

The State of the Art of First Language Acquisition Research on Slavic Languages

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Abstract: This paper provides an overview of recent work on the first language acquisition of Slavic languages. The focus is on those areas in which the most work has been done since the year 2000: referring expressions, nominal inflection, the verbal domain, and word order, with a brief mention of other topics, including the acquisition of phonology. Most of the studies reviewed here focus on typical monolingual first language development, but bilingual first language development is discussed where relevant.

1. Introduction: First Language Acquisition of Slavic Languages

The last two decades have seen a large body of work on the first language (L1) acquisition of a variety of Slavic languages. The most investigated languages from the perspective of acquisition are Russian, Polish, and Serbian/Croatian; work has also been done on the acquisition of Bulgarian, Czech, Ukrainian, and Slovenian, among other languages. The goal of this paper is to provide an overview of the field of L1 acquisition of Slavic, with a focus on those areas in which the most work has been done: namely, nominal inflection, referring expressions, the verbal domain, and word order (with a brief mention of other topics, including the acquisition of phonology).

Slavic languages have much to contribute to these topics by virtue of their rich morphological paradigms as well as the variety of available word order permutations. Such topics as the acquisition of morphological case or the relationship between word order and information structure cannot be easily addressed by the more commonly studied Germanic and Romance languages but present themselves readily for investigation in the case of the Slavic languages.

In light of space limitations, we cannot possibly do justice to all the work that has been done on the L1 acquisition of Slavic. We therefore give the most attention to subareas where multiple studies have been conducted, and we focus primarily on work since 2000 (with mention of older papers where relevant) in order to capture the current state of the field. We furthermore prioritize papers written in English (and hence available to a wide audience) and

published in peer-reviewed journals or edited volumes (although proceedings papers are included in a few cases).

Most of our review concerns typical monolingual L1 acquisition; for second language acquisition, the reader is referred to Gor's paper in this issue. We focus almost exclusively on behavioral studies which collect offline production or comprehension data; for online studies with children as well as adults, the reader is referred to Sekerina's paper in this issue. We do, however, include work on bilingual language development, in particular on the development of Russian as a heritage (minority) language, which has received much attention in the work of Maria Polinsky (e.g., Polinsky 2006, 2007, 2011) and others (e.g., Isurin 2000; Gagarina 2011a; Gagarina et al. 2014). Major issues in the work on heritage language development include the question of whether the minority/family language is incompletely acquired and/or undergoes attrition, the role of input quantity and quality, and the possibility of transfer from the dominant language (see Benmamoun, Montrul and Polinsky 2013 for an overview). These issues are discussed, as applicable, for those grammatical domains where work on bilingualism has been done.

2. Acquisition of Case, Number, and Gender

We begin our overview with the acquisition of nominal inflection in the Slavic languages. The Slavic languages have rich and complex inflectional paradigms which allow researchers to examine how (ir)regularity and different types of cues influence the course of acquisition. Most studies on the morphology of the nominal domain in L1 acquisition of Slavic focus on Polish, Russian, and Serbian/Croatian, languages with complex systems of nominal inflection that encode grammatical gender, number, and case. The recent studies on this topic can be divided into two broad types: (i) studies that examine whether, and how, the regularity of morphophonological cues facilitates the acquisition of nominal inflection; and (ii) studies, largely on Polish, whose goal is to contribute to the debate on rule-based vs. usage-based models of acquisition, which first began with regard to the acquisition of English. Finally, the (smaller) body of literature on nominal inflection in the context of bilingualism is largely concerned with bilingual children's ability to acquire nominal inflection under conditions of reduced input and/or cross-linguistic influence. In this section, we address these three points in turn.

2.1. Nominal Inflection and the Role of Diminutives

Studies of very young children's spontaneous speech production show that they use nominal inflections accurately very early on (e.g., Babyonyshev 1993 on Russian; Kovačević, Palmović, and Hržica 2009 on Croatian). The accuracy

of case appears to be related to number. Gordishevsky and Schaeffer (2008) find that in child Russian, case marking is correct in the singular but not in the plural around age two, leading the authors to argue that number is initially underspecified in child grammars. This is similar to the findings of Gagarina and Voeikova (2009) that Russian-acquiring children use the nominative plural form as early as 20 months of age, but do not use oblique plurals until 30 months.

In addition to studies of nominal inflections in children's naturalistic speech, a number of acquisition studies use experimental manipulations to investigate what cues children use to learn the case and gender systems of their languages. For example, Rodina and Westergaard (2012) investigate how Russian-speaking children acquire nouns which exhibit a mismatch between semantics and morphology when it comes to gender. They examine masculine nouns which end in *-a* and follow the declension patterns of feminine nouns (e.g., *papa* 'father'), double-gender nouns (e.g., *plaksa* 'crybaby'), hybrid nouns such as *doktor* 'doctor', and female diminutive names with masculine endings. Rodina and Westergaard used a game format to elicit gender agreement on adjectives and verbs appearing with these nouns. The children performed differently across the four types of nouns and showed sensitivity to morphological as well as semantic cues. Rodina and Westergaard analyzed their findings within the microcue approach of Westergaard (2008).

Extensive work by Vera Kempe and colleagues (beginning with Kempe and Brooks 2001) has provided evidence that the acquisition of grammatical gender in Russian is facilitated by diminutives. Nouns with diminutive suffixes have more consistent gender endings than nondiminutive nouns, with greater within-category similarity. Diminutives are, furthermore, common in Russian child-directed speech, more so than in adult-directed speech (Kempe et al. 2007). Kempe et al. (2003) used an elicitation task with two-to-four-year-old children, eliciting gender agreement with both familiar and novel animal names in both simplex and diminutive forms. The children exhibited overall high accuracy rates but were more accurate on familiar than on novel nouns, more accurate with masculine than with feminine nouns, and more accurate with diminutives than with simplex nouns. The children produced agreement on a variety of forms, with pronouns predominating, and were more accurate on gender agreement with pronouns than on gender agreement with adjectives.

Ševa et al. (2007) took up the question of whether this facilitating role of diminutives depends on their frequency in child-directed speech. Analyzing the child-directed speech of Russian-speaking and Serbian-speaking mothers, they found diminutives to be much more frequent in Russian than in Serbian. In order to examine whether frequency of diminutives in the input affected acquisition, they conducted a more constrained version of the experiment from Kempe et al. (2003) in both Russian and Serbian. Ševa et al.

found nearly identical performance in the two languages: both Russian- and Serbian-acquiring children produced gender agreement more accurately with diminutives than with simplex nouns and had greater accuracy with familiar than with novel nouns. Ševa et al. conclude that the morphophonological properties of diminutives (which are more regular than simplex nouns in both Serbian and Russian) play a more important role in the acquisition of gender than does the frequency of diminutives in the input.

Kempe et al. (2007) extended the investigation of the facilitative role of diminutives to case as well as gender marking. The Russian-acquiring children in their experiment were exposed to novel words in one of three conditions: the simplex form, the diminutive form, or both. Children's responses in an elicitation task were then coded for accuracy of case marking. Overall, children made the most case errors when the nouns were presented in simplex form, only compared to the two conditions containing diminutives. Analyzing both the speech of mothers and the performance of children, Kempe et al. (2007) conclude that wordplay (interchangeable use of simplex and diminutive forms) is beneficial for the acquisition of case-marking. Kempe et al. (2009) conducted a comparison between Russian and Serbian. The children in their experiment were exposed to familiar and novel nouns in either simplex or diminutive forms. As in Ševa et al. (2007), Kempe et al. (2009) found very similar performance in children acquiring Russian and Serbian, this time with respect to case marking: both groups of children were more accurate on case marking with diminutives than with simplex nouns (in addition to effects of noun familiarity and of the noun's gender). A parallel finding was obtained for Polish by Dąbrowska (2006) (see the next section).

To sum up, there is much evidence that diminutives, which give regular morphophonological cues to gender and case, are easier for children to acquire than simplex nouns.

2.2. Nominal Inflection and Overgeneralization

Much of the literature on the acquisition of the Polish case-marking system has addressed the question of whether children learn inflectional morphology by acquiring rules. On one side of this debate is the dual-mechanism model (e.g., Pinker and Ullmann 2002), in which children learn rules governing regular forms, as well as memorizing the exceptional or irregular forms. The regular form is the default with children exhibiting overgeneralization of the regular in place of the irregular. On the other side are connectionist and usage-based models (e.g., Tomasello 2003), in which there is no distinction between the grammar and the lexicon. This debate has largely focused on the acquisition of English past tense forms, which can be either regular or irregular. Work by Ewa Dąbrowska and colleagues has addressed this debate on the basis of data from Polish, which has a more complex morphological paradigm.

Dąbrowska (2001) examines the development of the Polish genitive in three children between the ages of one and four; unlike English past-tense marking, which easily divides into regular vs. irregular, the Polish genitive has three distinct forms used with three noun types. Dąbrowska shows that the children used all three genitive endings very early on, and while they showed some overgeneralization of all three forms, no form appears to be a default, and the overgeneralization rates are very low. These data are not readily compatible with the dual-mechanism system.

Dąbrowska (2005) examines how Polish-acquiring children learn the Polish masculine genitive inflection with its many irregularities. Dąbrowska conducted an experiment with two-to-ten-year-old children in which she elicited genitive use with nonce word forms. Most two-year-olds showed evidence of productivity (the ability to supply the correct form of a novel word) with at least one genitive ending, and performance gradually improved with age, becoming fully adult-like only at age ten. Dąbrowska provides an account of which child grammars are governed by rules differing from those of adult grammars, relying on phonologically specific low-level schemas. This proposal receives further support from Dąbrowska's (2006) findings that Polish-acquiring children are particularly successful at supplying case inflection with diminutives, which have densely populated phonological neighborhoods from which children are able to extract low-level schemas.

Dąbrowska and Szczerbiński (2006) extend the investigation of children's productivity with case to dative and accusative as well as genitive forms in Polish. They found that while the children exhibited early evidence of productivity, regularity was a poor predictor of productivity, with children being more influenced by such factors as frequency and phonological diversity. Dąbrowska and Szczerbiński (2006) argue that their results provide evidence for usage-based models. The same conclusion is reached by Dąbrowska and Tomasello (2008) in a study of two- and three-year-olds' productivity with the Polish instrumental case.

Krajewski et al. (2011) tested the two competing models (dual-mechanism vs. usage-based) in a study with two- and three-year-old Polish-acquiring children. The children were presented with novel words as part of a picture-based story with the word modeled in dative, instrumental, or locative case. The children were subsequently prompted to use the word in the genitive case. The results showed that similarity of the modeled form to the target genitive form was more important than frequency of the source form. In a second experiment, Krajewski et al. changed the target to the nominative instead of the genitive and established that the effect of the source form varies depending on the target form. Krajewski et al. argue that their findings speak in favor of the usage-based model over the dual-mechanism model but note that the lack of frequency effect poses challenges to the usage-based models.

2.3. Nominal Inflection in the Context of Bilingualism

A number of recent studies have investigated how gender and case in Russian are acquired by children bilingual in Russian and another language. Most of these studies focus on the acquisition of grammatical gender in production (but see Janssen and Peeters-Podgaevskaja 2012 for a comprehension study with Russian/Dutch bilinguals, which shows that bilinguals, like monolinguals, are able to use case cues in comprehension). While monolingual children are uniformly successful in acquiring the nominal inflection systems of their languages, this is not the case for bilingual children. The degree of success may depend on the amount of input in the language, as well as on cross-linguistic influence from the child's other language.

Schwartz et al. (2015) elicited gender agreement with adjectives in four groups of four-to-five-year children bilingual in Russian and another language: the second languages of the children were English, Finnish, German, and Hebrew. The children were early sequential bilinguals, first exposed to Russian at home, and then to the other language in preschool. Schwartz et al. found that the bilingual children were qualitatively similar to Russian monolinguals: at age four or five, the bilinguals exhibited error patterns exhibited by two-to-three-year-old monolinguals. The study furthermore showed that the grammar of the children's second language played a role: children bilingual in Hebrew or German (which have grammatical gender) performed better on Russian gender than children bilingual in English or Finnish (which do not have grammatical gender).

Rodina and Westergaard (2015) tested four-to-seven-year-old Russian/Norwegian bilinguals in Norway on their production of gender agreement in Russian and in Norwegian. The children were divided into those who were exposed only to Russian at home vs. those exposed to both languages at home. In the case of Russian, input made a difference: the bilinguals exposed only to Russian at home performed just as well as age-matched Russian monolinguals, while the bilinguals exposed to both Russian and Norwegian were much less accurate, and in particular often overgeneralized masculine agreement with feminine and neuter nouns. Rodina and Westergaard's finding of a reduced gender system in bilinguals is consistent with the findings of Polinsky (2008) with adult heritage Russian speakers in the U.S. Polinsky found that lower-proficiency adult heritage speakers had a reduced gender system, with two genders (masculine and feminine) and no neuter (Rodina and Westergaard also found individual children who used only the masculine gender, no feminine or neuter).

To sum up, there is evidence that bilingual children are able to acquire the target properties of the Russian gender and case systems, but there is also evidence that their success depends on how much input they receive in Russian, as well as the properties of their second language.

3. Acquisition of Referring Expressions

Staying within the nominal domain, we now move on to the acquisition of referring expressions, another topic that has received much attention in the literature on Slavic languages. L1-acquisition research on referring expressions in Slavic has mainly focused on the study of clitics, especially in the context of the cross-linguistic validation of the Unique Checking Constraint (Wexler 1998, 2003), as well as on the examination of full pronouns in object positions. Anaphoric binding has been additionally examined for Russian, mainly concentrating on the availability of the long-distance binding of reflexive anaphors and on the interpretation of pronouns at the interface of syntax and discourse/pragmatics (but see also Bittner, Kühnast, and Gagarina 2011 and Bittner and Kühnast 2012 on anaphoric reference of subject pronouns in Bulgarian). In both domains (clitics and binding), studies on Slavic have allowed researchers to test theories initially proposed on the basis of Germanic or Romance languages, as discussed below.

3.1. Clitics and Pronominal Objects

Croatian, Bulgarian, Polish, and Ukrainian have been investigated regarding clitic object acquisition. Russian and Ukrainian have been investigated with regard to the development of pronouns in object positions.

Most studies analyzing the nature of objects in child Slavic investigate the acquisition of object clitics. This is not surprising given the ongoing cross-linguistic interest in this topic. Clitics present researchers with a clear cross-linguistic puzzle since there is a division between two types of languages with respect to clitic development: clitic omission languages such as French, Italian, and Catalan, characterized by a high rate of object clitic omission in obligatory contexts even by the age of around three years, and non-clitic omission languages such as Spanish, Greek, and Romanian, where clitics are produced from the very beginning, around the age of two years. The variability with regard to clitic omission across languages is often accounted in terms of the Unique Checking Constraint (UCC) (Wexler 1998, 2003, and other work); the UCC predicts clitic omission to be found in child language whenever the derivation requires more than one instance of checking of uninterpretable features, which is suggested to be the case for languages with clitic-past participle agreement. In contrast, languages without agreement between the clitic and the past participle are not expected to have their acquirers undergo a stage of significant clitic omission. Other accounts look for the source of clitic omission in children's impoverished clausal structure (Guasti 1993/1994, Hamann, Rizzi, and Frauenfelder 1996, a.o.), in their processing limitations (Grüter 2006), or in an underdeveloped pragmatic component (Schaeffer 2000,

a.o.). While these approaches explain the difficulties children have with clitics, they do not account for the established cross-linguistic variation. Acquisition data from Slavic provide an important contribution to the evaluation of these competing theoretical proposals.

In Croatian, object clitics emerge early and are used productively at around the age of two, according to the experimental and naturalistic data in Stiasny (2006). Clitic omissions are rare, and since Croatian does not exhibit participle agreement with objects, the observation of no clitic omission stage in child Croatian seems to be compatible with the predictions of the UCC.

Similar results were found for Bulgarian by Radeva-Bork (2012), who tests the acquisition of accusative object clitics in terms of their production rates, morphosyntactic properties, and syntactic placement for ages 2;2–4;3. The data indicate clitic emergence at 2;3 and robust production from early on. Bulgarian children behave similarly to their Croatian and Spanish peers and omit clitics rarely, at 31% for ages 2;2–3;0, at 15% for ages 3;1–3;7, and at an adult-like 0% for ages 3;8–4;3. The findings are in conformity with the predictions of the UCC since Bulgarian does not exhibit clitic-past participle agreement, hence no double D-feature checking is necessary in child grammar. In terms of morphosyntax, clitic forms are adult-like from the onset, with no evidence for the existence of a default clitic (but see Ivanov 2008). An adult-like mastery of clitic syntax is present from very early on since both proclisis and enclisis are produced in a target-like manner right from the beginning. This finding is in line with research on many other languages with different clitic position restrictions, showing that position errors occur at a very low rate, if at all. Radeva-Bork (2012) also studied the acquisition of the double possession of the direct object position in Bulgarian, that is, the so-called clitic doubling (CD) of full DPs (e.g., *Emil ja xaresa knigata* 'Emil liked (it) the book.'). On the basis of comprehension data, she finds that double cliticization is problematic and emerges as late as late as age 4;2. The asymmetry in the acquisition of single clitics and CD is not grounded in a grammatical deficit but is attributed to interface coordination difficulties in the case of CD, specifically at the interfaces of syntax and discourse.

In contrast, L1 data from Polish suggest an initial clitic omission stage in the language. Tryzna (2009, 2015a) investigates the acquisition of Polish accusative and dative object clitics by means of longitudinal data from one child aged 2;1 to 2;9 and experimental production and comprehension data from 53 children aged 2;4–5;10. The results from the production studies indicate that object clitics appear relatively late, by the age of three, and that omissions are initially high (at 60%). The findings from the comprehension experiment clearly show an acquisition asymmetry since children's comprehension of object clitics is shown to be target-like from early on. The finding that Polish children omit clitics in production at substantial rates—although their target grammar does not exhibit clitic-past participle agreement—is taken to go

against the predictions made by the UCC. At the same time, the existence of three developmental stages with respect to the acquisition of clitic objects in Polish, as identified by Tryzna (2015a), is explained within a maturational account in line with Borer and Rohrbacher (2002), whereby the clitic phrase is open to D-linking as long as the morphophonology of object clitics has not been fully acquired. Tryzna admits that although such an approach may explain the early clitic omissions found in child Polish, it does not capture the cross-linguistic variance with respect to clitic development.

On other approaches, the clitic omission found in Polish is taken to be a case of choosing a competing legitimate alternative that is licit in the target grammar, namely the possibility to omit objects in certain contexts. In other words, it is possible that children's clitic omissions mirror (and children possibly overgeneralize) the null object availability in the input. Mykhaylyk and Sopata (2015) argue that Polish and Ukrainian allow null objects (clitics and full pronouns, respectively) in appropriate discourse conditions (i.e., when the referent is identifiable from the preceding utterance). The question "What did Peter do with the cake?" can be answered in two ways in Polish: The object can be realized, *On go zjadł/Zjadł go*, or omitted, *Zjadł* 'He ate it.' (Mykhaylyk and Sopata 2015: 2). The same holds for Ukrainian. The observation that object drop is well-formed in adult Polish and Ukrainian is empirically supported by experimental adult data in Mykhaylyk and Sopata (2015).

Mykhaylyk and Sopata (2015) use the above observation about this variation in the adult grammar to construct an elicited production experiment with Polish- and Ukrainian-speaking children aged three to six. The results indicate that both Polish and Ukrainian children make no errors in direct object (DO) realization but prefer to use null arguments up to the age of five. There is a semantic effect on the use of DOs, since around the age of five clitics/pronouns are used more often for animate referents and around the age of six—for inanimate objects. On the basis of the observation that the general developmental trajectory is similar for both languages irrespective of the DO types, clitic or pronoun, the authors conclude that clitics are not much different than pronouns.

Another study that takes on the comparison between pronouns and clitics in child production—a topic that has only recently started attracting attention—is Varlokosta et al.'s (2016) cross-linguistic study of clitic and pronoun production in five-year-olds for 16 languages. Both clitic languages and pronoun languages were investigated using a single elicitation method. The languages from the Slavic family tested were Croatian, Polish, and Serbian. The study provides arguments that at the age of five children's knowledge of pronominals is target-consistent across languages. Generally, children opt for the weakest alternative in accordance to the scale pronoun > clitic > null, depending on what is available in their languages. As in Mykhaylyk and Sopata (2015), no difference was found between clitics and pronouns in production.

All in all, Varlokosta et al. (2016) suggest that pronominal production can be taken as a developmental marker, provided that the null object properties of the individual languages are taken into account.

To sum up, research on object clitic acquisition in Slavic has contributed immensely to the general discussion of the nature of clitic elements. It seems that Slavic languages behave as predicted by the UCC: clitics appear early and are unproblematic in Croatian and Bulgarian, as expected for languages without clitic-past participle agreement. Polish, another non-clitic-past-participle agreement language, is characterized by early clitic omissions, which seems to reflect the optionality of object drop in the target grammar. The latter holds also for Ukrainian and Russian, which similarly allow null objects in adult grammar and for which object pronouns were found to be omitted at high rates in child speech. Generally, there are hints that clitics and pronouns follow a similar general developmental trajectory.

3.2. Binding and Co-reference

It is well-known that monomorphemic anaphors in Russian allow long-distance (L-D) binding, whereby the antecedent can be found outside the local clause, thereby apparently violating the locality requirement on anaphor binding, as in *Lena poprosila Marinu narisovat' sebja* 'Lena_i requested Marina_k to draw herself_{i/k}'. Bailyn (1992) studied the long-distance binding of reflexive anaphors such as *sebja* in an experimental study with 65 Russian-speaking children aged four to nine years and found that children accept L-D readings out of subjunctive clauses introduced by the complementizer *čtoby*, where such readings are not allowed in adult grammar, whereas they correctly do not accept L-D readings out of indicative *čto* clauses.

The interpretation of Russian pronouns by children was investigated in several studies. On the basis of comprehension data from Russian-speaking children aged four to seven years, Avrutin and Wexler (1992) studied the interpretation of possessive pronouns and showed that children have knowledge of Principle B (according to which a pronoun must be free in its binding domain, roughly the clause) but that they do not know a pragmatic principle (Principle P) that restricts the situations in which NPs may be coindexed. This is seen as providing support for the modularity of syntax vs. pragmatics. Knowledge of syntactic and discourse-related restrictions on the interpretation of Russian pronouns in subjunctive clauses was investigated by Avrutin and Wexler (2000) for ages four to five. Consistent with previous findings in English and Russian, Avrutin and Wexler found that children are adult-like in constructions in which only syntactic knowledge is implicated. However, in those cases in which the correct interpretation of pronouns requires the knowledge of the interaction of syntactic and discourse-related constraints

(e.g., when the antecedent for the pronoun is an R-expression), children make significantly more errors.

4. Acquisition of the Verbal Domain

We now move on to studies on the acquisition of the verbal domain, another much-studied area on the L1 acquisition of Slavic. This section gives an overview of three properties of the verbal system which have been the focus of much empirical investigation in the acquisition literature: root infinitives (RIs), grammatical aspect, and passive formation. In all three areas, studies on the acquisition of Slavic have tested and refined theories of acquisition that were initially proposed to account for the acquisition of Germanic and Romance languages.

4.1. Root Infinitives

It is well-known that children acquiring a variety of languages initially use morphologically infinitival verbs in root clauses, where a finite verb is required in adult language, a phenomenon known as root infinitives (Wexler 1994, Rizzi 1993/1994, and much subsequent literature). There is much cross-linguistic variation in the existence and the persistence of the root infinitive (RI) stage. In the case of the Slavic languages, there is evidence for the existence of a (brief) RI stage in Polish (Tryzna 2015b) but not in Slovenian (Rus 2007; see also Rus 2008 for an analysis of early Slovenian verbs as complex bare verbs). The RI stage is also characterized by copula omission (Becker 2000); Czinglar et al. (2008) find copula omission in child German (a language with an RI stage) but not in child Croatian (a language without an RI stage, see, e.g., Anđel et al. 2000).

Even among languages which do have an RI stage, there are differences with regard to the frequency of RIs and the duration of the RI stage. The possible reasons behind language-specific differences (including the inflectional paradigm of the language) are addressed by Gülzow and Gagarina (2008), who compare the RI stage in Russian and English, as well as Gagarina and Bittner (2004a), who compare the emergence of finiteness in Russian and German.

A few studies on the RI stage in Russian have addressed the question of whether RIs have modal interpretations (see Hoekstra and Hyams 1998 for a cross-linguistic overview of the relationship between RIs and modality). For example, Stepanov (2001) analyzes Russian RIs as complements of an omitted intentional verb such as *want*. In contrast, Brun, Avrutin, and Babyonyshev (1999) show that Russian RIs can receive a variety of interpretations, not restricted to modal/future readings. Kallestinova (2007) argues for a sequence

of developmental stages, with Russian RIs gradually acquiring a modal meaning, driven by the acquisition of both tense/agreement and aspectual morphology.

While RIs are attested in at least some Slavic languages, children acquiring these languages also produce inflected finite verb forms from a very early age (for case studies on the development of verb finiteness, see, e.g., Gagarina 2011b on Russian and Katičić 2011 on Croatian). However, the timing and path of acquisition is not necessarily the same for all the verbs: for example, Gagarina (2009) shows much variation among different verbs of motion in the acquisition of Russian.

To sum up, the studies on the RI stage in Slavic languages have contributed to the theoretical discussion of the nature of the RI stage, including the link between RIs, null subjects, modality, and the richness of the inflectional paradigm.

4.2. Tense and Aspect

A large body of literature, primarily focused on Polish and Russian (but see Kühnast 2012 and Kühnast, Popova, and Popov 2003 on Bulgarian), has examined the emergence of grammatical aspect in children's verb usage. One line of cross-linguistic research examines whether children's early uses of tense morphology have an aspectual rather than a temporal interpretation. This research goes back to Antinucci and Miller (1976), who argued—on the basis of data from Italian and English—that in early child language, tense morphology is used to express aspectual meanings. This proposal, known as the Defective Tense Hypothesis (DTH), has been tested in a variety of languages. In the case of Slavic, one of the first major studies addressing the relationship between tense and aspect in L1 acquisition is Weist et al. (1984), on Polish. Weist et al. examined tense morphology in both longitudinal and cross-sectional data of very young Polish-acquiring children and used their findings to argue against the DTH. The children in their study made both temporal distinctions between past and present tenses, and aspectual distinctions between the perfective and the imperfective; in particular, they distinguished between perfective and imperfective forms of the same verb. Bar-Shalom (2002) largely replicated Weist et al.'s findings for Russian (but see Gagarina 2003 for evidence that in Russian both children and adults show a preference for using perfective verbs in the past tense and imperfective verbs in the present tense).

Weist, Pawlak, and Carapella (2004) further confirmed, with corpora from both Polish-acquiring and English-acquiring children, that children make both temporal and aspectual distinctions from early on. Weist et al. (1984, 2004) argue that very young children treat reference time as identical to speech time and do not separate speech time from reference time until after age two and a half. Pawlak, Oehlich, and Weist (2006) provide further support for this

view by analyzing mismatches between tense marking and temporal adverbs such as 'yesterday' in child Polish as well as in child English.

While the above studies focus on production data, other studies have examined children's comprehension of different aspectual forms. Stoll (1998) conducted a comprehension study with two- to six-year-old Russian-speaking children. The children were shown two videos, one compatible with the imperfective form of a given verb and the other with the perfective verb. For example, for the verb *čitat'/pročitat'* 'read-perf/imp,' they would see one puppet reading a book continuously (compatible with the imperfective) and the other reading a book and finishing it (compatible with the perfective); the actions differed based on verb class (telic, delimitative, ingressive, and semelfactive). The child would then be asked a question in the perfective (e.g., 'Who read a book?') and would need to choose between the two puppets from the videos. Stoll found that children were most successful with telic verbs (such as *read*) and least successful with ingressives (such as *zaplakat'* 'to start crying'), incorrectly mapping them to the video showing the action taking place continuously, rather than starting. Stoll (2005) obtained similar findings in production tasks and suggested that children learn aspectual information in a piecemeal fashion.

Whereas Stoll (1998) examined only the interpretation of perfective verbs, Vinnitskaya and Wexler (2001) examined Russian-speaking children's comprehension of both perfective and imperfective verbs using a picture-matching task with pictures denoting completed vs. incomplete actions. All groups of children tested performed above-chance with even the three-year-olds selecting the target picture for each aspectual type most of the time. Interestingly, these results contrast with those of van Hout (2008), who found that two-to-three-year-old Polish-acquiring children selected the completed-action picture for both perfective and imperfective verbs. van Hout explains the difficulty with the imperfective (also attested in Italian and Dutch) by making reference to the aspect shift required to put telic verbs in the imperfective (per the theoretical proposal of de Swart 1998).

Kazanina and Phillips (2007) argue that picture-matching tasks do not test children's ability to associate the imperfective with past events that are permanently incomplete: if a picture depicts a girl in the process of reading a book, it does not provide information about whether the book-reading event finished. To address this issue, Kazanina and Phillips used a modified truth-value judgement task (Crain and Thornton 1998) in which children saw stories with either complete or incomplete events acted out. For example, they might see a monkey putting together a smurf at different locations and then have to answer the question "Where did the monkey assemble the smurf?" either in the perfective (*Gde obez'janka sobrala gnomika?*) or in the imperfective (*Gde obez'janka sobirala gnomika?*). For adults, the imperfective question is answered by listing all locations in which the monkey engaged in smurf-building,

whether or not the building was ultimately completed. Kazanina and Phillips found the children to be completely adult-like with perfective verbs but largely nontarget with imperfective verbs: specifically, they often named only locations where the smurf-building was completed, despite being prompted to name multiple locations. In further experiments, Kazanina and Phillips used a *while*-clause to set up an explicit temporal interval relative to which the main predicate was evaluated; with this manipulation, the children's performance improved dramatically. Kazanina and Phillips conclude that children understand that the imperfective lacks completion entailment but need an explicit temporal modifier in order to evaluate the imperfective predicate.

To sum up, studies show that monolingual children acquiring Russian or Polish have quite a firm grasp of aspectual distinctions from very early on in development. While some non-adult patterns are attested, on the whole children make accurate distinctions between perfectives and imperfectives in production as well as comprehension. Furthermore, grammatical aspect has been found to be largely preserved in children bilingual in Russian and another language (English: Bar-Shalom and Zaretsky 2008; Turkish: Antonova-Ünlü and Li 2016). At the same time, adult heritage speakers of Russian show evidence of attrition and restructuring with grammatical aspect (Pereltsvaig 2005; Polinsky 2006; Laleko 2011).

4.3. Passives and Unaccusatives

Much cross-linguistic research has been devoted to the study of how children produce and comprehend passives. Children are known to misinterpret passive structures in English, among other languages: e.g., a sentence such as *The cat was pushed by the dog* might be misinterpreted as *The cat pushed the dog*, until as late as seven years of age. In contrast, short passives, such as *The cat was pushed*, are interpreted correctly at an earlier age (for an overview of the relevant literature, see Armon-Lotem et al. 2016). It is also well-known that there is cross-linguistic variation in how early children learn to interpret passive structures. In a recent comprehensive cross-linguistic study, Armon-Lotem et al. (2016) compared the comprehension of long and short passives in eight different languages including one Slavic language, Polish. Armon-Lotem et al. found that for nearly all of the languages tested, five-year-old children were more accurate with short passives than with long passives; however, for most of the languages, including Polish, children were still well above-chance on their comprehension of long passives. Armon-Lotem et al.'s study tested only actional verbs (e.g., *feed—was fed*). However, many studies have found that children have more difficulty with full passives of psychological verbs (e.g., *saw vs. was seen*) than those of actional verbs (e.g., Fox and Grodzinsky 1998; Hirsch and Wexler 2006).

An influential syntactic explanation of children's difficulty with long passives, and especially passives of psychological verbs (Borer and Wexler 1987; Wexler 2004), attributes it to the late maturation of A-chains. The subject of a passive sentence starts out in object position, and an Argument chain (A-chain) is formed between its underlying and surface positions; on Borer and Wexler's hypothesis, A-chains mature late in development, with the result that children do not interpret full passives correctly. On this view, the reason that children are more successful with short passives than with long passives is that they interpret them as adjectival passives, which do not involve A-movement or A-chain formation. Furthermore, actional passives, unlike psychological passives, can also be interpreted as adjectival, which is why children are more successful with the former. This account has received support from a recent study of passive formation in Serbian by Perovic et al. (2014), who found that until about age seven, Serbian-speaking children perform poorly on the comprehension of long passives of psychological verbs, while being quite successful with short passives and with long passives of actional verbs. (See also Djurković 2007 on actional passives in Serbian.)

A-chains are also required for the formation of unaccusatives (Levin and Rappaport Hovav 1995). For example, in a sentence such as *She arrived*, the subject starts out as the object of the unaccusative verb, and an A-chain is formed when it moves to subject position. While young children have no difficulty producing sentences with unaccusatives, Borer and Wexler (1992) propose that children misanalyse them as unergatives. This proposal was tested by Babyonyshev et al. (2001) on the Russian genitive of negation structure. Babyonyshev et al. argue that the genitive of negation in Russian (which is possible only with unaccusative verbs) involves a covert A-chain. Their experimental findings show that Russian-speaking children often incorrectly use nominative case in place of the genitive of negation; Babyonyshev et al. analyze this as evidence that the children are replacing unaccusatives with unergatives.

To sum up, while the proposal about A-chain maturation was originally based on English and other western languages, important support for this proposal is found in the acquisition of Slavic languages, in particular Serbian and Russian.

5. Acquisition of Word Order Properties

So far in this paper, we have examined how young children acquire the inflectional morphology of Slavic languages (e.g., case, aspect, clitics) and the corresponding syntactic and semantic properties of these morphemes. We now turn to another area where Slavic languages have much to contribute, namely, word order and its relationship to information structure.

Flexible word order and the interplay between information structure (IS) and word order permutations (such as scrambling) are two of the main properties of Slavic languages and at the same time two favored research topics in theoretical linguistics. This interest is also mirrored by the thematic orientation of the acquisition studies on Slavic word order phenomena. Most of the studies are on Czech, Bulgarian, Russian, and Ukrainian and address issues such as noncanonical word orders, alternations between VO and OV word orders, and ordering of accusative and dative objects. These studies also examine the nature of the mapping of IS and word order, where relevant. Other studies have paid attention to the acquisition of co-ordination in Bulgarian and relative clauses in Russian and Serbian/Croatian. The results from Slavic have direct impact on general syntactic theory in at least two ways. They lead to better informed and empirically grounded theoretical discussions of the underlying properties of syntax in general and also to (re-)analyses of specific base generation proposals across languages.

5.1. Noncanonical Word Orders and Object Placement

A large-scale comprehension study of 107 Czech-speaking children aged 2;9–4;5 in Smolík (2015) showed that noncanonical, object-initial sentences are generally more difficult to comprehend than sentences with the standard word order, although many children can interpret noncanonical sentences before four years of age. IS did not have any clear effect on sentence comprehension. In Smolík's view, the results indicate that children have some early abstract knowledge of word order and case marking in transitive contexts, but in the initial stages they cannot use this knowledge when word order and case marking signal conflicting interpretations. The finding that structures with noncanonical word order are more difficult for children is in line with Radeva-Bork's (2012) study on the comprehension of constructions with fronted double objects (known as object clitic doubling) in child Bulgarian. This study showed that children face difficulties when confronted with noncanonical O-cl-V-S sentences even by the age 4;2.

The observation that IS is not a major factor in early sentence comprehension is contradicted by child production data. The acquisition of OV-VO alternations in Slavic languages has been addressed by Avrutin and Brun (2001), Dyakonova (2004), and Gordishevsky and Avrutin (2004) for Russian, by Ilić and Deen (2004) for Serbian/Croatian, and by Mykhaylyk (2012) for Ukrainian. For Russian and Ukrainian, it was shown that children have knowledge of the pragmatic principles related to IS already at the age of three. Avrutin and Brun as well as Dyakonova suggest that the link between position and interpretation either must be innate or is acquired at a very early stage. Turning to OV-VO alternations specifically, Russian-speaking children were found to use more scrambled than nonscrambled objects (Avrutin and Brun 2001),

whereas Serbian/Croatian-speaking children produced more unscrambled than scrambled objects (Ilić and Deen 2004).

Similarly as in Russian, early knowledge of the pragmatic principles related to IS has been shown to be at work from early on in Ukrainian. Mykhaylyk (2012) studied scrambling in Ukrainian on the basis of elicited production data and analyzed the interaction of object type and semantic features. Children scrambled at higher rates, in an adult-like manner, in definite/partitive contexts than in indefinite/nonspecific contexts. However, a contrast between pronominal scrambling and full DP scrambling was established. In adult grammar pronominal scrambling is mandatory, while full DP scrambling is optional. In child grammar, both types of scrambling were found to be optional until the age of around four to five.

The ordering of dative and accusative objects by children is another interesting topic that has been recently studied for Russian and Ukrainian in Mykhaylyk et al. (2013) (for Croatian see Gracanin-Yuksek 2006). Mykhaylyk et al. studied the acquisition of ditransitive constructions of the type V followed by DP_{DAT} and DP_{ACC} in the production of Russian and Ukrainian 3–6-year-olds. Children acted like adults in placing given recipients before themes, preferring the DP_{DAT}-DP_{ACC} word order in recipient-given contexts. However, unlike adults they preferred this order in theme-given contexts as well. Instead of tracing the performance back to lack of knowledge of the pragmatic principle given-before-new, the authors take this finding to show a preference for the underlying syntactic structure in Russian, namely DAT-ACC word order. This supports theoretical analyses of Russian word order according to which the default, underlying setting for object ordering in Russian is DAT-ACC (cf. for example, Junghanns and Zybatow 1997).

5.2. Co-ordination and Relative Clauses

The expression of co-ordination is another word order property that has been studied in child language. Kühnast (2014) addresses the question of how Bulgarian children acquire additive and consecutive coherence relations encoded in negative sentences co-ordinated by *i* 'and'. She presents experimental data from a picture-aided sentence continuation task with three- to six-year-old children. Results show that in negative contexts the acquisition of additive relations precedes the acquisition of temporally consecutive relations, the latter being not fully mastered by the age of six.

Another piece of complex word order structure, namely relativization of clauses, has been studied for Russian by Polinsky (2011) (but see also Goodluck and Stojanović 1996 on the acquisition of relative clauses in Serbian/Croatian). Polinsky investigated the comprehension of subject and object relative clauses in child and adult speakers of Russian, comparing monolingual controls with heritage speakers whose dominant language is English. The re-

sults showed that child speakers at age six have adult-like mastery of relative clauses. Heritage child speakers did not show interference from English in any type of relative clause and performed at the same level as their monolingual counterparts. Adult heritage speakers, however, were significantly different from the monolingual adult controls and from the heritage child group. Whereas subject relative clauses did not pose a problem for adult heritage Russian speakers (i.e., they maintained their competence in this domain), they showed significant degradation of object relative clauses. This divergent performance is taken as an indication that, at least in the case of relativization, the adult heritage grammar is not a product of incomplete acquisition but rather of the attrition of forms.

Summing up, from a Slavic perspective, noncanonical word orders in child grammar show a disassociation between comprehension processing difficulties and ease of production. The production of various permutations seems to follow the principles of IS from early on, in particular the principle of givenness (but possibly not in Czech). The studies from the acquisition of object scrambling in Slavic indicate that the basic operation of OV-VO scrambling in these languages is acquired early. Children hardly ever scramble objects that cannot scramble in the target grammar. On the contrary, to the extent that they make mistakes, these typically involve scrambling too little under conditions in which scrambling is obligatory (or very frequent) in the adult language. Finally, certain contexts of co-ordination are acquired late by children and the domain of object clause relativization seems to be subject to attrition in heritage grammar.

6. Acquisition of Phonology

Research on phonology in the early stages of Slavic is scarce, with only a few studies on Polish examining properties at the syllable onset and general phonological learning and on Russian investigating effects of syllable complexity.

For Polish, Lukaszewicz (2007) examines four strategies of onset reduction employed by a four-year-old child acquiring Polish: deletion, coalescence, metathesis, and gemination. The study confirms previous sonority-based findings, supplies further evidence for universal sonority mechanisms from word-medial clusters, and points to the coexistence of child-specific and abstract adult-based phonological strategies in the child's system. Jarosz (2010) studies phonological learning in Polish in the context of Optimality Theory (Prince and Smolensky 1993/2004) and examines the interacting roles of implicational markedness and frequency empirically and computationally. Significant preference for initial onsets is found in Polish children. The findings suggest a developmental path for Polish in which complex onsets are acquired earlier than complex codas.

For Russian, Kavitskaya et al. (2011) turns to two different populations of Russian-speaking children, children with Specific Language Impairment (SLI) and typically developing subjects, in order to investigate the effect of number of syllables and syllable structure on repetition of pseudo-words. The results demonstrate that children with SLI have deficits in working memory capacity. Repetition performance was shown to be affected by pseudo-word length as well as syllable structure complexity.

7. Other Topics in the Acquisition of Slavic

A limited set of other topics has been studied for individual Slavic languages. Since only single languages are presented here, and there is no core research on any of these topics, this section gives only a brief overview of some studies. For further reference on more general works such as the comparative study of grammar development in Russian, Bulgarian, and German, see Gagarina and Bittner (2004b), and for studies on the acquisition of reference in Slavic, see Serratrice et al. (2015).

For Czech, directive speech acts and the category of animacy have been studied. Chejnova's (2015) longitudinal study of directive speech acts in the spontaneous speech of one Czech-speaking child between the ages 2;8–4;1 showed that communicative strategies are acquired gradually and following the preference "one at a time." The acquisition of the animacy category in Czech seems to deteriorate from adult grammar as shown in the production study with 40 children in Bordag (2007). She found that whereas adults mark (in)animacy unambiguously, children are affected in their choice of inflectional endings by the frequent, unmarked [i]-plural irrespective of animacy. This is taken to indicate a frequency over animacy effect and generally supports the view that input frequency and formation patterns determine acquisition.

For Bulgarian, the acquisition of evidentiality and negative imperatives have been investigated. Evidentials in Bulgarian provide information about authorship (whether the speaker has personally acquired the information or not) and modality (whether perceptual or cognitive mechanisms were involved in the information's generation). Fitneva's (2008) comprehension study showed that Bulgarian children use both of these types of information, however, with an age effect: whereas nine-year-olds use the authorship and modality information carried by the evidentials, six-year-olds showed only evidence of using modality to assess reports. Negative imperatives in the production of three- and four-year-old Bulgarian children were studied in Kuhnast (2010). Since verbal aspect plays an important role in constructions with negative imperatives in Bulgarian, the study also focuses on the acquisition of imperfective morphology. Kuhnast found that while children successfully master different facets of deontic modality employing various

syntactic constructions, they still show some deviation from adult speakers with respect to the representation and overt marking of an inner perspective to a telic situation induced through the presence of negation.

Children's interpretation of numerals, a research topic that has received a lot of cross-linguistic interest in a number of studies on Romance and Germanic, was studied for Serbian by Knežević (2012). She tested children's comprehension of sentences with paucals in subject and object position with regards to scope-dependent (distributive) and scope-independent (collective) readings. Serbian children, unlike English children and unlike Serbian and English adults, rejected the collective reading. The difference between Serbian and English is attributed to the morphosyntactic properties of Serbian numerals, namely the opposition between paucals and collective numerals. Generally, Serbian children are sensitive to this morphosyntactic difference regarding numeral interpretations.

A research topic studied for Russian is children's interpretation of contrastive focus. Sekerina and Trueswell (2011) examined children's ability to interpret color-adjective noun phrases (e.g., 'red butterfly') as contrastive in an eye-tracking study with six-year-old Russian bilingual children. Various experimental manipulations, such as pitch accent, visual context with two same-colored referents, etc., were carried out in order to enhance contrastiveness. Regardless of the experimental manipulations, children employed the same strategy in the experiment: They had to wait until hearing the noun ('butterfly') to identify the referent, even in split constructions with scrambled objects.

Finally, there are some studies investigating properties associated with vocabulary acquisition in Slovenian and Russian (both in monolingual and bilingual contexts). Marjanovič-Umek et al. 2013 is a large-scale study of 512 Slovenian-speaking infants and toddlers aged 0;8 to 2;6. The findings for Slovenian are in line with results for other languages, showing that vocabulary does not develop independently of grammar. Early vocabulary is a good predictor of the acquisition of grammar at ages 1;4 to 2;6 for Slovenian. The results also show that nouns predominate in the vocabularies of infants and toddlers of various ages. As age and vocabulary size increase, the share of interjections decreases, and the share of verbs and adjectives increases.

Klassert et al. (2014) investigated the influence of word category (noun vs. verb) on picture-naming performance in two Russian populations: Russian monolingual and bilingual children (with L2 German). Two sets of results were obtained. First, the effect of word category was more strongly pronounced in monolinguals as compared to bilinguals. The bilingual children showed no effect or a weak effect of word category, whereas the monolingual Russian- and German-speaking children showed a clear noun bias. The authors take this result to suggest that the bilingual acquisition context has an impact on the degree of the noun-verb discrepancy in the naming task. Ad-

ditionally, the results demonstrate a naming deficit in bilingual children in comparison to monolingual children. The naming deficit is bigger for nouns than for verbs.

Another study, analyzing the peculiarities of Russian vocabulary development, is Davies et al. 1998. In this study 200 monolingual children aged from three to six-years-old were tested on three color tasks, color term listing, color-term production, and color-term comprehension. Interestingly, the two entries for 'blue' in Russian, *goluboj* 'light blue' and *sinij* 'dark blue', were confused more often than other pairs of terms even by age five to six. Generally, the study results confirmed the order of color-term acquisition within Berlin and Kay's (1969) theory of color universals, but the data were also consistent with the weaker claim that, in terms of color, primary terms tend to be learned before derived terms.

8. Conclusion

The above overview of recent work on the first language acquisition of Slavic languages indicates a growing interest in the study of Slavic. Investigations of the acquisition of phenomena such as nominal inflection, referring expressions, verb features, and word order properties, to name a few, have witnessed an extension from research dominated by the analysis of Romance/Germanic languages to the study of these processes in Slavic, as shown by this paper. This development is not only beneficial in terms of a better understanding of the initial stages of less studied language systems, and the verification of analyses that have cross-linguistic applicability, but it also facilitates the progress of general linguistic theory. In particular, the studies reviewed in this paper have allowed for the testing of general learning theories (e.g., usage-based vs. grammar-based approaches to the acquisition of morphology), as well as of specific syntax-based theories of acquisition (e.g., A-chain maturation and the Unique Checking Constraint, among others).

And yet there is still a lot of progress to be made in first language acquisition research on Slavic languages in at least two ways: we should increase in the number of Slavic languages studied and expand our study to other areas, departing from the dominance of morphosyntax and paying more attention to topics such as the acquisition of phonology, information structure, and semantics. Finally, if we allow ourselves a glimpse into the linguistic crystal ball in the context of current demographic developments and language settings worldwide, we can expect a further increase in studies discussing the acquisition of Slavic from the perspective of multilingualism, heritage language development, and attrition.

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