russian, without any analysis of their most salient features. His observations are limited to description of the several features of these verbs, such as "reference to the manner in which objects are displaced, reference to the speed of the displacement, reference to the environment in which the agent is moving", etc. He also touches upon the prefixed verbs of motion with emphasis on semantic structure. As was observed by many experienced instructors of Russian, the L2 learners do not have difficulties in

distinguishing prefixed verbs of motion, but rather face the problem of which form to use, or which form means what.

The work by Shimizu (1995) deserves mentioning because of the author's detailed study and description of the Russian verbs of motion. Obviously, there is no such category as verbs of motion in Japanese as per our discussion, which is why this article can be of great help to those who study Russian as native speakers of Japanese. Even though such matters are not part of our focus, there is a clear correspondence between the Japanese and Korean languages. This correlation was confirmed by the performance of the Korean subject in our study, as the reader can see later.

Summarizing the literature mentioned, we can conclude that the differences between the verbs of motion in English, Russian, Ukrainian, and Bulgarian often require special attention in the teaching of L2 learners of these languages. Furthermore, the present study has a practical, pedagogical goal in mind, as its primary purpose is to identify the most prominent features of these verbs from the prospective of both native speakers and L2 learners of the language. The study, the results, and the conclusions thus fill a gap in the area of teaching the Russian verbs of motion.

CHAPTER TWO

THE EXPERIMENTS

2.1. Aim of the Study

The main purpose of this study was to assess the relative salience of the main semantic features that are involved in the use of either the plain or prefixed forms of the Russian verbs of motion. These four features are as follows:

(1) Definite vs. indefinite (D/I): This feature expresses the difference between verbs that indicate a single specific motion in one direction (unidirectional, e.g., *idti* or *nesti*) vs. those that indicate habitual motion or motion in more than one direction, such as a round trip (multidirectional, e.g., *xodit'* or *nosit'*).

(2) Vehicle vs. nonvehicle (V/N): This feature distinguishes verbs that describe motion by a conveyance (e.g., *exat'* or *ezdit'*), as contrasted with motion on foot (e.g., *idti* or *xodit'*).

(3) Transitive vs. intransitive (T/I): This feature distinguishes verbs denoting actions that are transferred over to direct objects (e.g., *nosit'* or *vezti*), as opposed to verbs that do not take such objects (e.g., *idti* or *exat'*).

(4) Towards vs. away (T/A): This feature, which is relevant only for the prefixed verbs of motion, distinguishes verbs whose prefixes indicate motion

towards the speaker or some other object (e.g., *prixodit'* or *dovozit'*) vs. motion that is directed away (e.g., *uexat'* or *otnesti*). (For more detail, the reader may refer to Tables 5 and 6, where the feature markings are provided for all 14 of the verbs of motion.)

Using a simple card-sorting task, the relative transparency or salience of each of these features was assessed for three different groups of speakers, contrasting both native and non-native speakers of Russian. Native Russian (and/or Ukrainian) speakers were tested to establish a baseline against which the performance of the non-native speakers could be compared, while the selection of two groups of non-native speakers was done in the hope of providing some useful information about the effects of language background on this problem.

The sorting task employed in the experiments to be reported in this thesis was conceived as an informal version of the more general "concept formation" (CF) task that is widely used in both psychology and psycholinguistics. As Vinacke (1951:22) notes, this is a standard experimental technique used to test subjects' ability to "manipulate and classify the essential common features embedded in . . . complex stimulus situations." The basic procedure involved in the classic CF task requires setting up two (equal) sets of stimuli, one (called the target set) whose

members all share some particular property or feature of interest, while members of the other (the distractor set) all lack this property. The stimuli are then presented (randomly) to participants, who try, on the basis of simple "correct" or "incorrect" reinforcements, to identify the members of the target set, by responding "yes" to stimuli they believe are in the set, and "no" for those they think are not. For example, if a target set of Russian were to be defined on the basis of the 'definite' or 'unidirectional' feature, then participants would be conditioned to respond "yes" to verbs like *idti*, *exat'*, *nesti*, and *vezti*, but "no" to verbs like *xodit'*, *ezdit'*, *nosit'* and *vozit'*. The number of trials required to reach some well-defined performance criterion (such as ten consecutive correct "yes" and "no" responses) is then taken as a measure of the difficulty of identifying or "forming" the defining feature or concept.

However, to explore all of the features of interest in this study, using the full-blown CF technique, would clearly be a very large task, involving separate tests for each of the features involved. In addition, a great deal of computer programming would also be required in order to achieve efficient, computer-controlled presentations and tabulations of the results, as is typically done these days in research of this type. The simple sorting task was thus devised as a simpler and more easily administered alternative to the

CF task itself, which would allow for all features to be tested, in effect, 'at once,' as well as lend itself to a very easily administered task. Clearly, in order to sort verbs into two groups on the basis of some shared property or feature, attention must be paid to the particular concepts involved, and in this case we hoped that the ORDER (or RANK) of the choices—which sort was done first, which second, etc.—and perhaps also the TIME to perform each sort might be useful measures of the relative transparency or salience of the specific features involved.

2.2. Participants

Three groups of participants were tested: 50 native Russians or Ukrainians who spoke Russian fluently, and two groups of speakers who learned Russian as a foreign language: 22 native Bulgarian speakers and 20 native speakers of non-Slavic languages (mostly English). All respondents were university students or persons residing permanently in Canada. The first ("Russian") group was considered homogeneous for purposes of this study, given the native-like fluency of the few (6) Ukrainians tested and considering the fact that Ukrainian shows the same set of verbs of motion distinction as Russian does (see Table 2).

Bulgarian speakers were chosen for the first non-native ("Bulgarian")

group because, as noted in the previous chapter, the Bulgarian language lacks the special category of the verbs of motion.

Finally, the languages of the other, non-native ("Non-Slavic") group, such as English, were not only formally different from Russian but also manifested only the transitive-intransitive feature of the four that were the main focus of this study.

The idea of including Bulgarian speakers into the study was based on the assumption that as fluent speakers of Russian they would have a good passive knowledge of the Russian verbs of motion, expressed in their ability to recognize them and use them correctly. However, it was hypothesized that the Bulgarian respondents might have difficulties understanding the nature of unidirectness and multidirectness in motion because this contrast is only minimally represented in their native language.

All the non-native respondents completed formal courses at various levels in Russian. There was, however, an age requirement of at least ten years for Bulgarian speakers, because the younger generation of high school students does not learn Russian nowadays, unless at a specialized Russian language school for advanced learners. A decade or two ago, the Russian language was a compulsory subject in all Bulgarian schools. (There was one

subject in this group, who attended Russian high school in Japan for two years, for whom this age requirement was not applicable.)

University students who had at least intermediate or advanced knowledge of Russian and whose native language was English were typical of the third group of 20 participants, though native speakers of Armenian, Korean, Lithuanian and Spanish (two speakers) were needed to fill out the group. Their social status varied from high school students, undergraduate and graduate students, to university professors, a policeman, a member of the clergy, and housekeepers. The main selection method was a short interview with the participants in order to determine their suitability and willingness to be involved in the experiment. (See Table 14 in Appendix D for detailed background information on all of the participants in this study.)

The participants were asked to sign the Participation Agreement (Appendix A) and fill out the Background Information Form (Appendix B). The Participation Agreement and the Background Information Form were in English for all the subjects, regardless their mother tongue, while the Instructions were in English for members of the Non-Slavic group but in Bulgarian for the Bulgarian group and in Russian for the Russian group. The reason for providing the Instructions in the participants' native language was the desire to make the respondents feel at ease about the nature of the

experiment, as well to guarantee that the instructions for the experiments were clear and easy to understand (see Appendix C).

The non-native participants were asked to assess their proficiency in Russian, according to the following scale: 1 – excellent; 2 – good; 3 – functional; 4 – poor; 5 – very poor. If a participant knew a Slavic language other than Russian, he or she was also asked to evaluate his or her knowledge in it, as well, according to the same scale. It was presumed that a respondent might benefit greatly from knowledge of another Slavic language (except Bulgarian or Macedonian for reasons already discussed). Also, all participants were asked to indicate whether they spoke any other non-Slavic languages. English speaking subjects were also expected to identify their level of proficiency in Russian (beginner, intermediate or advanced) before they filled out the Background Information Form.

2.3. Procedure and stimuli

Before the test, the participants were informed as to general purpose and potential benefits of the experiments, as well as the nature of the specific tasks that they would be asked to perform. Deception of respondents was scrupulously avoided and all questions were answered honestly and fully,

avoiding only details that might bias their feedback or judgements on the experimental tasks.

The study consisted of three parts: a practice session, and a true experiment of two parts, each involving a different set of verbs. During the practice session, the participants were given 8 cards with the Russian names for the following animals: *korova* 'cow', *kot* 'cat', *kozël* 'goat', *lev* 'lion, *lisa* 'fox', *pantera* 'panther', *sobaka* 'dog', *volk* 'wolf'. The participants were then asked to sort these words into two equal piles as many times as they could, with a short break for discussion after each attempt. Time was not measured for this part of the experiment, so that the participants would not feel under pressure. After each practice sort, participants were asked to explain their reasons for sorting the way that they did. The most obvious ways of sorting the practice words were expected to be done according to the following criteria:

a) domestic (1st group) vs. wild animals (2nd group):

   1. *korova* 'cow', *kot* 'cat', *kozël* 'goat', *sobaka* 'dog',
   2. *lev* 'lion', *lisa* 'fox', *pantera* 'panther', *volk* 'wolf'.

b) grammatical gender — masculine (1st group) vs. feminine (2nd group):

   1. *kot* 'cat', *kozël* 'goat', *lev* 'lion', *volk* 'wolf';
   2. *korova* 'cow', *lisa* 'fox', *pantera* 'panther', *sobaka* 'dog'.

Other possible sorts that some subjects actually performed were based on the relative sizes of the animals, the relative length of the names, and even animals that were associated in Russian fairy tales (vs. those which were not). In any event, the main purpose of the practice task was to familiarize participants with the basic word-sorting procedure and to make it clear to them that there were a number of ways in which a balanced two-pile sort could actually be carried out.

After the practice session, the participants performed the true experiment. For this, response times were discreetly measured for each sort in the hope that this measure could serve as a useful way to assess the relative ease of each. The response time was measured separately for all sortings until the moment when the respondent stopped sorting and seemed sure about his or her choice. That moment was especially important because a sorting would not be accepted until the researcher was sure that there would be no alterations or changes made. The participant was asked to explain the reason for his or her choice after each sorting.

For the sorting task #1 with non-prefixed verbs of motion (set A) the participants were given cards imprinted with the 8 simple (non-prefixed) Russian verbs of motion shown in Table 5:

Table 5. Nonprefixed verbs of motion (Set A)

Verbs of motion	Distinctive Features		
	Definite	Vehicle	Transitive
idti	+	-	-
xodit'	-	-	-
exat'	+	+	-
ezdit'	-	+	-
nesti	+	-	+
nosit'	-	-	+
vezti	+	+	+
vozit'	-	+	+

Note: A (+) feature marking in this table indicates a positive marking for the first label for each feature contrast (i.e., definite, vehicle, or transitive), while a (-) marking indicates the opposite value for the feature in question (i.e., indefinite, nonvehicle, or intransitive, respectively).

All the nonprefixed verbs were imperfective but distinguished the three semantic features of definite (unidirectional) vs. indefinite (multidirectional), motion by vehicle vs. self-locomotion (e.g., 'go' vs. 'ride'), and transitive vs. intransitive (e.g., 'go' vs. 'carry'). Table 5 shows the values for each feature on each of the 8 verbs.

Up to four sorting attempts were made on this verb set, permitting participants to sort on the basis of each of these dimensions, as well as on others that they might invent for themselves. Records were kept both of the order/rank of the sorts (i.e., which sort was done first, which second, etc.) and a rough estimate of the time required to carry out each successive sort (using a simple stopwatch). The decisions about the relative salience of the

features were made on the basis of these two response variables.

During sorting task #2 with prefixed verbs of motion (Set B), the participants were given new, prefixed variants of the same 8 verbs used in task #1 as shown in Table 6 (which uses the same feature marking conventions as Table 5):

Table 6. The prefixed verbs of motion (Set B)

Verbs of motion	Distinctive Features			
	Definite	Vehicle	Transitive	Towards
prijti	+	-	-	+
prixodit'	-	-	-	+
uexat'	+	+	-	-
uezžat'	-	+	-	-
otnesti	+	-	+	-
otnosit'	-	-	+	-
dovezti	+	+	+	+
dovozit'	-	+	+	+

Note that half of these verbs have prefixes meaning 'motion towards' and the other half with prefixes meaning 'motion away', as shown by the feature values marked in the table. The rest of the features remained unchanged, but for one complication: When prefixed, the definite forms all take on the perfective aspect, while the indefinite forms all remain imperfective when prefixed. In the new variants, therefore, the distinction definite vs. indefinite is thus redundant with (or is converted into) a distinction between perfective vs. imperfective aspect. With the addition of

the direction of motion distinction, this set exhibits four semantic distinctions of interest, rather than just three as in the first set. For that reason, as many as five sorting attempts were allowed for this task. Otherwise, the procedures and scoring were the same as the previous set.

In order to determine whether participants were overtly aware of the basis (and even the appropriate terminology) on which they made each of their sorts, the experimenter asked each participant to explain after each sorting attempt why they sorted the words the way they did and checked whether the sort was performed correctly. (Incorrect sorts were noted but not analyzed and participants were asked to try again, so long as they were willing to do so, without counting the incorrect sort against the upper limits of the number of sorts that were allowed, as described above.)

Finally, in order to assess whether one of the verb sets was intrinsically more revealing of the semantic features involved than the other, half of the participants performed task #1 with Set A (order AB) before task #2 (Set BA), while the other half did the reverse. This allowed us to see how the sorting was done on each set without any influence from a prior sort on the other set. All of the results were then recorded into the Master Data Chart that is provided as Appendix D.

Post-experimental interviews were conducted with all participants to the extent that they agreed. The purpose of these interviews was to clarify the subjects' own understanding of what they were doing and why. The participants whose native language was English also discussed the 'tips' provided in their classroom study of the verbs of motion, as well as the main problems they encountered while learning them. It was discovered that the main problems for these students were memorizing the forms for perfective and imperfective verbs, as well as the distinguishing the unidirectional from multidirectional verbs. As a rule there were no problems in acquiring or using the prefixed forms of verbs of motion; once learned, the prefixes were easy to use correctly. Some participants expressed concerns about the use of verbs of motion and the fact that they always had to think whether the motion was by foot or by vehicle. One subject, an advanced learner who spent two years in Russia, said that he had problems with verbs of motion at the beginning of his study of the language; however, he "overcame" the problem once he became immersed in the language environment in Russia, by using them in every-day life. Frequent use helped him to master these verbs and to distinguish them from one another. Interestingly enough, none of the Bulgarian speakers expressed having any particular problems with the Russian verbs of motion prior to the experiment, and the vast majority of

them spoke Russian very well. Until the moment of the 'real' test and post-experiment interview, they were not even aware of the difference between the unidirectional and multidirectional verbs. However, most of the Bulgarian participants still did the sortings correctly, explaining that 'there is some difference', but they often could not actually define the categories involved.

The respondents were given the opportunity to ask any further questions that they might have about the conduct and purpose of the experiments. All participants were also offered free access to verbal or written reports of the resulting research findings.

CHAPTER THREE

RESULTS

3.1. Selection of participants for the statistical analyses

A total of 92 subjects were tested in this study (50 in the Russian group. 22 in the Bulgarian group, and 20 in the non-Slavic group). A few of them performed so poorly, however, that their data yielded little information about the relative difficulty of sorting on the basis of one feature rather than another. Consequently, it was decided to impose a minimum performance criterion that would eliminate the least useful of these participants. This criterion selected was that, in order for his or her data to be included in the analysis, a subject had to perform at least one sort for each set that was based on least one of the features of interest, and to perform at least two such sorts for at least one of the sets. As noted by the subject number gaps in the Master Data Chart in Appendix D, two individuals (R23 and R43) were thus eliminated from the Russian group on this basis, and two more (B04 and B21) were also eliminated from the Bulgarian group. We also eliminated one additional member of the Russian group (R51) on the grounds that her native language turned out to be Polish, rather than either Russian or Ukrainian. The net result of these cuts was a sample of 47 for the Russian group, 20 for the Bulgarian group, and 20 for the non-Slavic group,

or 87 people in all. These are the participants for whom the background and response characteristics are tabulated in the Master Data Chart, which appears as Table 14 of Appendix D.

The background statistics for the three subject groups can be summarized as follows:

3.1.1. Composition of the Russian (R) subject group

This group consisted of 47 participants, 21 of whom were males and 26 females. Their ages ranged from 16 to 53 years for the males (M = 33.0 years) and from 13 to 56 years for the females (M = 31.9 years). All but five of the subjects were native speakers of Russian, four of Ukrainian, and one declared himself to be a native speaker of both languages. As shown in Table 5 of Appendix D, 24 of these participants were given Set A (the unprefixed verbs of motion) to sort first, while the remaining 23 sorted Set B (the prefixed verbs of motion) before set A.

3.1.2. Composition of the Bulgarian (B) subject group

This group consisted of 20 participants, with 10 of each sex. Their ages ranged from 16 to 50 for the males (M = 36.8 years) and from 22 to 51 for the females (M = 38.5 years). All spoke Bulgarian as their native language

but were fluent in Russian, as well. Half of these participants were given Set A to sort before Set B, while the other half did the reverse.

3.1.3. Composition of the Non-Slavic (N) subject group

This group consisted of 20 participants, 11 of whom were males and 9 females. Their ages ranged from 22 to 65 for the males (M = 36.9 years) and from 16 to 38 for the females (M = 24.9 years). Few of these subjects were fluent in Russian, but most had at least two years of formal study in the language. Three-quarters (15) of this group spoke English as their native language, while 2 were native speakers of Spanish, 1 of Armenian, 1 of Korean, and 1 of Lithuanian. As with the Bulgarian group, half of these participants were given Set A to sort first and the other half Set B.

3.2. Data tabulation and scoring

As indicated in the preceding discussion, two response measures were tabulated in this study: data on the order or RANK of the defining feature for each successive sort (i.e., which feature was used first, which second, etc.), as well as the TIME required to perform each sort. Since some sorts were actually done on the basis of features that were not the focus of the investigation, and since others were not completed at all, some decisions had to be made about aberrant responses. The decisions reached can be

summarized as follows:

3.2.1.Calculating the ranks

If a person sorted the cards only according to one or more of the features outlined in Table 5 (for Set A verbs) or Table 6 (for Set B verbs), the actual order of the sorts was recorded as the "rank" for each sort (1 for the feature involved in the first sort, 2 for the second sort, etc.). If an individual sorted on the basis of some other, idiosyncratic criterion, the actual order or rank was noted but was ignored in calculating the ranks for the features of interest. (Thus, if someone sorted first on the basis of the D/I feature, second on the basis of some idiosyncratic feature, and third on the basis of the V/N feature, the rank for the V/N feature was still tabulated as 2, ignoring the idiosyncratic sort.) Redundant ranks were similarly ignored if a participant sorted twice on the basis of the same feature, regardless of any attempts to explain the redundant sort on some new grounds. Finally, if an individual failed to perform a sort based on a particular feature, a rank of 4 was assigned for the three-feature task involved for set A (see Table 5) and a rank of 5 for the four-feature task involved with set B (see Table 6).

3.2.2 Adjusting the ranks for Set B verbs

As already noted, there were three features of interest involved for set A verbs (the nonprefixed verbs of motion), but four features for set B verbs the prefixed verbs of motion, since the latter also exhibited a feature that was related to the meanings of the prefixes. In order to compare the two verb sets on the common ground of the three features they all shared, the ranks for the features for the set B verbs were recalculated, ignoring the rank of the fourth, non-shared feature. (Thus, for example, if someone sorted first on the basis of the non-shared T/A feature, second on the basis of the D/I feature, and third on the basis of the V/N feature, the ranks of the second and third of these were increased to 1 and 2, respectively, ignoring the rank assigned to the T/A feature, which was not relevant for the three-feature analyses.) It is these "adjusted" ranks that appear in Table 14 of Appendix D for the first three features for set B, with 4 used for each feature that did not serve as the basis for any sort. For the separate four-feature analysis that was carried out for set B verbs (only), the original four ranks were restored and 5 was used to denote the non-sorts, and these are the ranks that appear in Table 14.

3.2.3. Time limit and the time for non-sorts

In order that participants would not pause indefinitely over a given sorting attempt, a time limit of five minutes (300 seconds) was imposed on each

trial, and anyone who delayed for this long in performing a sort was considered to be unable to perform any of the other sorts not already completed. (Thus, for example, if a subject sorted the set A verbs first in terms of the feature D/I but then worked for five minutes in trying to perform a second sort, that individual was deemed to have failed to sort on the basis of either of the two remaining features and was assigned a rank of 4 and a time of 300 for both.) The same rank and time were also recorded, of course, for people who "gave up" before the five-minute limit was reached.

3.3. Statistical comparisons of the two verb sets on the three common features

The first comparison tested was the performance of participants on set A (nonprefixed verbs of motion) versus that on set B (prefixed verbs of motion), and for this only the ranks and times for the three shared features (D/I, V/N, and T/I) were taken into account (see section 3.2.2 above for a discussion of the adjustments that were made to the ranks for purposes of these analyses).

Two ANOVAs were then performed with Group (R vs. B vs. N) as the between-subjects factor and Set (A vs. B), Order of Presentation (AB vs. BA), and Feature (D/I vs. V/N vs. T/I) as the within-subjects factors. The

first of these analyses was based on the scores for RANK, while the second was based on the scores for TIME.

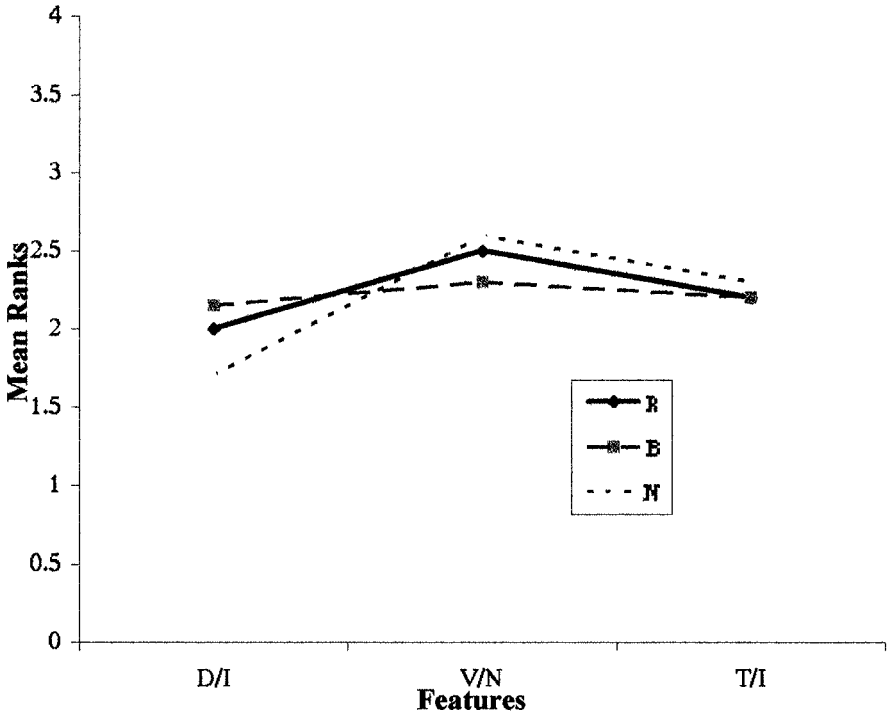
3.3.1. The three-feature analyses in terms of RANK

The results of the basic three-feature analysis for ranks revealed that only Set ($p < .01$) and Feature ($p < .001$) were significant, as well as their interaction ($p < .03$). Presentation Order and Group were not significant, nor were any of their interactions, so the results reported are based on the pooled data from both orders of presentation and from all three language groups. Because of the significant Feature by Set interaction, however, the results from the two verb sets could not be pooled and had to be analyzed separately.

3.3.1.1. The rank results for Set A (the nonprefixed verbs of motion)

Figure 1 below shows the mean ranks for each feature for the Set A verbs, plotted for each of the three language groups, which all show a highly similar pattern.

Fig. 1. Mean Ranks for Language Groups on Set A Verbs



Averaging across the three language groups, the overall mean ranks for each feature are shown in Table 7.

Table 7. Overall Mean Ranks on Set A

Features	Mean Ranks
D/I	1.950
V/N	2.470
T/I	2.245

Pairwise comparisons of these three means showed that none of the three features were significantly different for these verbs, although the comparison

between the means for the feature D/I and the feature V/N almost reached significance ($p = .059$). This means that, for the eight nonprefixed verbs of motion tested, there was no strong tendency to favor any of the features as the basis for the earlier sorts (though there was perhaps a slight tendency to favor D/I over V/N). Written schematically, this result can be summarized as follows:

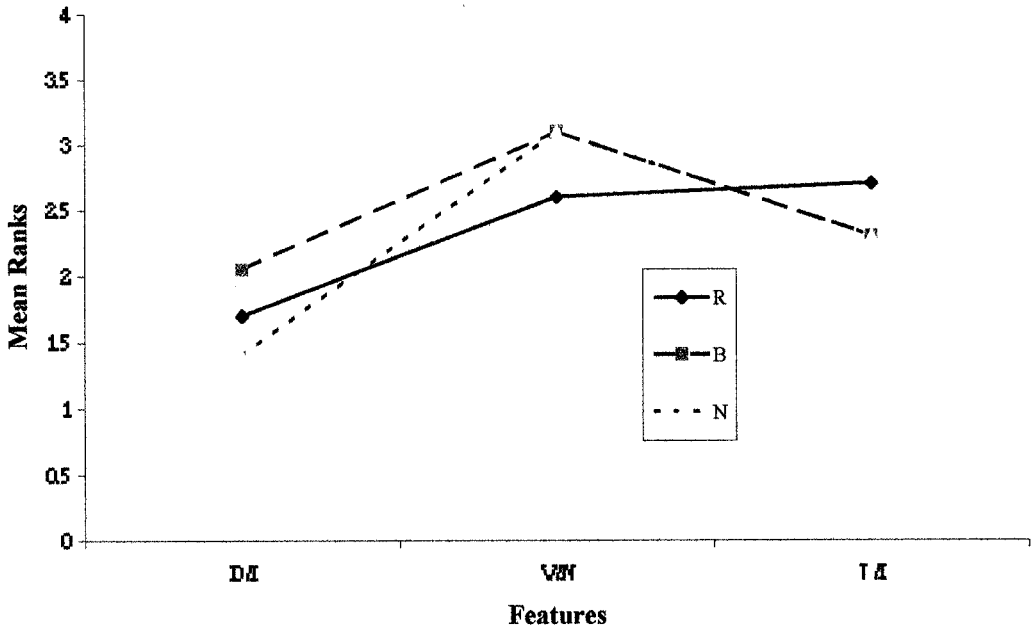
D/I, V/N, T/I

with no feature ranked lower or higher than any of the others.

3.3.1.2. The rank results for Set B (the prefixed verbs of motion)

Figure 2 shows the mean ranks for each feature for the Set B verbs, plotted for each of the three language groups, which once again all show a highly similar pattern.

Fig. 2. Mean Ranks for Language Groups on Set B Verbs



The overall mean ranks for each feature are shown in Table 8.

Table 8. Overall Mean Ranks on Set B

Features	Mean Ranks
D/I	1.724
V/N	2.918
T/I	2.510

Pairwise comparisons of these three means showed that the mean rank for the D/I feature was significantly less than that for both the V/N and the T/I features ($p < .001$ in both cases), but that the means for neither of the latter

two features were significantly different from each other. This signifies that, for the eight prefixed verbs of motion, subjects tended to sort first in terms of the D/I feature but were equally likely to choose V/N or T/I for the second sort. Schematically, this result can be written as follows:

$$\boxed{D/I < V/N,\ T/I}$$

where the "less than" symbol shows that the first feature tended to be ranked lower than either of the other two.

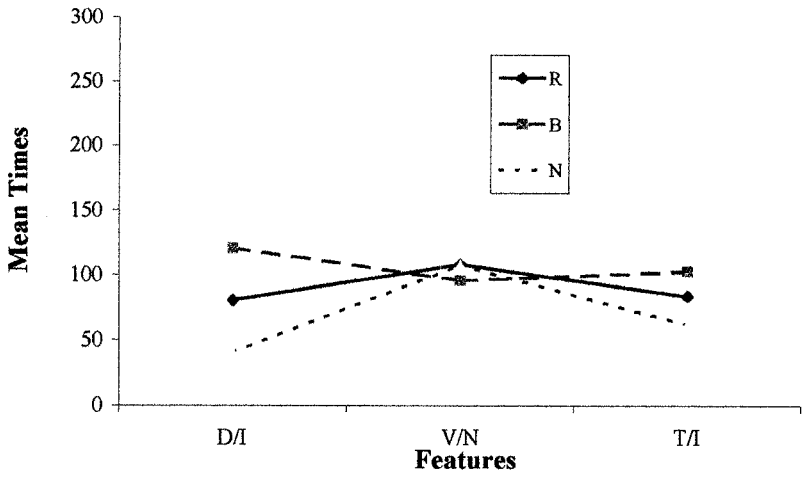
3.3.2. The analyses in terms of TIME

Substituting the time data for the rank data in the same analysis as performed in 3.3.1 above, much the same overall result was found: only Set ($p < .001$) and Feature ($p < .002$) were significant, together with their interaction ($p < .002$), with Presentation Order and Group as non-significant factors. Again, because of the significant interaction, the results for the two verb sets had to be analyzed separately.

3.3.2.1. The time results for set A (the nonprefixed verbs of motion)

Figure 3 below shows the mean times for each feature for the Set A verbs, plotted for each of the three language groups, which reveal only small differences.

Fig. 3. Mean Times for Language Groups on Set A



Averaging across the three language groups, the overall mean times were as shown in Table 9.

Table 9. Overall Mean Times on Set A

Features	Mean Times
D/I	80.363
V/N	103.745
T/I	82.501

Pairwise comparisons of these three means again showed that none of the three features differed from each other for these verbs, just as was the case with the analysis of the data for ranks. Schematically,

D/I, V/N, T/I

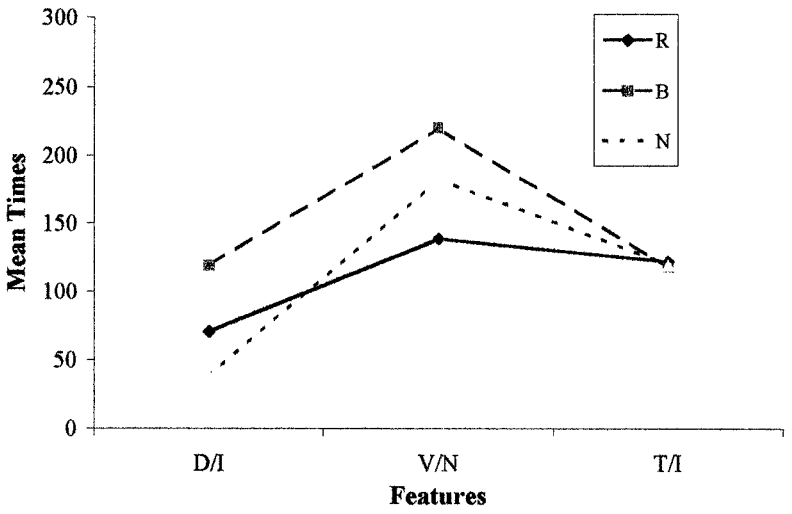
This means that for the eight nonprefixed verbs of motion, the sorts were all

done at about the same rate, regardless of the feature involved.

3.3.2.2 The time results for set B (the prefixed verbs of motion)

Figure 4 shows the mean times for each feature for the Set B verbs, plotted for each of the three language groups, which once again all show a highly similar pattern.

Fig. 4. Mean Times for Language Groups on Set B



The overall mean times for each feature are shown in Table 10.

Table 10. Overall Mean Ranks on Set B

Features	Mean Times
D/I	75.774
V/N	180.474
T/I	119.712

Pairwise comparisons of these three means showed that the times for both the D/I feature and the T/I feature were significantly lower than for the V/N feature ($p < .001$ in the first case and $p < .03$) in the other), but that neither of the former two features were significantly different from each other. Schematically,

$$\boxed{D/I,\ T/I < V/N}$$

This means that, for the eight prefixed verbs of motion, the sorts were done at about the same speed for the first two features, but slower for the third feature, V/N.

3.4. The four-feature analyses for Set B verbs

Since four features were involved in the sorting task for Set B (the prefixed verbs of motion), separate ANOVAs were run on the ranks and times for this set alone (see section 3.2.2 above for adjustments that were made to the ranks for purposes of these analyses).

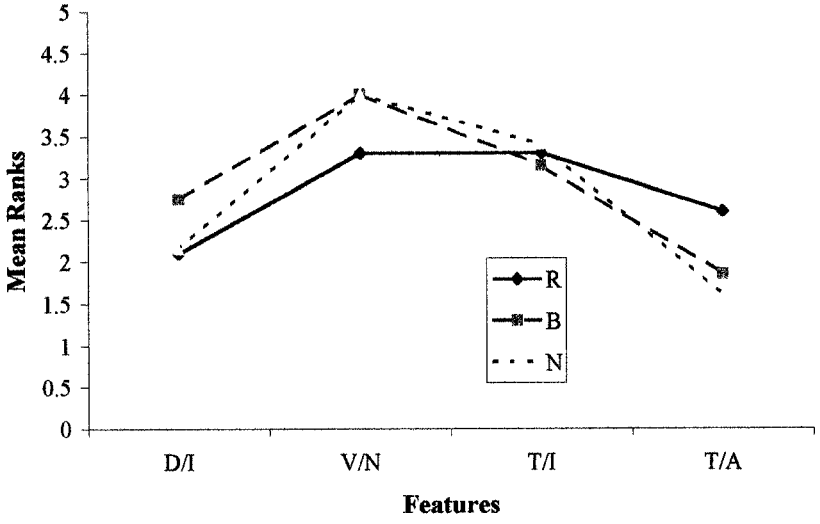
3.4.1. The four-feature rank results for set B

Only Feature was a significant main factor in this analysis ($p < .001$), but there was also a significant Feature by Group interaction ($p < .03$); see Figure 5. Thus, these results had to be analyzed separately for each language

group.

Figure 5 shows the response profiles for the three language groups on the four features involved, which are presented in detail in Tables 11-13.

Fig. 5. Mean Ranks for Set B Verbs (all features)



3.4.1.1. The rank results for the Russian group

The rank means for the Russian group are shown in Table 11.

Table 11. Mean Ranks for the Russian group on Set B (all features)

Features	Mean Ranks
D/I	2.106
V/N	3.255
T/I	3.340
T/A	2.596

Pairwise comparison tests showed that the feature D/I was ranked significantly lower than both the V/N feature and the T/I feature ($p < .03$ and $p < .001$, respectively), but none of the other features were significantly different from each other. Schematically,

D/I < V/N, T/I

Thus, the native Russian/Ukrainian speakers tended to sort the prefixed verbs on the basis of the D/I feature before either V/N or T/I.

3.4.1.2. The rank results for the Bulgarian group

The rank means for the Bulgarian group are shown in Table 12.

Table 12. Mean ranks for the Bulgarian group

Features	Mean Ranks
D/I	2.750
V/N	4.000
T/I	3.150
T/A	1.850

Pairwise comparison tests showed that for these subjects the feature T/A was ranked significantly lower than both the V/N feature and the T/I feature

($p < .03$ and $p < .001$, respectively), but that none of the other features were significantly different from each other.

Schematically,

T/A < V/N, T/I

The native Bulgarian speakers thus tended to favor the T/A feature over either the V/N and T/I features as the basis of the first sort, rather than using the D/I feature that was favored by the native Russian/Ukrainian speakers.

3.4.1.3. The rank results for the Non-Slavic group

The rank means for the Non-Slavic group are shown in Table 13.

Table 13. Mean ranks for the Non-Slavic group

Features	Mean Ranks
D/I	2.150
V/N	4.000
T/I	3.400
T/A	1.600

Pairwise comparison tests showed that for these individuals both the features D/I and T/A were ranked significantly lower than both of the other two features (both differences with V/N were significant at the level of $p < .001$,

while the first differed from T/I at $p < .001$ and the second at $p < .02$, respectively), but none of the other features were significantly different from each other. Schematically,

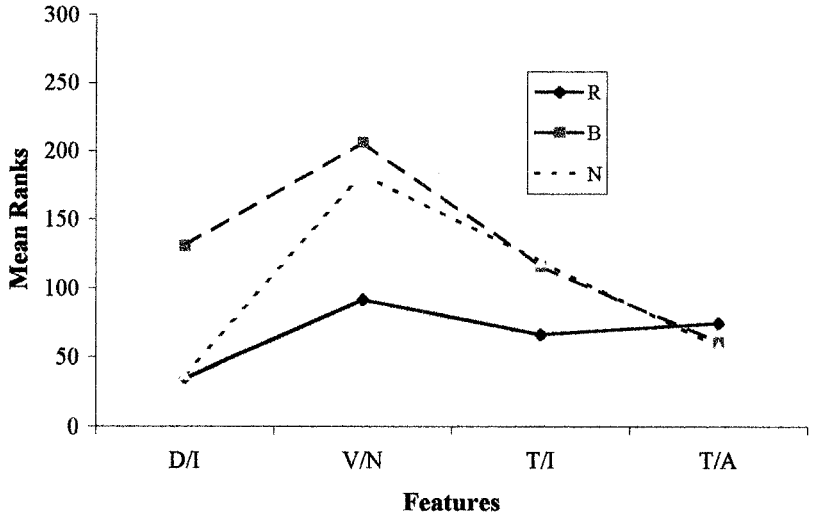
D/I, T/A < V/N, T/I

Thus, the native non-Slavic speakers tended to equally favor the D/I or the T/A feature as the basis of their early sorts, leaving the V/N and T/I features until later.

3.4.2. The four-feature time results for Set B

As with the rank analysis, only Feature was a significant main factor in the time analysis ($p < .001$), but this time there were no significant interactions, either. A single, global analysis could thus be performed on the four features, pooling the data from all three language groups. The common response pattern for the groups is shown in Figure 6.

Fig. 6. Mean Times for Set B Verbs (all features)



The overall mean times for the four features are given in Table 14.

Table 14. Overall Mean Times for Set B (all features)

Features	Mean Times
D/I	67.735
V/N	160.117
T/I	100.619
T/A	64.461

Pairwise comparisons of these four means shows that the sorts involving the features D/I and T/A were both performed significantly faster than the sort involving the feature V/N ($p < .001$ in both cases), while those based on the feature T/I were performed at about the same rate as all of the others.

Schematically,

D/I, T/A < V/N

Thus, the participants who were native speakers of non-Slavic languages tended to perform better on sorts that were based on the features D/I or T/A, but were slower in sorting on the basis of the feature V/N.

3.5. Nonsystematic individual variation in the word sortings

Some of the participants showed incredible creativity and resourcefulness in their sortings. Although it is meaningless, statistically, to speak of any stable pattern in this respect, it is very interesting to mention some of the examples of such a colorful array. The following examples are organized by the language groups involved.

3.5.1 Native Russians or Ukrainians

Subject #25, a 33-year-old male mathematician, made 11 attempts at sorting the two sets. Besides those seven variants that were expected, he did a few more; his explanations were "one could solve the same problem in many ways." Therefore, he sorted the cards with the verbs according to such criteria as "words with and without letter e", "odd and even number of the letters in the word", "second stem in a word is the same", and "vowel vs.

consonant at the beginning of the word". There seemed to be a link between his profession and his ability to solve the task in so many different ways, and with his desire not to give up easily. Another Russian mathematician, a 24-year-old student, tried 12 times, using such criteria as "letters in the words follow the alphabetical order", "vowels and consonants repeat more than two times", and "common letter in all the words is e". He enjoyed the experiment very much and even offered to create a computer program for a follow-up study, involving similar tasks and rules. In this case, again, the respondent was very inventive and resourceful, as might be expected from a mathematician.

Similarly, a female subject, educated in physics and math, offered a sorting according to a logical parallel: "If you walk, you carry (on foot) (two pairs of verbs *idti – nesti, xodit' – nosit'*); if you drive, you transport something by a vehicle (two more pairs: *ezdit' – vozit', exat' – vezti*). A Russian male, an instructor of mathematics, had four ways of sorting the practice cards with the names of animals: the two expected ways (domestic vs. wild, female vs. male), then animals with and without the letter "el" in them, and short vs. long words. As for the verbs, he, too, did not give up easily, making nine attempts to group the cards. Subject #R07, a 39-year-old male graduate student in electrical engineering, did his first sort on the

vehicle/non-vehicle feature in both verb sets. These arrangements took him a mere 12 to 15 seconds, a result that is likely related to his way of viewing the world. A 19-year-old Muscovite business student also performed tirelessly in trying ten times. She enthusiastically explained her choices: "There are words in this pile with three-letter roots, there is rhyme in all these verbs, vowels vs. consonants, " etc. Regardless of the fact that some of her sortings were not justified, she did not get discouraged and tried again and again, with even more eagerness. Another Muscovite, a 24-year-old student in management and business, sorted the cards with the animals in a very clever way. In total, he did more than four different sorts, including one where the animals were put together according to traditional way of combining animals in Russian fairy tales: such characters as 'cat' and 'dog', 'wolf' and 'fox' go together, while 'panther' and 'goat' or 'cow' and 'lion' do not.

3.5.2. Bulgarians

While sorting the cards with animals, the Bulgarian subjects very often showed that, even though the animal names were written in Russian, they perceived them and thought of them in Bulgarian, rather than in Russian. Thus, 'dog' in Bulgarian is a neuter noun, and sometimes a dog could also

be referred as 'he'; therefore, the Bulgarians were often uncertain which group to put the *sobaka* card into. Similarly, 'cat' is usually perceived as a feminine noun in Bulgarian, unless one specifically uses a word for a male cat. That is why some Bulgarian participants were not able to see *kot* as a masculine noun.

A 42-year-old native speaker of Bulgarian sorted the animal cards according to quite unexpected criterion – as honorific and derogatory terms for people. He clearly justified his choice by such examples as *korova* 'cow', *kozël* 'goat', *lisa* 'fox', *sobaka* 'dog' as being offensive nicknames for people, while *lev* 'lion', *kot* 'cat', *pantera* 'panther' and *volk* 'wolf' were honourable terms. A female subject, who held a Ph. D. in animal husbandry, sorted all the cards with animals very quickly according to expected criteria, adding another one: mammals. This criterion was, however not a distinctive one, because all of the animals were, in fact, mammals. She meant a category of those animals who feed their young with milk and who were domestic animals at the same time.

Interestingly enough, only a few of the Bulgarians correctly identified a category of motion with and without a vehicle. It could be hypothesized that the main reason was the almost complete absence of this distinction in Bulgarian. Nonetheless, many of the Bulgarian subjects performed correct

sortings on this feature, adding comments like "I cannot explain why this sorting is correct" or "I feel that it should be this way, but I don't know exactly why", etc. Subject #B14, even stated: "I would have used these two pairs of verbs interchangeably, there is no difference for me [she meant verbs involving a D/I distinction]". Another subject seemed to arrive at the Vehicle/Non-Vehicle sorting by accident, saying: "I don't see the difference, I cannot understand why they are different!"

These examples all show that it was quite possible for speakers to do their sorting on a completely intuitive basis, without any clear cognitive awareness of the semantic bases involved.

3.5.3. Non-Slavs

Subject #N14, whose native language was English, was a professional linguist and a university professor with an extensive teaching and research experience in Slavic languages, and his mention of the category of 'frequentative and iterative' for definite/indefinite forms of verbs of motion, was rather novel in regards to these verbs. A speaker of Spanish, a 52-year-old software engineer with a background in economics, explained his initial difficulties while he was learning Russian verbs, their perfective and imperfective form, and especially verbs of motion. He however, felt much

more confident after spending several years in Russia. Only after being immersed into language environment did he manage to use the verbs correctly. Another learner of Russian, a native speaker of English, a 32-year-old male, did a sorting that was not a 'usual' one. He called it "opposite categories – impossibility to do these actions at the same time", e.g. *nel'zja exat', ezdit' i nesti, nosit'. Nel'zja vozit' , vezti i xodit', nesti.* Even though it was not how the test was designed, the explanations were quite logical and in accordance with the instructions, outlining the criteria of sorting into two equal piles with the opposite features.

A female subject, a 17-year-old student in her second year of Russian studies, was very precise in her definitions of the criteria and her desire to perform as well as she could. She tried as many as twelve times, repeating the same sortings sometimes, but remained unable to find the category of vehicle/non-vehicle motion in either set. There are two feasible explanations for her failure to find this category: first, insufficient knowledge of the language (it was only her second year of Russian studies); second, lack of a clear-cut distinction of this kind in her mother tongue – English, where, indeed there is no formal difference between 'to go by foot' and 'to go by vehicle', unless the speaker purposely emphases this distinction by adding the descriptive phrases.

A Korean subject failed to separate the category "vehicle/non-vehicle". This was striking, because while doing his sortings for both sets, A and B, he was thinking aloud in English that "this is movement by vehicle, this is not". In the interview later, he clarified his actions by saying that there was no distinction in Korean, and therefore he thought it was not appropriate to separate the verbs on this basis.

A graduate student in his Ph. D. program in applied mathematics, a native speaker of Armenian who was very fluent in Russian, did the same sorting three times with the set A, without noticing that the classifications were identical. In total, he tried nine times to organize the cards, though successfully identified only three correct groups. In the post-experiment interview, he was surprised to find out that he had made three absolutely identical sortings. He explained that he was "proving the same theorem by different means."

3.6. Variations in the sorting times by the three language groups

As reported above, the analyses of the sorting time data yielded much the same results as the analyses of the ranks (or orders) of the sorts, including the finding of a lack of any significant differences between the three language groups. In all of those analyses, however, the "assigned scores" of

300 seconds were included for all failed attempts to sort in terms of one or more of the targeted features. If these somewhat artificial scores are excluded from the data set, and only the real times for successful sorts are considered, some potentially interesting differences do emerge between the three language groups tested.

3.6.1. Range of times for successful sorts

As indicated in the Master Data Chart in Appendix D, the range of the times for successful sorts can be summarized as follows:

(1) For the Russian/Ukrainian group, the range of real times was from 5 to 160 seconds;

(2) For the Bulgarian group, the range of real times was from 6 to 214 seconds; and

(3) For the Non-Slavic group, the range of real times was from an incredible 3 (!) to 89 seconds.

These figures suggest that the non-Slavs performed their sorts faster than either of the other two groups, while the Bulgarians were the slowest, overall.

3.6.2. Mean real times for successful sorts

A summary of the mean real times involved also supports this general conclusion:

(1) The mean real time for the Russian/Ukrainian group was 36.0 seconds;

(2) The mean real time for the Bulgarian group was 58.9 seconds; and

(3) The mean real time for the Non-Slavic group was 27.4 seconds.

Although no statistical analyses were performed on these data, the summaries provided do seem to show that both the Russians and non-Slavs performed their successful sorts at an average rate of about 30 seconds (a little higher for the former and a little lower for the latter), while the typical Bulgarian subject took almost twice that long.

CHAPTER FOUR

DISCUSSION AND PROGNOSIS

4.1. Some important negative findings

One of the most pervasive and potentially profound findings of this study was a negative one. This relates to the nonsigificance of the factor of Group in all of the overall data analyses presented in Chapter 3, whether carried out on the basis of the ranks or the times of the sorts. In fact, the only place were Group showed any effect at all in this study was in the significant Feature by Group interaction that was reported in section 3.4.1, where only relatively minor differences in the ranks of the features were involved. This means that, in general, the background of the participants played little role in either the order of the sorts or in the variations in time required to perform them. Surprisingly, it mattered little whether a participant was a fluent native speaker of Russian, a native speaker of Bulgarian who was fluent in Russian, or a non-fluent student of Russian whose experience with the language was largely restricted to the L2 classroom: All performed the sorting tasks in essentially the same way and using the same order of preferences (as discussed in detail in section 4.4 below). This suggests that the hierarchy of features involved may be intrinsic to the nature of the problem, rather than

subject to influences that relate to the wide variations in experience with the language that were present across these three language groups.

Dr. Terry Nearey [p.c.] has suggested a highly plausible alternative hypothesis that the negative finding for Group in the rank analysis may be nothing more than an artifact of the limited range of rank responses that were available to subjects. Specifically, were it not for the "4" responses in the three-feature analysis for ranks, all subjects would have been limited to the three responses 1, 2, and 3 for all items, a circumstance that would have automatically resulted in a mean of 2 in each case. Even when the "4" responses is added for non-sorts, however, it is clear from Figure 1 on p. 39 that the overall means do not vary much from 2.0, even for the individual features.

Another somewhat unexpected negative finding of this study was the consistent lack of a significant effect of the factor of Order of Presentation. This means that it did not matter whether the participants sorted the plain, non-prefixed verbs of motion first (Set A) or the morphologically more complex prefixed verb set (Set B). Neither one had a significant effect on the performance of the other, despite the fact that three feature distinctions were common to both sets. This was surprising because one might have expected that experience in sorting on the basis of some particular feature, say, D/I or

V/N, on the first verb set might make that feature more salient the second time around, but the data suggest that this was not the case. Instead, each set was evidently dealt with anew on its own terms, without reference to the earlier one. Despite this, there were, of course, significant effects between the sets themselves, as will be brought out in the discussion of the following section.

4.2. Differences in salience among the features and verb sets tested

The factor of Feature played a significant role in all of the analyses performed. However, there was some variation in the rank preferences and performance times, depending on the verb set that was involved. Specifically, in the three-feature comparisons for the two verb sets, both the rank and the time analyses showed no differences between the features in the case of the non-prefixed verbs of motion (Set A), yet the rank for the D/I feature was significantly lower in the case of the prefixed verbs of motion (Set B). The times were significantly longer for the V/N feature for this set, as well. These patterned responses suggest an overall picture for the three shared features that looks like this, at least for Set B:

D/I < T/I < V/N

In other words, from the standpoint of the prefixed verbs of motion, the feature D/I emerged as the most salient overall, while the feature V/N was the least salient; the feature T/I was in between.

The first of these differences seems to be relatively easy to explain, since it only emerged with the prefixed forms. As noted in Chapter 1, when prefixes are added to the definite plain forms of Set A (all of which are imperfective to begin with), the result is to create a new perfective verb, whereas adding prefixes to the indefinite forms results in an imperfective form and thus has no effect on aspect (since the plain forms are all imperfective to start). In effect, therefore, the relatively opaque feature D/I (to judge by the results from Set A) is, in effect, converted into the relatively transparent feature P/I (for perfective vs. imperfective), which is a distinction that runs through almost the entire verbal system of the language. Put another way, a relatively obscure semantic distinction that is relevant for only 14 verbs in the language is changed into one that is relevant for literally thousands of verbs, and hence is much more likely to be recognized and selected as the first basis for performing a series of sorts of the kind required in this study.

Dr. Pogosian [p.c.] has suggested that the special salience of the P/I distinction might also be the result of the emphasis that tends to be placed on

it in the formal educational system, even for native Russians. It might be interesting to explore, therefore, whether the P/I distinction would emerge as strongly transparent for Russian subjects who were not as well educated as were most of the ones who participated in this particular study.

The relatively long times required to sort on the basis of the V/N feature can also be explained on similar grounds. Specifically, the V/N feature (like the D/I feature for the non-prefixed forms) is one that is limited to the 14 verbs of motion that are listed in Table 2. By contrast, and despite its seemingly "abstract" character, the T/I feature is one that distinguished a very large number of verbs in Russian (or any language that makes the distinction).

Finally, a similar overall hierarchical tendency seems to emerge when the additional feature T/A is added to the list of comparisons for the prefixed verbs of motion. As before, in the three-feature comparisons, the feature D/I (now converted to a P/I distinction, as just discussed) again emerges as the preferred feature for the first sort, both by the Russian group (see section 3.4.1.1) and for the Non-Slavic group, where it shares this distinction with the feature T/A (see section 3.4.1.3). The significantly slower sorting times for the feature V/N also emerge in the time analysis for these verbs. The only really new wrinkle, in fact, in the four-feature analyses is the consistent

appearance of the feature T/A as a relatively transparent or "easy" feature in the rank results for both the Bulgarian group (where it stands alone as the easiest) and the Non-Slavic group (where it shares this status with the D/I = P/I feature).

This result, too, can be quite readily explained as follows. The feature T/A is a feature that reflects the meanings of the prefixes that are added to the verbs in Set B and, significantly, it is the only general feature that characterizes the meanings of these prefixes. The other three features (i.e., D/I, T/I, and V/N) are all features that are intrinsic to the verb roots and, as such, ought to cause greater difficulties in getting sorted out. (It is as if comparing the relative ease of finding a particular item in a box that has only one item in it, with the task of finding a similar item contained in a different box along with two other items.) Looking at the problem in this way, it ought to come as no surprise to find that the feature T/A is, relatively speaking, highly salient.

The argument might also be offered that the salience of the feature T/A is enhanced by some kind of "real-world" or experiential transparency that is not shared by a purely grammatical distinction like T/I, since "motion away from" and "motion towards" some person, place or object is something that can be readily observed in real life. However, since this kind of

experiential transparency would also seem to be true of the feature V/N, which did not emerge as highly salient in this study, no general explanation would seem to be possible along these lines.

Finally, if a general overall trend were to be extracted from the full pattern of the results of this study, this would seem to be the one that actually characterized the rank results for the Non-Slavic group, which is repeated here for both emphasis and convenience:

D/I, T/A < T/I, V/N

In sum, at least insofar as performing verb sorts is concerned, the features D/I (especially when realized as the feature P/I for the prefixed verbs) and T/A are both relatively salient, while the features T/I (a purely grammatical distinction) and V/N (a distinction limited to 14 verbs in the language only) are relatively opaque. That, at least, appears to be the chief finding of this study.

4.3. Evaluation of card sorting as a technique

As discussed in section 2.1, the card-sorting procedure that was used in all of the experiments described in this thesis was an innovation introduced in order to avoid some of the complexities of the more familiar concept formation task. At the same time, the hope was that useful information about

categorization and feature hierarchies could still be gained, despite the methodological simplifications involved. It would appear from the relative enthusiasm and ease with which the participants took to the task that the first of these aims was accomplished, and judging from the essential "cleanness" and ready interpretability of the results, the second aim seems to have been achieved, as well. The card-sorting task can thus be recommended for future research in areas where information about semantic hierarchies is sought and where elaborate experimental techniques are not desired.

4.4. Shortcomings with respect to original goals

One problem that arose in this study was the limited number of L2 learners of Russian that were available. The original goal was to match the total number of L2 participants with that of native Russian speakers. For instance, if the total number of native speakers was 60, as was originally intended, we hoped to find 60 non-native learners of the language, as well. Ideally, these might then have been equally distributed among as many as three different categories, based on the level of their study; that is, 20 beginners, 20 intermediate learners, and 20 advanced learners. This might have given us some useful information about how the feature hierarchy developed among L2 learners, and at what point the responses of the learners came to match

those of the native speakers. Unfortunately, due to the end of the teaching term in April, combined with the need to finish this thesis in time for the fall convocation, it was not possible to recruit as many subjects as would have been required to achieve this goal.

4.5. Theoretical and practical benefits of the study

Although for the reason just stated we do not have information about how skill with the verbs of motion develops over time in L2 learners of Russian, the information that has been collected in this study is nonetheless interesting from both theoretical linguistic and practical pedagogical points of view.

From a theoretical perspective, the following two findings are of particular interest:

(1) It was quite surprising that the language background of the participants played little role in this study. This means that, for whatever reason, the approach taken to sorting the verbs was essentially the same by all participants, whether they were operating on a purely intuitive basis (as was obviously the case with all or most of the native Russians, and by some of the Bulgarian participants, as well) or on the basis of overt knowledge provided by formal training in a classroom setting. One interpretation of this

finding is that the feature hierarchy uncovered in this research is intrinsic to the nature of the problem, rather than something that is subject to the whim of individual background differences. It may also say something, of course, about how well the materials now used in the Russian L2 classrooms adequately reflect the internalized, intuitive categories of native speakers of the language.

(2) It was highly significant, however, that the native Russian participants were able to perform the task well, despite their general lack of any formal training on the feature distinctions involved (and the same goes for some of the Bulgarian participants, too, who were described in the discussion above as often being able to solve the sorting problem without any overt awareness of the underlying semantic distinctions involved). This is important for future research in other, similar areas where native speakers of a language may have little or no overt knowledge of the linguistic categories or distinctions of interest and where experimental research of this kind may be the only way to reveal the details of the implicit or "tacit" knowledge that may be involved.

From a pedagogical point of view, one obvious implication of this research comes from the discovery that a salience hierarchy does in fact exist among the four features investigated for the Russian verbs of motion.

Whether the explanations proposed are the actual reasons for the emergence of these distinctions in order of "accessibility" among the features or not, the fact that they do exist strongly suggests that L2 learners of Russian would benefit from extra instruction and practice on those features that have been seen to be the least salient or transparent. This includes the V/N distinction, in particular, which, overall, proved to be the most difficult of all, as well as the T/I distinction, which was of intermediate difficulty. Furthermore, since the D/I feature became "transparent" only with the prefixed verbs (when it could readily be reinterpreted as a difference in aspect, as discussed above), this feature, too, would likely benefit from increased classroom attention, particularly in the case of the nonprefixed forms.

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APPENDIX A

PARTICIPATION AGREEMENT

Participation Agreement

Title: Salience of Semantic Features in the Russian Verbs of Motion

Researcher: Larissa Bondarchuk

Department of Modern Languages & Cultural Studies

University of Alberta, Edmonton

This study involves a simple word-sorting task. A certain amount of personal background information is necessary for us to provide a comprehensive report of the results of this study. This information is for statistical purposes only. It will be kept completely confidential and only group scores and general trends will appear in any reports of the results. You are under no obligation to participate in this study, and you may withdraw at any stage. Your name will never be quoted in any publications. Access to the study responses will be restricted to myself and my advisors, Dr. Andrij Hornjatkevyč, of the Department of Modern Languages and Cultural Studies and Dr. Bruce L. Derwing, of the Department of Linguistics.

PARTICIPATION AGREEMENT:

I agree to participate in the word-sorting study.

Signature:_____

Name Printed: _____

Date: _____

Thank you very much for your willingness to provide valuable data for us in our research.

Please also fill out the attached Background Information Form.

APPENDIX B

BACKGROUND INFORMATION FORM

Background Information Form

Postsecondary Education (major)_____

1. Surname, given name, middle initial_____
2. Contact number/e-mail address_____
3. Date of birth (YY/MM/DD)_____Sex M☐ F☐
4. Educational level (circle the highest: elementary school; high school; BA; MA/MSc; PhD)
5. Occupation_____
6. Native language _____
7. Familiarity with other Slavic languages: _____
8. Evaluate your fluency in each language: (circle appropriate number)

LEGEND: 1 = excellent; 2 = good; 3 = functional; 4 = poor; 5 = very poor

RUSSIAN

Listening comprehension	1	2	3	4	5
Reading	1	2	3	4	5
Speaking	1	2	3	4	5
Writing	1	2	3	4	5

(other Slavic language, if any) _____

Listening comprehension	1	2	3	4	5
Reading	1	2	3	4	5
Speaking	1	2	3	4	5
Writing	1	2	3	4	5

10. Other languages that you speak: _____

APPENDIX C

INSTRUCTIONS IN ENGLISH, RUSSIAN, AND BULGARIAN

INSTRUCTIONS

Dear Participant:

Thank you very much for your willingness to participate in today's test. Please sign the Participation Agreement and fill out the Background Information Form.

You are given the cards with various words. Please read them carefully before the test. Put these words into two equal piles in such a way that words in the first pile would have a certain common feature. The words in the second pile should have an opposite feature. The researcher will measure the time of your sorting. Should you have any questions regarding the test, please ask the researcher for explanations.

Thank you very much!

Инструкции по выполнению теста

Уважаемый участник!

Благодарим Вас за Ваше желание принять участие в сегодняшнем тесте. Перед началом эксперимента, пожалуйста, внимательно заполните данную Вам анкету.

Вам даны карточки с различными словами. Перед началом теста, пожалуйста, внимательно прочитайте их. Сгруппируйте слова в две равные колоды таким образом, чтобы слова в первой из них имели какой-либо общий признак. Слова во второй группе должны иметь противоположный признак. Время, за которое Вы произведете сортировку, будет засечено и записано исследователем.

Если у Вас будут вопросы, связанные с процедурой теста, просьба задавать их перед началом теста.

Спасибо!

Инструкции за изпълнение на теста

Уважаеми участници!

Благодарим Ви за Вашето желание да участвате в днешния тест. Преди теста, моля прочетете и внимателно попълнете анкетата.

Вие ще получите картончета с различни думи върху тях. Преди да започнете теста, внимателно ги прочетете. Съберете тези картончета в две равни купчинки по такъв начин, че думите в едната от тях да имат някакъв общ признак. При това, думите във втората купчинка трябва да имат противоположен признак. Времето, за което ще направите групиране, ще бъде записано от изследовател.

Ако възникнат някакви въпроси, свързани с процедурата на теста, моля задавайте ги преди теста.

Благодаря!

APPENDIX D

TABLE 14. MASTER DATA CHART

S#	NL	Sex	Age	Group	Order	Set	DIrA	DItA	VNrA	VNtA	TIrA	TItA
R01	R	M	28	R	AB	A	1	25	4	300	2	9
R02	U	M	45	R	AB	A	2	21	4	300	1	42
R03	R	F	44	R	AB	A	1	18	2	17	3	27
R04	R	M	19	R	AB	A	2	35	1	28	4	
R05	R	F	30	R	AB	A	2	89	4	300	1	21
R06	R	F	56	R	AB	A	1	52	4	300	2	15
R07	R	M	39	R	AB	A	2	7	1	12	3	49
R08	R	M	33	R	AB	A	3	23	2	10	1	6
R09	R	F	27	R	AB	A	2	27	4	300	1	48
R10	R	M	45	R	AB	A	3	20	1	29	2	40
R11	R	F	30	R	AB	A	1	21	2	64	3	56
R12	R	F	19	R	AB	A	1	17	3	62	2	55
R13	R	M	46	R	AB	A	1	35	2	29	3	44
R14	R	F	15	R	AB	A	3	58	2	32	1	13
R15	R	F	40	R	AB	A	4	300	1	52	4	300
R16	R	M	35	R	AB	A	1	41	3	47	2	23
R17	R	M	53	R	AB	A	4	300	1	21	4	300
R18	R	F	54	R	AB	A	1	20	2	19	4	300
R19	R	F	35	R	AB	A	2	81	3	37	1	63
R20	R	M	30	R	AB	A	1	56	3	100	2	19
R21	R	M	16	R	AB	A	1	113	2	16	3	17
R22	R	F	44	R	AB	A	1	29	4	300	2	39
R24	R	M	24	R	AB	A	1	39	2	51	3	19
R25	R	M	33	R	AB	A	1	43	2	25	4	300
R26	U	M	26	R	BA	A	3	19	1	20	2	47
R27	R	F	19	R	BA	A	3	26	1	31	2	23
R28	R/U	M	31	R	BA	A	1	32	3	30	2	60
R29	R	M	24	R	BA	A	3	30	2	44	1	10
R31	U	F	38	R	BA	A	2	23	4	300	1	3
R32	R	M	39	R	BA	A	1	36	2	11	4	300
R33	R	F	38	R	BA	A	2	25	4	300	1	29
R34	U	F	30	R	BA	A	1	18	3	99	2	12
R35	R	M	28	R	BA	A	1	25	3	53	2	59
R36	R	F	19	R	BA	A	4	300	4	300	1	27
R37	R	F	42	R	BA	A	4	300	1	21	2	10
R38	R	F	16	R	BA	A	4	300	4	300	1	21
R39	R	F	32	R	BA	A	1	90	2	24	4	300
R40	R	F	13	R	BA	A	4	300	1	46	4	300
R41	R	F	29	R	BA	A	1	17	2	45	4	300
R42	U	F	23	R	BA	A	4	300	2	22	1	34
R44	R	M	38	R	BA	A	3	19	2	11	1	27
R45	R	F	35	R	BA	A	1	38	2	28	3	42
R46	R	M	27	R	BA	A	4	300	1	24	2	46
R47	R	F	32	R	BA	A	1	30	4	300	2	33
R48	R	F	38	R	BA	A	1	8	3	13	2	15
R49	R	M	33	R	BA	A	1	17	4	300	2	12
R50	R	M	35	R	BA	A	2	60	4	300	1	112

Set	DIrB	DItB	VNrB	VNtB	TIrB	TItB	TArA	TAtB	Education
B	1	15	3	12	2	12	1	14	Philology
B	1	9	4	300	2	7	5	300	Linguistics
B	2	47	4	300	1	20	3	68	Philology
B	2	141	1	19	4	300	5	300	Science
B	1	25	4	300	2	23	3	15	Philology
B	2	41	3	58	1	20	5	300	Economics
B	2	16	1	15	4	300	2	11	Engineering
B	4	300	1	13	2	12	3	41	Elec Engineering
B	1	18	4	300	4	300	1	14	Economics
B	1	17	3	101	2	24	5	300	Physics
B	2	83	4	300	1	19	3	6	Sociology
B	1	21	4	300	4	300	1	6	High school
B	4	300	1	29	4	300	5	300	Math
B	2	26	1	17	3	114	1	20	High school
B	2	50	4	300	1	24	5	300	Math
B	1	21	2	36	3	14	4	30	Physics
B	4	300	2	19	1	13	2	35	Chemistry
B	2	20	1	27	4	300	3	61	Chemistry
B	2	14	1	7	3	35	1	20	Physics/math
B	1	37	4	300	2	49	1	26	Physics
B	4	300	1	22	4	300	1	21	Science
B	1	23	4	300	2	16	5	300	Mech Engineering
B	3	106	1	34	2	7	5	300	Math
B	1	35	2	8	4	300	3	12	Math
B	2	31	1	17	3	38	1	28	History
B	1	31	2	87	3	107	1	9	Business
B	1	25	3	63	2	160	2	159	History
B	1	20	4	300	2	17	3	17	Ed Management
B	1	10	4	300	4	300	2	16	Literature
B	1	10	2	13	3	22	2	35	Elec Engineering
B	1	84	2	19	4	300	2	28	Program Engineering
B	1	30	4	300	2	90	2	28	Ed Philology
B	1	31	4	300	2	17	2	30	Elec Engineering
B	1	139	4	300	2	24	2	33	Ed History
B	4	300	1	12	2	19	1	23	Ed History
B	1	41	4	300	2	17	5	300	High school
B	2	69	1	60	4	300	2	25	Geophysics Engineering
B	1	29	3	172	2	76	2	30	Junior High
B	2	23	1	54	4	300	3	174	Psychology
B	1	5	4	300	4	300	1	5	Math
B	1	10	2	69	4	300	1	24	Geophysics
B	2	22	1	53	4	300	3	72	Math
B	4	300	1	51	2	22	1	102	Business
B	1	16	4	300	2	13	2	37	Elec Engineering
B	2	54	1	10	3	20	4	31	Designer
B	1	49	3	23	2	50	3	66	Physics
B	1	30	4	300	2	130	2	70	Physics

S#	NL	Sex	Age	Group	Order	Set	D/I Rank	D/I Time	V/N Rank	V/N Time	T/I Rank	T/I Time
B01	B	F	47	B	AB	A	1	30	3	38	2	34
B02	B	F	39	B	AB	A	3	60	2	38	1	20
B03	B	F	22	B	AB	A	1	16	4	300	2	53
B05	B	F	31	B	AB	A	3	42	2	158	1	144
B06	B	M	39	B	AB	A	1	225	3	43	2	41
B07	B	M	40	B	AB	A	2	127	4	300	1	105
B08	B	M	41	B	AB	A	4	300	1	61	2	20
B09	B	F	51	B	AB	A	2	73	1	19	3	106
B10	B	M	50	B	AB	A	1	71	3	30	2	26
B22	B	F	36	B	AB	A	4	300	2	17	1	25
B11	B	F	32	B	BA	A	1	120	4	300	4	300
B12	B	M	42	B	BA	A	2	105	1	15	4	300
B13	B	M	32	B	BA	A	2	36	1	27	4	300
B14	B	F	46	B	BA	A	4	300	2	41	1	24
B15	B	F	39	B	BA	A	2	80	1	87	3	65
B16	B	F	42	B	BA	A	2	37	1	53	4	300
B17	B	M	44	B	BA	A	1	85	3	20	2	76
B18	B	M	16	B	BA	A	4	300	1	23	2	55
B19	B	M	42	B	BA	A	2	34	3	43	1	28
B20	B	M	22	B	BA	A	1	67	4	300	2	29
S#	NL	Sex	Age	Group	Order	Set	D/I Rank	D/I Time	V/N Rank	V/N Time	T/I Rank	T/I Time
N01	E	F	22	N	AB	A	1	24	4	300	4	300
N02	E	M	22	N	AB	A	1	22	2	9	3	10
N03	E	F	22	N	AB	A	1	27	2	25	3	11
N04	E*	M	24	N	AB	A	2	5	1	9	3	20
N05	Span*	M	52	N	AB	A	2	32	3	45	1	25
N06	*E	F	16	N	AB	A	1	21	4	300	2	10
N07	*E	M	23?	N	AB	A	4	300	1	40	4	300
N08	E	M	37	N	AB	A	1	34	4	300	2	15
N09	Kor*	M	37	N	AB	A	2	27	4	300	1	11
N10	Arm*	M	30	N	AB	A	2	46	4	300	1	28
N11	E	F	26	N	BA	A	1	26	3	25	2	9
N12	E	F	26	N	BA	A	1	31	4	300	2	9
N13	E	M	25	N	BA	A	1	40	3	20	2	20
N14	E*	M	65	N	BA	A	2	4	1	6	3	26
N15	E	M	32	N	BA	A	2	14	3	12	1	20
N16	*E	F	20	N	BA	A	3	10	2	11	1	8
N17!	E	F	21	N	BA	A	3	20	2	24	1	66
N18	Lith*	F	38	N	BA	A	1	24	2	13	3	3
N19	E	F	33	N	BA	A	2	25	1	84	3	37
N20	Span*	M	59	N	BA	A	1	72	2	30	4	300

Set	D/I Rank	D/I Time	V/N Rank	V/N Time	T/I Rank	T/I Time	T/A Rank	T/A Time	Education
B	1	38	4	300	2	57	1	15	Technical University
B	1	59	4	300	4	300	1	29	Engineering
B	2	65	4	300	1	28	1	14	Commerce
B	1	33	4	300	4	300	5	300	Forestry
B	1	52	4	300	2	12	3	58	Engineering
B	2	90	4	300	1	135	1	48	Geology
B	3	66	2	153	1	6	1	20	Engineering
B	1	62	4	300	2	30	1	14	Animal Husbandry
B	4	300	4	300	1	7	1	17	Philology
B	4	300	1	60	2	26	1	40	Chemistry
B	1	18	2	214	4	300	3	34	Physics
B	1	53	4	300	2	19	3	39	Physics
B	3	84	2	187	1	66	1	37	Forestry
B	4	300	4	300	1	30	5	300	Chemistry
B	1	92	2	43	4	300	3	25	Geology
B	4	300	1	64	2	39	1	19	Math
B	1	28	3	16	2	50	2	16	Math
B	4	300	1	67	4	300	1	17	High school
B	1	66	4	300	2	49	1	23	Engineering
B	1	74	4	300	4	300	1	28	Math
Set	D/I Rank	D/I Time	V/N Rank	V/N Time	T/I Rank	T/I Time	T/A Rank	T/A Time	Education
B	1	33	3	32	2	32	2	13	G/R Lg & Literature
B	1	18	4	300	4	300	1	21	Slav Lgs & Literature
B	2	80	4	300	1	10	1	19	Slavic Lgs
B	1	7	3	89	2	5	1	4	International Business
B	2	44	1	3	4	300	1	18	Economics/Computing
B	2	11	4	300	1	14	1	13	Linguistics
B	1	72	2	42	4	300	1	38	Arts
B	1	44	4	300	4	300	1	29	Photography
B	1	30	4	300	2	32	2	28	Slavic Folklore
B	1	46	4	300	4	300	1	11	Math
B	2	59	1	55	3	38	5	300	Russian
B	1	59	3	68	2	15	1	28	Russ Lg & Literature
B	1	17	4	300	2	62	1	22	International Business
B	2	5	1	7	4	300	1	6	Slavic Linguistics
B	2	34	4	300	1	24	5	300	Languages
B	2	14	4	300	1	12	1	10	Bioscience
B	1	51	4	300	2	21	3	30	French Lg
B	1	13	2	24	4	300	1	30	Philology
B	2	75	4	300	1	16	1	153	History
B	1	40	2	30	3	9	1	77	Religion/Linguistics