

INVESTIGATING THE ACQUISITION OF RUSSIAN
MOTIONAL PREFIXES IN L1 ENGLISH SPEAKERS

by

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Many Russian language teachers have claimed Verbs of Motion (VoM) and their affiliated prefixes to be an exceptionally difficult category for native English speakers to learn. Evidence for this, however, has been primarily anecdotal, and Second Language Acquisition (SLA) researchers have only recently started to conduct empirical investigations of the domain. The present study aimed to review the current body of empirical literature adapting methods from meta-analysis. Although meta-analyses traditionally rely on statistical analyses, the present study used the format of a meta-analysis coding sheet to organize relevant variables and narrative results. Gaps in the coding sheet indicated potential areas for new research perspectives and designs. The results were organized into categories based on the independent variables of linguistic feature, speaker type, and task modality. Linguistic features were considered because there are errors that can originate from the grammatical differences of Russian and English in addition to potential issues caused by the internal complexities of multiple grammatical features appearing on a single verb form. Aspect was of particular interest in the present study because the Russian VoM have a different aspectual

paradigm than other Russian verbs. The coding sheet indicated that attempting to control for specific grammatical features was often outside the scope of the studies used in the meta-analysis. Comparing different speaker types—particularly second language and heritage learners—gave insight into how age of acquisition and language exposure affects acquisition. The present study only included one study on heritage speakers, but went on to hypothesize why incorporating other research methodologies into heritage speakers studies might be useful. Lastly, task modality shows how proficiencies in various skills, such as speaking, comprehension, or metalinguistic knowledge, could be mismatched. Regarding this variable, one of the main points that the coding sheet highlighted was that the studies used in the meta-analysis were mostly studies on production skills. Overall, these results indicated that the current body of research might benefit from a) research designs that control for both VoM-specific and non-specific verbal features; b) consideration of the role of explicit and implicit knowledge in the comparison of heritage and second language speakers; and c) more research designs that target comprehension and metalinguistic skills. The scope of the study can potentially apply to broader SLA theory, Russian language pedagogy, and language typology theories. New directions include extending the literature review with the incorporation of adult first language studies and conducting new SLA experiments on the topic.

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1. Introduction

A central observation of the process of language acquisition is that the vast majority of children experience total success in their first languages, yet second language success as adults varies dramatically. Second language learning can be likened to other adult skills such as music and sports in which mastery, even with extensive practice, is not always attainable (Bley-Vroman 1990). Varied success in second language learning indicates that there are factors that affect the ultimate outcome of the process. The field of Second Language Acquisition (SLA) has divided these factors into two categories: internal and external. Internal factors are the personal and predispositional qualities of a language learner such as age, motivation, personality type, or the first language. External factors can be anything outside of the individual, including the language-learning environment or the specific complexities of the target language. SLA as a discipline aims to identify these factors and determine how and to what extent they have an impact on learning processes.

The present study explores the factors that may affect monolingual native (L1) English speakers' outcomes of learning a notoriously difficult subset of Russian verbs called Verbs of Motion (VoM), which are one of the constructions used across all languages to describe some kind of literal or metaphorical movement and trajectory (e.g. *walk in, run around, swim through*). Motion constructions are communicatively important because motion is essential for the description of many facets of human life. Our use of motion in language goes beyond literal, spatial meanings and provides us a system with which many concepts can be framed. An illustration of this is how motion

talk has permeated idiomatic language; take, for example, *the time has flown by, we need to catch up, the money is running out*. (Driagina 2007, p. 2).

The reasoning behind the choice of this topic is that Russian language teachers and pedagogy researchers have identified Russian VoM as being exceptionally difficult for L1 English speakers (Pahomov 1977; 1979; Chaput 1997; Elliott & Yountchi 2009). In a pedagogical article, Pahomov (1977) postulates that students perceive the rules governing verbs of motion to be nebulous and even chaotic:

“It is well known that one of the greatest causes of anxiety for the student of Russian has been the seeming unpredictability of the proper usage of the verbs of motion. It is precisely because there seems to be no uniformly meaningful system in their application, that students learn to fear them.”

Despite observations such as this and a substantial effort to develop teaching methods, there are limited empirical studies on this topic in existence and therefore little knowledge of exactly which components of Russian motion constructions comprise the acquisitional issues. The present study is an investigation of the few empirical studies that are in existence. In addition to compiling what is already known about this domain, the study aimed to systematically highlight and discuss the gaps in the literature using techniques borrowed from meta-analysis. This approach allowed for the consideration and synthesis of results from a varied body of studies that is perhaps more difficult to achieve when using traditional literature review techniques.

2. Theory

2.1. General SLA Phenomena

Early SLA researchers believed that the majority of issues in second language learning could be attributed to interlingual disparity; i.e. differences between the native and second languages. Thus, they often took a research approach called Contrastive Analysis (CA), in which the similarities and differences between the features of two languages are compared in order to explain or predict language-learning difficulties. As research methods were further developed, however, it became clear that the development of L2 learner speech was more complex. First of all, the language transfers that would be predicted by CA did not always occur—differences between an L1 and L2 sometimes did not result in acquisitional issues (Zobl 1980), and sometimes a particular L2 feature was problematic despite its similarity to the corresponding L1 feature (Hyltenstam 1977). Furthermore, it became apparent that intralingual issues—difficulties caused by the internal complexity of the target language itself—were also pertinent, and, thus, researchers were presented with the challenge of distinguishing between interlingual and intralingual issues.

Eventually, another approach called Error Analysis (EA), which focused on patterns in actual learner speech, took hold of the field. Although EA is still prominent today, it is not foolproof. One of the issues that arose out of the development of this method was that of avoidance strategies. There were cases in which learner speech was technically accurate yet was marked by the absence of certain linguistic features, which sometimes resulted in noticeably simple or unnatural speech (Schachter 1974). Thus,

scrupulous analysis of learner speech is a necessity in studies of second language acquisition.

Notwithstanding that linguistic factors have major impacts on second language acquisition, more recent research has revealed many other variables that require attention. These variables include many internal qualities, such as age and proficiency. One variable in particular has recently received more attention: the age of acquisition. Of particular interest is the case of heritage speakers. On the native-nonnative spectrum, heritage speakers fall somewhere in the middle. They are people who have learned a language from birth through naturalistic exposure but live in an environment that eventually causes them to become dominant in another language. The linguistic developmental patterns of heritage speakers diverge from those of both native and L2 speakers. The study of heritage speakers is valuable in its own right, but also has potential implications for the understanding of L2 acquisitional issues.¹ It is often suggested that a key reason adult L2 learners never master certain linguistic features is that these features must be learned during a critical period, a theoretical window of time in early childhood in which the cognitive resources for learning certain functions are more readily available. Heritage speakers, like L1 speakers, usually have exposure to the target language within this period of time. Thus, Montrul (2008) suggested that if there is a linguistic feature that is problematic for an L2 speaker, but not for a heritage speaker, then this feature might be sensitive to the age it is acquired. Conversely, if both L2 and heritage speakers do struggle, then ostensibly age of acquisition is not the issue,

¹ Outside the realm of L2 acquisition, the study of heritage speakers is still useful because it can help reveal the extent to which limited language exposure in childhood can affect ultimate acquisition, and it can be used to develop pedagogical methods for classrooms where heritage (in addition to L2 speakers) are becoming more and more common (Montrul 2009).

but rather another factor such as language exposure, motivation, or personality. Limited language exposure in particular is often highlighted as a conclusion because it is a factor that sets native and heritage speakers apart, yet a commonality (to an extent) between heritage and L2 speakers (Montrul 2008).

In sum, both linguistic and non-linguistic variables must hold weight in studies of second language acquisition. Moreover, consideration of different types of acquisition, such as that of heritage speakers, has contributed new dimensions to the field.

2.2. What are Verbs of Motion?

The forms of motion verbs vary across languages. Generally, motion verb constructions are composed of two components: one encoding for Path and the other for Manner (Talmy 2000). Path encodes for the trajectory of the motion. For instance, in English direction is often marked by a preposition that directly follows the main verb.

Ex (1) *John walked **into** the store.*

Manner, on the other hand, encodes for the nature of the motion being carried out. This is exemplified by the main verb *walked* in Example (1) above. Other Manner verbs in English include *run*, *climb*, *fall*, *fly*, etc. Manner is often optional in the languages of the world, as in this English example:

Ex (2) *She **came** to my house yesterday.*

The verbs *come* and *go* in English do not express Manner, but rather the direction of the motion relative to the speaker.

According to Talmy's (2000) typology, the ways in which the languages of the world construct expressions of motion can be divided into two broad categories: verb-

difference is that in Russian, the Path satellite is a prefix that is bound to the verb and, thus, precedes the verb root. In addition to this Path prefix, some constructions also contain a post-verbal unbound preposition that also marks for Path (see *v* in the example above or *iz* in the example below). In English, Path is only marked on one place: the unbound post-verbal preposition.

Ex. (5) Oni kupili knigi i **vy-shli** **iz** magazina.
 They bought books and **out-go.by foot.past.pl from** store
 ‘They bought books and **walked out** of the store.’

Although there are other motional constructions in Russian, the focus of the present study is a subset of 14 verbs that are referred to as the ‘closed-class’ VoM. The defining feature of these verbs is directionality, a semantic distinction that does not exist in English. In terms of directionality, these verbs are split into two categories: unidirectional and non-unidirectional.

Unidirectional	Non-unidirectional	Translation
<i>idti</i>	<i>khodit'</i>	‘to move by foot’
<i>bezhat'</i>	<i>begat'</i>	‘to run’
<i>bresti</i>	<i>brodit'</i>	‘to wander’
<i>vezti</i>	<i>vosit'</i>	‘to carry by vehicle’
<i>vesti'</i>	<i>vodit'</i>	‘to lead’
<i>gnat'</i>	<i>goniat'</i>	‘to chase’
<i>ekhat'</i>	<i>ezdit'</i>	‘to move by vehicle’
<i>katit'</i>	<i>katat'</i>	‘to roll’

<i>lezt'</i>	<i>lazit'</i>	'to climb'
<i>letet'</i>	<i>letat'</i>	'to fly'
<i>nesti</i>	<i>nosit'</i>	'to carry'
<i>plyt'</i>	<i>plavat'</i>	'to swim'
<i>polzti</i>	<i>polzat'</i>	'to crawl'
<i>tashcit'</i>	<i>taskat'</i>	'to drag'

Table 1: The Closed-class Verbs of Motion (adapted from Hasko 2010)

The use of a unidirectional verb emphasizes that motion is going in only one direction from one point to another.

Ex. (6) Kuda **begut** eti mal'čiki?
to where **run.unidirection.3rdper.pl.pres** these boys?
'Where are those boys **running** (to)?'

Ex. (7) Obyčno ya **edu** na rabotu na metro.
usually I **go.by vehicle.unidirection.1stper.pres** to work by subway.
'I usually take the subway to work.'

(Mahota 1996, pp. 10-11)

More difficult to define, non-unidirectional verbs are sometimes referred to as being *multidirectional* in pedagogical literature. These verbs, however, encode for more than just motion in multiple directions. The meanings of non-unidirectional verbs include but are not limited to the ability or function of something, random motion, and round-trips (Mahota 1996).

Ex. (8) Ability
Deti **begayut**, a ptitsy **letayut**.
children **run.non-unidirection** and birds **fly.non-unidirection**
'Children run, and birds fly.'

Ex. (9) Function

Počtal'ony **nosyat** pis'ma i pakety.
Mail carriers **carry.non-unidirection** letters and packages
'Mail carriers carry letters and packages.'

Ex. (10) Random Motion

Vec' den' my **ezdili** po raznym magazinam.
all day we **went.non-unidirection** to different stores
'All day we went to different stores.'

Ex. (11) Round Trips

Segodnya utrom ya **khodil** v muzeiy.
today morning I **went.non-unidirection** to museum
'This morning I went to the museum (and came back)'

(Adapted from Mahota 1996, pp. 7-8)

Because non-unidirectional verbs apply to a broad range of contexts, some theoretical literature has opted to give unidirectional verbs a *positive* definition and non-unidirectional verbs a *negative* definition. In other words, unidirectional verbs denote motions that simply go from point A to point B, while non-unidirectional verbs denote any motion that is not under the umbrella of unidirection (Ward 1965 as cited in Driagina 2007, p.62).

Lastly, regarding directionality, it is important to note that only closed-class VoM that *do not* take motional prefixes encode for this semantic distinction. VoM with motional prefixes do, however, still carry the directional stems, which take on a different function in these forms (see 2.2 below). Henceforth, prefixed VoM will be emphasized as having (non)unidirectional *stems* rather than carrying the semantic distinction of directionality.

In terms of second language acquisition, it is important to take into account any feature of a verb form or predicate because 1.) The parts of a verb are often interrelated and 2.) Second language (L2) speakers often must pay attention to multiple parts of any single form in order to produce accurate speech. Therefore, Russian VoM may be especially difficult for L2 learners to acquire because these speakers must track not only the features related to the closed-class set of motion verbs (i.e. Path, Manner, and directionality), but also features that appear on verbs generally (e.g. tense, aspect, person, gender, etc.). For L1 English speakers in particular, it is possibly a combination of the grammatical differences between the two languages in the motion domain (e.g. the position of Path particles or the semantic distinction of directionality), as well as having to attend to several other verbal features that may or may not exist in the L1 that make these verbs difficult to acquire despite the aforementioned typological similarities.

2.3. Aspect in Russian and English

Aspect is a feature that is central to the present study because it is morphologically required to be marked on every Russian verb (Driagina 2007, p. 56), and it is a grammatical category that Russian and English treat very differently. Aspect, by definition, gives information about the temporal structure within an event. It is distinct from tense in that tense relates an event to a particular point in time (e.g. the past is a point in time before the utterance), while aspect gives information about the duration of an event (Comrie 1976).

There are two kinds of aspect: lexical and grammatical. Lexical aspect encompasses the inherent semantic properties of verbs as well as the other constituents of a predicate that indicate whether an event is *telic* and has either an end or beginning

point (or both), or is *atelic* and does not have an end or beginning point (Slabakova 2005). Telicity can be marked on various items within a predicate. English generally marks of telicity outside of the verb itself (Slabakova 2005). The predicates *eat a piece of cake* and *eat cake* from the examples below demonstrate this; i.e. the presence or absence of the indefinite article *a* determines the telicity.

Ex (12)

Telic predicates: *eat a piece of cake, drink two beers, find a wallet, realize*

Atelic predicates: *eat cake, drink beer, think about you, know, believe.*

(Slabakova 2005).

Vendler (1957) created a useful way to conceptualize telicity in which verbs are grouped into four semantic categories: State (*know hate, want*), Activity (*read (letters), run laps, bake bread*), Achievement (*recognize, die, find*), and Accomplishment (*read those letters, run a lap, bake a loaf*). States and Activities are generally atelic because they have no inherent endpoint (i.e. they could allegedly continue forever).

Achievements and Accomplishments, on the other hand, do have some inherent endpoint and are therefore telic. Other information in the predicate, however, can change the telicity of the entire predicate.

Unlike in English, telicity marking in Russian is directly on the verb form. These markers take the form of prefixes. In (6a) below, the verb form is atelic because it lacks a prefix. Conversely, examples (6b-d) are telic because the prefixes add semantic nuances that imply some kind of endpoint. It is important to note that some of these telicizing prefixes have additional lexical/semantic content, such as *pod-*, *do-*, and *pere-* below.

Ex (13)

a. pisat' 'write'

b. pod-pisat' 'sign'

c. do-pisat' 'write to the end (of something that was started)'

d. pere-pisat' 're-write'

(Slabakova 2005)

In addition to the aforementioned telicizing prefixes, there is also another subset of aspectual prefixes that encode for specific types of lexical aspect called Aktionsarten. The Aktionsarten prefixes include *po-*, *na-*, and *-za*, and their purpose is to contribute subtle nuances about the development of an event in time (Driagina 2007, p. 95).

Ex. (14)

Lyudi net.	Ona po-shla	k Nade.
Lyuda isn't here.	she Perf.start-go.uni.past.fem	to Nadya
'Lyuda isn't here. She set off to see Nadya.'		

(Adapted from Mahota 1996, p. 15)

The example above shows the Aktionsarten prefix *po-* on a VoM. It adds the dimension of starting to do something (or 'setting off' to do something) in addition to its telicizing and perfectivizing properties.

The second type of aspect is called grammatical aspect. Grammatical aspect indicates the temporal structure of an entire event (rather than just at the predicate level) with reference to the present point in time (Mikhaylova 2012). The two distinctions within grammatical aspect are perfective and imperfective. In perfective aspect, the perspective of the event is zoomed out so that the event falls within clear boundaries. The time structure within the event itself is de-emphasized (Comrie 1976).

In the following examples from English, the events are each contained within clear, singular points in time:

Ex (15) They **just went** to the library.

Ex (16) **She'll look** for a job next year.

Conversely, imperfective aspect emphasizes that the event is ongoing or repeated. The scope of the event is broader than in the perfective. The imperfective views the event from a standpoint where it is still in progress (Nossalik 2009). Some examples of English imperfective are:

Ex (17) She **is playing** the piano.

Ex (18) He **used to go swimming** everyday.

English marks for aspect in various ways, such as with the lexical *just* in Example (15), the continuous *-ing* suffix in (17), or the auxiliary verb *used* in (18). Aspect in Russian, however, is a primarily grammaticalized category marked by the presence or absence of prefixes and suffixes on the verb form (Slabakova 2005; Nossalik 2008; Mikhaylova 2012). Unprefixed verbs are generally imperfective (as in *pisat'* from Example 13a above), and prefixed verbs are generally perfective (as in examples 13b-d above).

The primary function of the prefixes, as was discussed before, is to indicate telicity. This does not mean, however, that all telic events are perfective. In Russian, there is a secondary imperfective suffix, *-va*, that turns prefixed verbs into imperfective forms. Therefore, perfective aspect is marked not only by a prefix, but also by the absence of a secondary imperfective suffix.

Ex (19)

a. Kolja **pere-čital** eti pis'ma. ← telic, perfective
 Kolja **PREFIX-read.Ø.PAST** these letters

‘Kolja reread these letters.’

b. Kolja **pere-čit-yva-l** eti pis'ma. ←telic, imperfective
 Kolja **PREFIX-read-SUFFIX-PAST** these letters

‘Kolja was rereading these letters.’ (Mikhaylova 2012)

Likewise, in English it is also necessary to denote events that are telic and imperfective. This is determined by the inherent telic or atelic properties of the main verb, as well as the properties of the other constituents in the sentence. Thus, in example (20a) below, the event is imperfective, yet it is telic in that it is leading up to a clear endpoint. Additionally, although the main verb *sing* in Example (20b) does not have an inherent endpoint, the direct object *five songs* creates an endpoint for the predicate (Comrie 1976).

Ex (20)

- a. John is making a chair.
- b. John is singing five songs. (Comrie 1976, p. 45)

For nonnative speakers, the semantics of VoM and the aspectual system individually can be quite daunting. Complexity, however, is even further elevated by the unique interaction between aspect and prefixed VoM. Marking for aspect on these verbs follows a different pattern than on non-prefixed verbs of motion and on the regular verbs. Unlike most other prefixed verbs, the VoM stem rather than the prefix carries aspectual information. This is because, as unidirection implies a single direction

with an endpoint, unidirectional-stemmed verbs inherently denote telicity, while, as non-unidirection shifts focus away from any destination or endpoint, non-unidirectional verbs inherently denote atelicity. As a result of motional prefixation, the semantic category of directionality is eliminated by morphing into the grammatical category of aspect (Driagina 2007).

In example (21), the unidirectional semantics *shli* are diminished by the addition of the motional prefix *vy-*. The prefix *vy-* itself is not aspectualizing, but rather the semantics of the unidirectional stem are grammaticalized into denoting telicity and perfectivity. The same pattern applies for non-unidirectional stems; the non-unidirectional stem loses some of its original semantic properties in favor of denoting atelicity and imperfectivity:

Ex. (21) Oni kupili knigi i **vy-shli** iz magazina.
 They bought books and **out-go.by foot.PERF.past.pl** from store
 ‘They bought books and **walked out** of the store.’

Ex. (22) Petya často **za-ezžayet** za mnoiy utrom.
 Petya often **stop-go.non-unidirection** to me in the morning
 ‘Petya often **picks me up** in the morning. (Mahota 1996, p. 79)

A further complication of VoM and aspect is that unprefixated directional verbs can take Aktionsarten prefixes (see Example (22) above). It is important to note that VoM that take Aktionsarten prefixes are distinct from VoM that take motional prefixes. Many verbs outside of the closed class of VoM take Aktionsarten prefixes, and therefore when VoM take them, the pattern is closer to that of the majority of Russian verbs. Hence, because all unprefixated VoM are imperfective by default, they become perfective when they take these prefixes.

Lastly, the motional prefixes that VoM take are frequently homophonous to the telicizing prefixes that other verbs take.

Ex (23)

Ivan Ivanovic **pri-gotovil** sup.
Ivan Ivanovic **PERF-cook-PAST** soup.
'Ivan Ivanovich cooked the soup'
(Slabakova 2005)

Ex (24)

Oni **pri-letayut** iz Moskvi zavtra vecerom.
they **in-fly.UNI.3rdper.PRES** from Moscow tomorrow evening
'They are arriving (flying in) from Moscow tomorrow evening.'
(Mahota 1996, p. 74)

Although the prefixes in the above examples take the same form, they have different functions. *Pri-* in Ex (23) serves only as a telicizing prefix, while *pri-* in Ex (24) serves only as a Path marker. The identical forms of these prefixes, in addition to their placements, might cause further confusion for the Russian learner.

This section and the one before it have highlighted the linguistic features that are possibly problematic to L2 acquisition of Russian VoM. Aspect is a category of particular concern because it is a major grammatical component of Russian verbs, and the systems for marking it are relatively different from those of English. Because Russian VoM is a small subset of verbs with its own system for marking aspect, these differences are compounded, and an L1 English speaker is given even more components to attend to. However, although the complexity of linguistic features is often a central factor in SLA studies, non-linguistic variables demand equal consideration in the present study.

3. Literature Review

3.1. Acquisition of Motional Prefixes in SLA Literature

Because Russian and English are in the same typological categories of motion, it might seem intuitive that there would be positive transfer of motional structures from English to Russian (i.e. L1 English speakers should not struggle with Russian motional prefixes). There has been evidence, however, that this is not the case. Pedagogical literature has suggested that many L1 English speakers struggle with Russian VoM (Pahomov 1977; 1979). Furthermore, Robin (2011), a study that gathered general narratives from L2 Russian speakers of high intermediate to advanced proficiency levels, concluded that L1 English speakers often implement strategies to avoid using Russian VoM, such as using stative verbs instead. This means that the learners told narratives through description of the circumstances of the event (using verbs such as *byt' 'to be'*) rather than telling the stories from the first person perspective, with a punctual series of events.

Empirical literature focusing on Russian motional expressions has further highlighted L1 English speakers' struggles with motional prefixes. Hasko (2009b) and Driagina (2007) employed narrative elicitation tasks using *The Frog Story*—a picture book rich with opportunities for motion description (Mayer 1969). Another story called *'The Bean Story'* accompanied the *Frog Story* as an elicitation tool in Driagina (2007). Hasko (2009b) looked at highly proficient speakers, while Driagina (2007) looked at both high and low proficiency speakers. The studies compared the narratives of L1 and L2 speakers and found that L2 speakers used more unprefixated VoM than did the L1

speakers. In concordance with this result, error analysis of the L2 narratives showed that the most common error was the omission of Path prefixes in sentences that required them. Also, it was relatively common for the L2 speakers to use semantically incorrect prefixes and verb stems. Lastly, Driagina (2007) determined that lower proficiency speakers not only make more VoM-related errors than higher proficiency speakers, but they also employ avoidance strategies.

One point that Driagina (2007) included that Hasko (2009b) did not was an analysis of double Path marking (see Examples (4) and (5) in 2.2. above). The study found that L2 speakers of both proficiency levels tended to use fewer double Path constructions than did the native speaker controls. This result in particular reinforces that the larger concept of Path itself, in addition the use of the motional prefixes, is challenging for L2 Russian learners.

Hasko (2010) used the same methodology as Hasko (2009b) and Driagina (2007), but focused analysis on unprefixed directional verbs. The study again found that a large portion of the errors was the omission of prefixes. Furthermore, there was a lot of inconsistency with the use of unidirectional versus non-unidirectional verbs. In the L2 corpus, the majority of tokens that required a directional verb were marked as unidirectional and non-unidirectional. These selections in the L1 corpus, on the other hand, were consistently either unidirectional or non-unidirectional. Moreover, the ratio of unidirectional to non-unidirectional verbs in the L2 corpus was 1:1, while in the L1 corpus it was 5:1. These results indicate that, even at very high proficiencies, L2 Russian learners have still do not have a grasp on the production of VoM regarding the two major components of directionality and prefixation.

Bondarchuk & Derwing (2009) took a different approach to this domain by testing L1 and L2 speakers' metalinguistic knowledge of various VoM features. In the study, participants were presented with infinitive VoM that varied in semantic components. They were asked to sort both prefixed and unprefixed infinitive verbs into several different groups based on linguistic features: unidirectional vs. non-unidirectional (perfective and imperfective for prefixed verbs), vehicle vs. non-vehicle², transitive vs. intransitive³, and towards vs. away (only applicable to prefixed verbs). Unlike the production task, involving the use of VoM in speech, of Hasko (2009b; 2010), the L1 and L2 participants of this study had comparable results. Both groups sorted verbs most quickly into the categories of unidirectional vs. non-unidirectional, perfective vs. imperfective, and towards vs. away. The reason for the dramatically different results of Hasko (2009b; 2010) and Bondarchuk & Derwing (2009) was probably that each of the studies targeted different modalities—production and metalinguistic knowledge, respectively. The results of these two studies together exemplify how proficiencies in individual skillsets can be mismatched.

Gor et al. (2009) contributed data on both L2 speakers and heritage speakers. The study was divided into three tasks: a grammaticality judgment task, a Restricted Control Task (RCT), and a Sentence Completion Task (SCT). Overall, heritage speakers outperformed L2 speakers of matched proficiency levels on all tasks. The RCT and SCT were relatively similar. Participants in both tasks were asked to provide the

² There is a semantic distinction between some Russian VoM that indicates whether the motion is carried out on foot (e.g. *idti*- 'go by foot[uni]' *xodit'*- 'go by foot[non-uni]) or by vehicle (e.g. *exat'*- 'to go by vehicle'[uni], *ezdit'*- 'to go by vehicle[non-uni]).

³ Transitive verbs take direct objects (e.g. 'throw a ball', 'drink water'), while intransitive verbs do not (e.g. 'walk', 'smile').

sentence-final VoM of various idiomatic expressions. In the RCT, the first syllable of the VoM was provided, while in the SCT, participants had to provide the entire VoM form. The error analysis suggested problems with the verb stems in both these tasks. In the RCT, both participant groups had a tendency to use non-unidirectional stems where unidirectional ones were required (for both prefixed and unprefixed conditions), while in the SCT both groups tended to substitute more generic manner of motion verbs (e.g. *idti*- ‘to go’, *nosit*- ‘to carry’) for more nuanced or specific manner of motion verbs (e.g. *lezt*- ‘to climb’, *taščit*- ‘to haul’).

The stimuli of the grammaticality judgment task consisted of sentences that contained both prefixed and unprefixed VoM with both unidirectional and non-unidirectional stems. Additionally, there was a group of sentences of prefixed non-unidirectional verbs that had only grammatical aspectualizing prefixes rather than motional ones. Half of the sentences in each group used the VoM forms correctly, while the other half them incorrectly. Participants were asked simply to indicate whether each stimulus was grammatically correct or incorrect. For the L2 group, all of the prefixed conditions were more erroneous than the corresponding unprefixed conditions. For the heritage speakers, on the other hand, only the group containing non-unidirectional verbs with motional prefixes was more difficult. Additionally, low proficiency heritage speakers outperformed L2 speakers of matched proficiency levels in all conditions except for the group of incorrect unidirectional verbs (i.e. incorrect unidirectional verbs were substituted for non-unidirectional verbs in the stimulus sentences). The results of this study seem to indicate that, although heritage speakers have a stronger grasp on

VoM (both prefixed and unprefixed) than do L2 speakers, both these groups struggle with the finer semantic and grammatical functions of the directional verb stems.

A study of L1 child acquisition of VoM, Gagarina (2009) showed some results that may give insight into adult L2 acquisition. The study collected a longitudinal series of speech samples from several native Russian-speaking children interacting in everyday situations. The analysis showed that both prefixed and unprefixed verbs with unidirectional stems appeared earlier and were more common in children's speech than verbs with non-unidirectional stems. Additionally, inflectional morphology such as aspectual prefixes, motional prefixes, and tense/person-gender inflections began appearing on unidirectional stems before non-unidirectional stems.

In sum, the combined results of these studies clearly indicate that L2 learners often have a tenuous grasp of both the grammatical and semantic rules that govern the prefixed VoM, which is mostly reflected in production skills. Moreover, the studies on heritage speakers and L1 children suggest that there are various stages to the development of these forms in non-L2 speakers. The missing pieces from this body of research include a more thorough examination of specific grammatical features that make prefixed VoM challenging (as quite a few elements comprise Russian motional constructions) and an investigation of any developmental correlations between L2 speakers and heritage/L1 speakers.

3.2. Acquisition of Aspect in SLA Literature

The prefixed VoM indicate a relationship between directionality and grammatical aspect in that the unidirectional stem of a prefixed VoM encodes for perfective aspect, while the non-unidirectional stem of a prefixed VoM encodes for

imperfective aspect. Therefore, consideration of studies that investigate the acquisition of Russian aspect might contribute to the understanding of the acquisition of prefixed VoM.

Kazanina & Phillips (2007) focused on how L1 child speakers interpreted imperfective events with telic predicates in the past tense. As the imperfective aspect, when combined with a telic predicate in the past tense, does not indicate anything about the inherent completion of event, both the interpretations of completion or incompleteness are feasible. The researchers showed participants a series of videos depicting events that included two different outcomes: 1.) A smurf was built to completion, and 2.) A smurf was partially built. They were then asked the following questions:

Ex (25a) Gde obezyanka sobrala gnomika? ←Perfective
where monkey assemble.Past.Perf smurf
'Where did the monkey build a smurf?'

Ex (25b) Gde obezjyanka sobirala gnomika? ←Imperfective
Where monkey assemble.Past.Imperf smurf
'Where was the monkey building a smurf?'

(Kazanina & Phillips 2007)

When asked the first question, L1 adult controls and children responded the same—with only the completed event. When adult controls were asked the second question, they responded with both the completed and partially completed events. The children, however, often only responded with the completed event. The study concluded that, while children have adult-like interpretations of perfective aspect, they have difficulty interpreting imperfective aspect when it is paired with a telic predicate. The results of this study raise the question of whether adult L2 speakers have a similar developmental pattern.

Regarding L2 acquisition, Slabakova (2005) presented evidence that it is also more difficult for adult learners to interpret imperfective events than it is perfective ones. The study asked participants with a range of Russian language proficiencies to continue past tense imperfective sentences in ways that indicated that they interpreted the stimuli as being a.) strictly telic; b.) strictly atelic; or c.) possibly telic or atelic. The results indicated that, excluding a group of low proficiency speakers, L2 Russian speakers generally do not have a problem with the comprehension of various events in this domain. Nonetheless, there was a significant difference between how native and nonnative speakers interpreted imperfective sentences. While native speakers chose the possibly telic or atelic reading for imperfective sentences more often than they chose the strictly atelic reading, nonnative speakers favored the atelic readings.

The results of these studies on aspect indicate that imperfective aspect is less salient in the development of both L1 and L2 comprehension. Slabakova (2005) further showed that these interpretation problems persist even at higher proficiencies. As VoM also use aspectual morphology, another question is whether there are similar tendencies with this subset of verbs.

3.3. Research Gaps and Goals

The VoM studies discussed above generally do not focus on any singular component of the VoM form. This is because these articles are some of the first SLA studies on the topic, and they aim to answer the initial question of what is difficult about VoM as a whole for L2 Russian speakers. Although there are studies that take motional prefixes into consideration, there is not yet any research designed exclusively around these prefixes. Slabakova (2005), however, does focus on aspectual prefixes on another,

larger subset of verbs: verbs with incremental theme⁴. Moreover, not many studies control for linguistic variables that are not specific to VoM. Because L2 speakers of Russian must simultaneously attend to multiple features on a verb form, it is possible that these features could be contributing to the difficulty of Russian VoM. Aspect is of particular interest because of the relationship between directionality and grammatical aspect.

Hasko (2009a) is a literature review that incorporates many of the VoM studies discussed above. This paper, however, serves more as an overview of the field. There are some suggestions for the progression of the field, but they are mostly limited to the suggestions put forth by the authors of each of the individual studies. A literature review that compiles results of pre-existing studies and highlights the less significant findings may offer some additional directions to take. Results might be less significant if there are weak correlations. These correlations over several studies, however, might begin to appear more relevant. Additionally, a more systematic way of finding the gaps in the research can point out issues that might otherwise be overlooked.

The present study aimed to systematically find gaps in the literature by adapting techniques from meta-analysis. The goals of this study are to:

- 1.) Compile the variables that have been used in the present body of research.
- 2.) Highlight gaps that could inspire future research.
- 3.) Suggest how above information can be implemented in new research designs.
- 4.) Discuss new directions for the field.

⁴ Verbs with incremental theme are activities that can be carried out in stages, such as eating, writing, or building. A way to determine whether a verb has incremental theme is by testing whether the modifiers bit by bit or gradually can be added to the predicate (Braginsky & Rothstein 2008).

4. Method

4.1. Meta-analysis

This study borrowed techniques from meta-analysis. Based on the results of pre-existing studies, meta-analysis is a research approach that has been utilized in many different fields. The method consists of systematically searching for relevant research, compiling the results of the research into coding sheets, which are organized into various independent and dependent variables retrieved from the studies themselves, and then statistically analyzing the results to determine effect sizes of the variable set across multiple studies. It is useful because it is a way to create an empirical overview of the literature of a particular topic, as well as a way to identify areas for future progress (Plonsky & Oswald 2012).

In linguistics and other fields, the acceptable scope of a meta-analysis varies greatly. For an example in SLA, Li (2010) had very broad criteria for the inclusion of studies in the meta-analysis in that the study examined the effect of feedback on the performance of *any* L2 feature. Conversely, Russell and Spada (2006) limited their scope to the effect of meta-analysis on grammatical features (as cited in Plonsky & Oswald 2012, p. 277). Still other studies can have an even more narrow focus. There is value in both broad and narrow focuses in meta-analysis; the results of each variant simply have different implications for the field.

4.2. Data Coding

Although meta-analysis is a strictly quantitative methodology, the present study borrowed the organizational format for the purpose of doing a more qualitative,

narrative-style form of analysis. The study was centered on the creation and analysis of a coding sheet. One of the main challenges of creating a coding sheet is to select variables that are broad enough to draw ties between studies that may vary considerably in methodology, focus, and scope, and yet are narrow enough to group studies together (Plonsky and Oswald 2012, p. 279). Because there are relatively few studies that address the nonnative acquisition of Russian VoM, the variables of these studies were first grouped into logical categories. After this, variables that had not been included in the current body of research were considered and placed into the aforementioned categories when they were relevant and appropriate.

		Independent Variable									
		Linguistic Factors			Proficiency Level		Task Modality			Language Group	
		Complexity	Tense	Aspect	High	Low	Comprehension	Production	Metaling. Skill	Second Lang.	Heritage
Dependent Variables	Context Appropriateness										
	Presence/Omission of Prefix										
	Semantics	Prefix									
		Stem									
	Number of VoM Tokens										
	Sorting										
	Grammaticality Judgment	Timed									
		Untimed									
	Fill-in-the-blank Accuracy										
	Restricted Control Task										

Table 2: Coding Sheet (without narrative data)

After determining the variables, the results sections of each of the articles were consulted. Instead of filling in the coding sheet with statistics, results were extracted in narrative form. This coding sheet provided evidence to support claims about possible

gaps in the literature. Empty cells in the coding sheet were opportunities to suggest how and why shifts in focus might benefit the state of the art.

The gaps in the coding sheet were crucial to the final analysis. They provided insight into what possible research designs could broaden the scope of knowledge about the acquisition of VoM. In the analysis, gaps of variables that research on topics outside of Russian VoM has indicated could be useful were discussed. In the coding sheet, the independent variables were divided into three main groups: linguistic features, learner type/proficiency, and task modality.

The outcome of the meta-analysis will take the form of a literature review. The literature review will summarize important findings and relate them to one another, as well as provide an overview of what has and has not been addressed by the present body of research. Lastly, the gaps in the research will be analyzed more thoroughly in order to offer a rationale for future research.

4.3. Studies

The meta-analysis consisted of six articles, five of which focused on second language acquisition, and one of which focused on first language acquisition. Gor et al. (2009), one of the SLA studies, collected and analyzed data from both L2 learners and heritage speakers. The number of experimental group participants in the SLA studies was relatively consistent: the smallest group was 20 L2 learners of Russian, while the largest was 36. Because these participants were mostly recruited from college campuses, the mean age of this set of studies ranged from early twenties to mid-thirties. Gagarina (2009), the study on First Language Acquisition, had five child participants. Data from these participants were collected several times between the ages of three and

four. All studies employed a control group of native Russian speakers for means of task-specific comparison.

Proficiency of the L2 and heritage speakers was determined by some combination of years of formal study, language immersion, and scores on established proficiency or placement tests. All participants had experienced some formal instruction of the Russian language, excluding the majority of the heritage learner group in Gor et al. (2009). The most highly proficient group was in Hasko (2009b; 2010), which had an average of 5.3 years formal instruction and scored highly on a placement test for an intensive language program. Gor et al. (2009) included the lowest proficiency speakers, determined by low scores on the Interagency Language Roundtable Oral Proficiency Interview, a standardized measure of proficiency.

Driagina (2007) and Gor et al. (2009) split experimental groups into high and low proficiency levels. Gor et al. (2009) matched heritage and L2 speakers of similar proficiency levels in order to compare. Hasko (2009b; 2010), on the other hand, used only participants who were considered to be highly motivated and proficient in Russian. Lastly, Bondarchuk & Derwing (2009) did not control for proficiency, although the participants generally were not considered to be fluent in the language.

The studies addressed various lexical, morphosyntactic, and semantic components of Russian VoM. These included prefixation, path marking, directionality, and aspect.

The methodologies used in this set of studies targeted several different skill sets. Driagina (2007) and Hasko (2009b; 2010) focused on production skills by eliciting longer narratives. VoM tokens were extracted for analysis and also compared to the

motion language of L1 Russian speakers by using Contrastive Learner Corpus Analysis (CLCA). Gagarina (2009) collected naturalistic data from children interacting with their caretakers in everyday situations. Both the children's speech, as well as the input speech from their caretakers, were analyzed for tokens of VoM. Bondarchuk & Derwing (2009) and Gor et al. (2009) employed tasks that targeted more metalinguistic skills. These tasks included sorting based on grammatical features, a grammaticality judgment task (GJT), and a couple of sentence completion tasks.

5. Results and Discussion

5.1. Results

The results are grouped into four broad categories: linguistic features, speaker type, proficiency level, and task modality. These categories are based on the independent variables of the meta-analysis coding sheet, as well as the topics highlighted in the SLA theory section (see 2.1. above). Each section contains explanations of gaps in the literature and, when possible, relevant results to justify why the study of these gaps might be useful.

5.1.1. *Linguistic Features*

In this section of the analysis, the features of the verb that are considered are those that are not under the umbrella of motion, including tense and aspect, as well as features that are specific to VoM; i.e. motional prefixes and directionality.

Aspect is of particular interest to the present study because it is marked differently on VoM than it is other Russian verbs (see 2.2 above). Hasko (2009b), Bondarchuk & Derwing (2009), and Gagarina (2009) are the only studies that take aspect into account. Moreover, Bondarchuk & Derwing (2009) is the only study that considers aspect in the research design, while aspect is only incorporated into the analysis of the other two studies. In L2 studies, aspect was not problematic for L2 speakers. Hasko (2009b) found that errors pertaining to aspect only accounted for only 18% of the total mistakes with the prefixed closed-class set of VoM in the narrative task. Bondarchuk & Derwing (2009) found that participants in both the L2 and the native control groups were able to sort prefixed verbs most quickly into the categories

of perfective and imperfective. Additionally, participants sorted the verbs more quickly into these categories than they did the corresponding unidirectional and non-unidirectional categories of the unprefixes verbs. Lastly, Gagarina (2009), as it was a study on L1 children, did not so much analyze errors but rather the emergence of certain forms over time. The results indicated that L1 children start to use aspectual morphology on VoM with unidirectional stems before VoM with non-unidirectional stems. It is worth noting that, the accurate use of aspectual morphology was not exceptionally problematic in any of these studies despite the fact that they targeted a couple different modalities (production, metalinguistic skills) and even different speaker types (L2 adults, L1 children). Nonetheless, as aspect was not a central topic in any of these studies, the elicited data can only account for a limited range of aspectual usage.

Tense is also important to consider because an L2 speaker often must attend to conjugational paradigms (many of which are irregular in the present tense) alongside other typical components of VoM. Most the studies included in the meta-analysis did not control for tense. Hasko (2009b; 2010) and Gagarina (2009) could not control for tense because the methodology used elicited naturalistic speech. Because the task of Hasko (2009b; 2010) was a narrative re-telling of a story, however, most of the tokens were ostensibly in the past tense, as the participants were reporting what happened in pictures. Regarding error analysis, tense was placed into a combined category of several verbal components that were not specific to VoM and, thus, was not considered individually. The methodology of Gagarina (2009) had more varied instances of tense. Because researchers recorded the children's speech in everyday contexts, there really was no way to control for it. In the analysis, however, tense is taken into account. It is

noted that tense/person-gender inflections appear on the unidirectional verbs *idti* ('to go by foot[uni]') and *exat'* ('to go by vehicle[uni]') before they appear on the non-unidirectional counterparts. There have been no equivalent observations of L2 speakers, although as conjugational paradigms are brought to their attention early on in formal instruction, the more pertinent issue is their accuracy on various verb stems, especially earlier in the development of interlanguage.

There was a larger variety of tense in Gor et al. (2009). The sample stimuli of the three tasks included past, present, and infinitive forms. Tense was not, however, considered in the analysis. Bondarchuk & Derwing (2009) was the only study that actually controlled for tense; all of the verbs in the sorting tasks were in the infinitive form. Overall, there seems to be a lack of studies that 1.) Attempt to control for tense within the naturalistic context of a sentence and 2.) Take a thorough consideration of tense in error analysis, as Gagarina (2009) did with L1 children.

As for features specific to VoM, most studies considered both motional prefixes and (non)unidirectional stems. Hasko (2009b; 2010) and Driagina (2007) all considered the presence versus the omission of prefixes and found that L2 speakers use fewer prefixed verbs than native speaker controls. As for error analysis, all of these studies noted that omission of an obligatory motional prefix was the most common L2 error. Bondarchuk & Derwing (2009), Hasko (2009b), and Driagina (2007) were the only studies that considered prefix semantics. Bondarchuk & Derwing (2009) considered the semantics of motional prefixes, grouping them into the categories of motion going towards and motion going away. Participants were able to make this distinction relatively easily. Hasko (2009b) found that errors in prefix semantics accounted for

36% of the errors in prefixed verbs with (non)unidirectional stems. Lastly, the methodology of Gor et al. (2009) could not account for errors pertaining to motional prefix. Errors in the GJT were attributed to the verb stems. The Restricted Control Task provided participants with the first syllable of the VoM forms, so the motional prefixes were always revealed to participants. As for the Sentence Completion Task, prefixes were not included in the analysis. In addition to the motional prefixes, Driagina (2007) found that L2 speakers use fewer double Path constructions (i.e. a motional prefix + a post-verbal preposition). Double Path constructions accounted for 36% of the total motion constructions in low proficiency speakers, 57% in high proficiency speakers, and 70% in the L1 controls. The composite results of these studies seem to indicate that errors pertaining to the motional prefixes are twofold; learners will often omit or avoid motional prefixes altogether, and when they do attempt to use them, it is not uncommon for them to select semantically incorrect ones. What appear to be missing are finer analyses of which motional prefixes, if any, are more problematic in terms of semantics, and on which verb stems (e.g. unidirectional, non-unidirectional, or various manners of motion), if any, L2 speakers tend to omit prefixes.

All studies considered the verb stem in some capacity. This is because all of articles investigated the broader category of VoM rather than specifically prefixed VoM. Hasko (2009b) and Gor et al. (2009) looked at the selection of the verb stems. Hasko (2009b) found that about a third of the prefixed verbs with directional stems could be attributed to the selection of improper verb stems. In Gor et al. (2009), the first two tasks (the GJT and Restricted Control Task) indicated that L2 and heritage speakers are more likely to accept the misuse verbs with non-unidirectional stems as being

grammatical. The Sentence Completion Task indicated that both L2 and heritage speakers had difficulty in selecting specific manner of motion verbs. Gagarina (2009), likewise, noted that more basic manner meanings (such as *idti* and *exat'*) appeared earlier and more frequently in children's speech. Hasko (2010) mentioned the proportion of unidirectional to non-unidirectional verbs, which is 5:1 in native speakers and 1:1 in L2 speakers. Finally, Bondarchuk & Derwing (2009) used directionality as a set of categories in the sorting task. Most of these studies cite the selection of the appropriate verb stem as a relatively consistent error. As mentioned above, there needs to be an investigation of whether there is an imbalance of accuracy of prefixes on different verb stems. Some possible interfering factors are word frequency and the conceptual abstractness of the verbs.

In sum, this set of studies suggests that the linguistic features that are specific to the domain of VoM are more problematic for learners than are the features that are not specific. This conclusion, however, is somewhat tenuous because many of the research designs did not explicitly consider or elicit varied tokens of these features. As for both the major components of VoM-specific features, the prefix and the verb stem, these studies do highlight that the production patterns are rather inconsistent among L2 speakers.

5.1.2. Speaker Type

Although most of the studies in the meta-analysis focused on L2 speakers, Gor et al. (2009) used heritage speakers as an experimental group, in addition to L2 speakers, and Gagarina (2009) was a child L1 study. Heritage speakers and L1 child speakers are taken into consideration in this study because comparison of the

developmental patterns of these groups with those of L2 speakers can help elucidate issues of L2 speakers.

Although Gor et al. (2009) is the only heritage speaker study included here, it is notable that the study was composed of three separate tasks, and that heritage speakers outperformed L2 speakers overall on all of these tasks. Additionally, the prefixed conditions of the tasks were generally not more difficult than the unprefixed conditions for heritage speakers, although they were more difficult for the L2 speakers. In terms of the finer analysis of this study, however, the most notable result was that, in the GJT, low proficiency heritage speakers were more likely than L2 speakers of matched proficiency levels to accept incorrect usages of both prefixed and unprefixed unidirectional verbs than L2 speakers of matched proficiency levels. It is, however, difficult to say where some of the research gaps pertaining to heritage and L2 speakers are because the areas of knowledge that the tasks of Gor et al. (2009) target are debatable (see 5.2 for discussion). The study is distinctly different from the naturalistic production tasks of Driagina (2007) and Hasko (2009b; 2010) and the metalinguistic task of Bondarchuk & Derwing (2009). The question worth investigating, however, is whether or not L2 speakers, in some facets, have a better metalinguistic understanding of directionality as well as its intersection with aspect. Ostensibly this could be attributed to the amount of formal instruction rather than age of acquisition or language exposure, as this was the distinguishing factor between heritage and L2 speakers in the study.

As for the research on L1 children, Gagarina (2009) found that, although both prefixed and unprefixed verbs were appearing at early ages, the majority of VoM in

both the children's output speech and their caretakers' input were unidirectional and that various aspectual and tense/person-gender inflections appeared on unidirectional verbs before non-unidirectional verbs in the development of the children's speech. This result is in contrast to one in Hasko (2010), which was that L2 speakers use an equal amount of unidirectional and non-unidirectional verbs, while native speakers use them in a 5:1 ratio. These results may not be comparable, as Hasko (2010) used a more controlled task, *The Frog Story*, while Gagarina (2009) used speech from everyday contexts. Notwithstanding, these results suggest that the usage of unidirectional verbs is more salient to early L1 speakers. If the same is true for L2 speakers, however, it is not reflected in their production patterns.

Overall, it appears that the linguistic development of L2 speakers departs from the development of heritage speakers and L1 speakers. It also seems that mastery of motional prefixes is achieved early in the linguistic development of L1 and heritage speakers, but not the L2 speakers, which could indicate an issue of age of acquisition. Also, any areas in which L2 speakers outperform heritage speakers are important for further investigation because they could indicate that some formal instruction plays a role in ultimate acquisition. Lastly, as L1 speakers acquire certain verb stems and inflections before others, it would be interesting to search for any correspondences in L2 interlanguage development.

5.1.3. Proficiency Level

While the extant research contains studies that include both high and low proficiency groups (Driagina 2007; Gor et al. 2009) and studies that focus on high proficiency speakers (Hasko 2009b; 2010), there are no studies that focus on low

proficiency speakers. The studies that include both high and low proficiency speakers, however, seem to suggest that knowledge of the VoM domain is incrementally acquired. Gor et al. (2009), for example, noted that scores on all three of the tasks were distributed in a way that higher proficiency speakers (both heritage and L2) had higher scores. Driagina (2007) also indicated that more highly proficient speakers consistently outperform lower proficiency speakers.

A major general finding of these studies, however, is that the use of motion language in highly proficient L2 speakers does not resemble that of native speakers (Driagina 2007; Hasko 2009b; 2010). Highly proficient speakers use far more unprefix directional verbs than native speakers (Hasko 2009b; 2010), and, in *The Frog Story*, there was almost no consensus among individual participants about whether an event was unidirectional or non-unidirectional (Hasko 2010).

These results are in contrast to those of Bondarchuk & Derwing (2009), in which the native speaker controls and the L2 participants performed similarly on the metalinguistic sorting task. The proficiency of these L2 speakers was not strictly controlled in the study, but none of them were highly proficient, fluent speakers. The composite results of these studies seems to suggest that, although non-fluent L2 speakers have a solid metalinguistic understanding of the rules that govern this domain, this understanding does not translate to production at even higher proficiency levels. What is further needed is a finer error-analysis of lower proficiency speaker production and investigation into the point of the development of proficiency in which meta-linguistic understanding of VoM is established.

5.1.4. Task Modality

The current body of research appears to favor production studies (Driagina 2007; Hasko 2009b; 2010; Gagarina 2009). The Restricted Control and Sentence Completion tasks of Gor et al. (2009) can also be argued to be production tasks, although as participants only provide one word for each stimulus, these tasks do not really compare to the more free, narrative-style tasks of the other aforementioned studies. As a result, the high proficiency speakers of Gor et al. (2009) performed better than the participants of narrative-style studies. Although these production studies are a good, naturalistic indicator of L2 speakers' communicative skills, research in the other modalities could still help disentangle some finer grammatical issues, as one of the drawbacks of many production studies is a relinquishment of control over certain features. Also, as effective communication requires a multi-faceted skill-set, and proficiency in one skill does not entail proficiency in another, it is important to have balanced consideration of skills.

There was only one comprehension task in this group of studies, which was the GJT of Gor et al. (2009). Even so, it is difficult to categorize this task as either targeting comprehension or metalinguistic skills, as there is contention about whether this kind of task activates implicit or explicit knowledge. The study, however, arguably does tap into some metalinguistic knowledge, as participants were given an unlimited amount of time to respond to each stimulus (see 5.2 below for discussion).

It appears that only one study included in the meta-analysis, Bondarchuk & Derwing (2009), explicitly targeted metalinguistic knowledge. As was discussed above, the participants of this study performed better (even comparable to native speakers) than

did the participants of the narrative-style tasks. Moreover, the participants of this study were able to most easily identify grammatical features that the participants in the other studies struggled to accurately produce, such as directionality and prefix semantics, above the other features included in the analysis. One of the benefits of studies of both comprehension and metalinguistic knowledge is that, using them, it is easier to tailor stimuli to target specific grammatical features. Thus, it might be useful to design these studies to isolate both general and VoM-specific grammatical features.

5.2. Discussion

The composite results of the meta-analysis highlighted a few gaps in the research. Furthermore, some of these gaps encompass topics that other SLA research has deemed important. Such gaps include a more thorough consideration of confounding verbal components (especially for the purpose of exploring intralingual issues), more varied heritage speaker studies, and a better balance of studies that target production, comprehension, and metalinguistic skills.

The incorporation of research designs that control for or elicit verbal components that are not specific to the domain of motion, such as tense and aspect, could result in studies that better isolate prefixed VoM and their motion-specific components. Aspect in particular would be a useful addition to the current body of research, even though Hasko (2009b), Driagina (2007), and Bondarchuk & Derwing (2009) indicated that aspect on VoM is not especially problematic for L2 speakers. In terms of aspect, the results of these studies can be misleading because tokens of aspect are not always varied in the particular research designs. The narrative methodology of Hasko (2009b) and Driagina (2007) called for more perfective verbs than imperfective

ones, as participants were asked to re-tell a series of concrete events from a picture book. Also, because the most frequent error was the omission of obligatory prefixes, there are probably many more tokens of prefixed VoM that should have been included in the total number of aspectual errors on prefixed VoM with directional stems. In Bondarchuk & Derwing (2009), on the other hand, participants responded to isolated infinitive verbs outside of the real context of a sentence.

Thusly, controlled studies that aim for a balance of imperfective and perfective verbs, as well as freer narrative-style studies that are designed to elicit imperfective aspect, might be useful because other studies have shown mastery of imperfective aspect generally lags behind that of perfective aspect in both children and adult learners. The methodology of studies such as Kazanina & Phillips (2007) and Slabakova (2005) (see 3.2 above), which concluded that learners struggle to associate imperfective events with telic predicates with both complete and incomplete events, could be translated over to the comprehension of prefixed VoM as well. Such studies would aim to determine whether the distinct aspectual paradigm of VoM causes the same problems as other aspectual paradigms in L2 speakers. The prefixed VoM aspectual paradigm might be especially difficult for L2 learners because motional prefixes take the same placement that is allocated to telicizing prefixes on most other regular verbs. Also, because the stems of VoM (rather than the prefixes) mark for aspect, motional prefixes can appear on both perfective and imperfective forms. Lastly, VoM cannot take the Secondary Imperfectivizing suffix, *-yva*, that the regular prefixed verbs take in order to create a prefixed imperfective form. Additionally, the incorporation of narrative studies that elicit tokens of imperfective aspect would be useful as well, as it would complement the

studies that have primarily elicited perfective aspect and determine whether aspect plays a role in the accuracy of VoM production.

Furthermore, controlling for tense might provide more insight into VoM-specific features. This is because, in the present tense, there are different conjugational paradigms, including many irregular ones, that an L2 speaker must devote attention to in conjunction with VoM-specific features, making tense a possible confounding variable. Studies on aspect such as Slabakova (2005) and Mikhaylova (2012) have used only past tense stimuli, as the paradigm for past tense verbs is much more consistent. Thus, there is less possible interference from participants having to conjugate the verb properly. Also, in order to find any possible correlations between VoM accuracy and verb tense, finer error analyses would be necessary. An example of a similar type of analysis is in Gagarina (2009), which revealed that tense inflections appear on unidirectional verbs first in children's speech. Although such a longitudinal study is perhaps not well suited for L2 studies, it would be possible to conduct error analyses in synchronic SLA studies that consider tokens of past, present, and future tenses separately.

Finer error analysis can also be applied to the use of motional prefixes and verb stems. There has not yet been a study that explicitly examines L2 speakers' semantic knowledge of these features. Bondarchuk & Derwing (2009) did a version of this, and although the categorization of unidirectional and non-unidirectional verbs was a useful inclusion, manner of motion could not be included in the research design, and the motional prefixes were only split into the semantic categories of 'towards' and 'away', which do not necessarily capture the refined meanings that these prefixes can have. The

semantics of motional prefixes and verb stems may be causing problems in L2 acquisition because of conceptual abstractness (e.g. directionality or manner meanings in verb stems or spatiotemporal boundaries of prefixes) or because of word frequency

Also regarding motional prefixes specifically, several studies suggested that L2 speakers, even highly proficient ones, use strategies to avoid motional prefixes in production (Driagina 2007; Hasko 2009b; 2010). Once again, finer error analysis can be used here to determine if L2 speakers tend to omit motional prefixes on specific verb stems. Also, a study that focuses more on the comprehension of these prefixes would be insightful because other studies have suggested that there are discrepancies between the production and comprehension skills of aspectual prefixes on other verb types. Slabakova (2005), for example, demonstrated that L2 speakers have a relatively solid grasp on the function of aspectual prefixes, yet still have difficulty using them.

Additionally, it would be worthwhile to further investigate L2 learners' use of double Path marking constructions. This is because in order to accurately produce a native-like motional construction, the finer meanings of Path that are conveyed by a combination of Path-marking satellites must be used. Also, because most of the failures to use double Path marking constructions in Driagina (2007) were due to the omission of the prefix rather than the satellite preposition, it is conceivable that there is some L1 interference. Namely, this would be because English seldom uses double Path marking constructions, and it marks for Path using a post-verbal preposition.

In terms of speaker type, some recent findings on the differences between heritage and L2 speakers can help inform more research designs. Bowles (2011), a study on Spanish heritage speakers, determined that heritage speakers rely more on

implicit knowledge, while L2 speakers rely more on explicit knowledge. The study further posited that tasks on which heritage speakers perform better may be targeting implicit knowledge, while tasks that are easier for L2 speakers may be targeting explicit knowledge.⁵ Relatedly, in the GJT of Gor et al. (2009), the only condition in which L2 speakers outperformed heritage speakers was on sentences that used unidirectional verbs incorrectly (i.e. a non-unidirectional rather than a unidirectional verb would have been grammatical). This result could indicate that, at least in some facets, L2 speakers have more refined metalinguistic knowledge about directionality than do heritage speakers. As metalinguistic knowledge falls under the umbrella of explicit knowledge, it could be posited that overall knowledge of this domain requires that speakers have had some interaction with the grammatical rules that govern this domain. This could be obtained through a formal education in the language, which most native speakers have, or, in the case of L2 speakers, formal second language instruction. Although this is not a defining feature of the group by any means, heritage speakers are less likely to have been exposed to either type of formal instruction. More studies that compare the metalinguistic skills of L2 and heritage speakers would help disentangle the components of VoM that, regardless of speaker group, require some deeper metalinguistic understanding to use accurately.

Relatedly, one of the gaps in the present body of research is a lack of any longer narrative elicitation tasks (e.g. the Frog Story) from heritage speakers. In the GJT and shorter production tasks of Gor et al. (2009), heritage speakers consistently

⁵ In SLA, explicit knowledge is what speakers can explain with a rule (e.g. adding -s or -es to the end of a noun makes it plural). Explicit knowledge takes more time to access and apply; therefore having explicit knowledge of a linguistic feature does not guarantee the ability to use it in online production of speech. Implicit knowledge, on the other hand, is knowledge that can be accessed automatically (Bowles 2011).

outperformed L2 speakers in all but a select few contexts. Therefore, in line with the results of Bowles (2011), it might be valuable to pair a longer narrative task with tasks that measures metalinguistic knowledge, such as describing grammatical rules. This would provide insight into which skills, in terms of prefixed VoM, are governed by explicit or implicit knowledge in heritage and L2 speakers. Furthermore, if L2 speakers were more successful in the metalinguistic tasks than the production ones, this would be further evidence that certain skill sets are mismatched. The opposite could also be true for heritage speakers, as they often struggle with explicit, metalinguistic knowledge.

Regarding pre-established research designs, experiments implementing Grammaticality Judgment Tasks can be improved by making one of two changes: only giving participants a limited amount of time to respond to stimuli, or having participants identify exactly what they believe is wrong with ungrammatical stimuli.⁶ Gutierrez (2013) argued that timed GJTs are more likely to reflect implicit knowledge, as they are closer to real speech events in which there is less time to respond to any given utterance. Asking participants to identify what they think is ungrammatical, on the other hand, taps explicit, metalinguistic knowledge. This is further useful because it shows whether or not the anticipated ungrammatical form is what the participant identifies. GJTs are often useful because they can give insight into the L2 knowledge of linguistic features that are either uncommon in the language or may be avoided by the L2 speaker in normal speech. Moreover, incorporating more GJTs in studies about Russian VoM would be especially useful because several studies have indicated that L2 speakers

⁶ This can be accomplished by asking participants to either identify where the error is, to correct the error, or to explain the rule or rules that have been broken (Gutierrez 2013).

avoid using prefixed VoM (Hasko 2009b; 2010). GJTs would be a good way to collect information about this grammatical feature that is often absent from L2 production.

Also regarding speaker type, Gagarina (2009) showed that L1 children use unidirectional verbs before non-unidirectional ones. As Kazanina & Phillips (2007) showed that L1 children were able to interpret perfective aspect before imperfective aspect, it could also be posited that unidirectional VoM and their prefixed counterparts are likewise more salient in the earlier stages of L1 development. To show if L2 interlanguage development follows a similar pattern, a task similar to those of Kazanina & Phillips (2007) and Slabakova (2005) could be used not only to elucidate issues of the interpretation of aspect as discussed earlier in this section, but also issues of the interpretation of directionality. Because Hasko (2010) indicated that even highly proficient L2 speakers use an equal amount of unidirectional and non-unidirectional verbs, it is probable that L2 speakers do not develop the same understanding of unidirectional verbs as do L1 children speakers, despite the fact that these verbs are more semantically transparent.

Lastly, a result that various points of this section have hinted that there needs to be a better balance of studies in terms of task modality. The majority of these studies targeted production skills, but such research designs do have certain drawbacks. Although the production tasks of Driagina (2007) and Hasko (2009; 2010) have the advantage of eliciting very naturalistic speech, it is much more difficult to control for the many possible linguistic variables using narratives. Although it is perhaps more difficult to imitate real speech events using comprehension and metalinguistic tasks, the benefit is that stimuli can be carefully designed to isolate variables. The broader scopes

of the early narrative studies do, however, provide preliminary information about which variables need to be further studied in isolation and, thus, serve as good starting points for more controlled research designs.

In conclusion, the most pertinent areas for further investigation are varied task modalities, studies on heritage speakers, and finer control and analyses of linguistic features. Possible future steps in this line of research include modifying pre-existing VoM studies (or their corresponding analyses) to target specific verbal components or groups of speakers, or creating new studies based on neighboring topics such as L2 acquisition of aspect or broader SLA topics such as the activation of implicit versus explicit knowledge. The aim of future research would be to pursue the more specific questions brought up by the broader scope of the initial round of research.

6. Conclusion

The aim of the present study was to review the extant literature on L2 acquisition of Russian motional prefixes on the closed-class set of VoM and, using techniques borrowed from meta-analysis, to highlight gaps in the research in need of further investigation. The results suggested that the present body of research could be diversified by adding studies that target more varied modalities, studies that are inspired by the linguistic developmental patterns of L1 and heritage speakers, and studies that implement finer analyses of linguistic features.

One significant limit to this study was that the body of research on this domain is relatively small. As more studies are designed and conducted, it may be possible to do more primary research using more traditional meta-analysis techniques, such as statistical analyses. Another possible limit is that studies on this topic written in Russian were unavailable to me. Lastly, it might have been useful to include more L1 studies in the analysis. There are a larger variety of studies that look at adult native speakers than there is of L2 studies. Corpus studies, because they focus on real production data, would have been particularly useful. These studies might have further inspired the inclusion of other linguistic factors or added breadth to the suggestions for future research designs.

This subject of research has the potential to affect a couple of neighboring sub-disciplines. A major one of these is the development of pedagogical methods. Russian language educators tend to spend a lot of time teaching this particular set of verbs, yet there have been few empirical studies to consolidate their methods. In the broader field of pedagogy, there has been an increase in methods informed by empirical research. Understanding acquisitional problems can help educators streamline their teaching

methods by drawing their attention to the challenging components of an extremely multi-faceted language system.

Outside the Russian language field, research on this topic can inform theoretical frameworks, in general language typology as well as in SLA. Particularly, this is something that could add to what is known about language transfer. For example, it can contribute to SLA questions such as how to distinguish between interlingual issues, such as typological distance, and intralingual issues, such as complexity or lexical input. This topic can also give insight into general typology theory. The framework set up by Talmy (1985;2000) and elaborated in SLA by Slobin (1996) has inspired a lot of research into how motional constructions across languages should be typologically categorized. For example, under the current typological frameworks, the differences between Russian and English motional constructions are considered to be inter-typological. It could be argued, however, that the lack of transfer between English and Russian motion constructions indicates that these differences should be considered in the refinement of bigger typological categories.

This research suggests several avenues for further research. One of them is creating an experiment based on one or more of the gaps discussed in the meta-analysis. Such experiments could include reiterations of tasks used in previous studies with the addition of new analytical designs, continuation or interpretation tasks (such as the ones that have been used to study the acquisition of aspect) that target the metalinguistic or comprehension skills of L2 speakers, or designs that can be used with heritage speakers. Outside of the experimental route, another option is to continue the literature review with more studies on L1 acquisition and native speakers in order to identify any more

prospective acquisitional issues. Lastly, this paper might serve as a useful synopsis of the empirical literature for Russian language teachers who are interested in incorporating empirical findings into their pedagogical methods. In sum, the present study can serve as a crossroads for more narrow issues and questions affected by this topic.

Glossary

Aktionsarten prefixes- A subset of telicizing prefixes that contribute subtle nuances about the development of an event in time.

aspect- a part of a verbal predicate that determines the internal temporal structure of an event (Comrie 1976).

bound morpheme- a language particle, such as a suffix or prefix, that attaches to a word.

closed class VoM- a set of 14 motion verbs that mark for directionality

Contrastive Analysis (CA)- an SLA research method in which the similarities and differences between the features of two languages are compared in order to explain or predict language-learning difficulties.

corpus- a collection of either written or spoken language samples.

directionality- Distinction within Slavic language that determines whether a motion is unidirectional (from point A to B) or non-unidirectional (and expression of motion not under the umbrella of unidirection; i.e. ability, function, random motion, and round trips).

double Path constructions- when multiple Path satellites are used in the same motional construction to refine meaning.

Error Analysis (EA)- An SLA research method that focuses on patterns in actual learner speech

external factors- anything outside of the individual, including the language-learning environment or the specific complexities of the target language.

grammatical aspect- indicates the temporal structure of an entire event (rather than just at the predicate level) with reference to the present point in time (Mikhaylova 2012).

grammaticalized- a distinction that is embedded into the morphology of a language as opposed to individual lexical items.

heritage speakers- people who have learned a language early in their lives through naturalistic exposure, but live in an environment that eventually causes them to become dominant in another language.

imperfective aspect- Views the event as ongoing or habitual, as if the event is still happening (Comrie 1976).

interlingual- differences between the native and second languages.

intralingual- language difficulties caused by the internal complexity of the target language itself

internal factors- the personal and predispositional qualities of a language learner such as age, motivation, personality type, or the first language.

Grammaticality Judgment Task (GJT)- A task in which participants are presented with grammatically correct and incorrect stimuli and then are asked to provide their intuition about whether the stimuli are correct or incorrect.

lexical aspect- encompasses the inherent semantic properties of verbs as well as the other constituents of a predicate that indicate whether an event is *telic* and has either an end or beginning point (or both), or is *atelic* and does not have an end or beginning point (Slabakova 2005).

L1 transfer- The ways in which the first language affects the learning of a second language. The L1 can be beneficial (positive) to learning the L2, or it can be negative (Ortega 2009).

Manner- Indicates the way a motion is being carried out (e.g. walking, running, flying, jumping) (Talmy 2000).

meta-analysis- A research method that consists of systematically searching for relevant research, compiling the results of the research into coding sheets, which are organized into various independent and dependent variables retrieved from the studies themselves, and then statistically analyzing the results to determine effect sizes of the variable set across multiple studies.

metalinguistic knowledge- speaker knowledge of the grammatical rules that govern a given language.

modality- the way in which language is being used (i.e. speaking, listening, reading, writing).

inflectional morphology- Changes in words that affect grammar. Some examples of English morphology are plural *-s*, possessive *'s*, past tense *-ed*, or present progressive *-ing*.

morphology- Additions to a word that either affect the grammar or the semantics

motion constructions- the constructions used across all languages to describe some kind of literal or metaphorical movement and trajectory (e.g. walk in, run around, swim through).

Path- A part of a motion construction that indicates the trajectory of the motion (e.g. go in, walk out). (Talmy 2000).

perfective aspect- Views the event as having distinct beginning and end points. The viewpoint is zoomed out so that the temporal structure from within the event itself is less important (Comrie 1976).

Predicate- A verb and its associated constituents (e.g. direct objects, prepositional phrases)

typology- A categorization of languages based on a specific linguistic feature or set of features.

unbound morpheme- a language particle, such as a suffix or prefix, that is freestanding.

verb-framing languages- Languages that express Path on the main verb (e.g. Romance languages) (Talmy 2000).

VoM- Verbs of Motion

satellite-framing languages- Languages that express Path on some form outside of the verb (e.g. English, Russian). (Talmy 2000).

telicity- Property of predicates that shows whether the actions have inherent end and/or beginning points (Slabakova 2005b).

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