Acquisition of Agreement and Morphological Features

Within the Noun Phrase in Russian

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University of Connecticut, 2010

This dissertation is dedicated to the study of acquisition of morphological features of number, gender and case within the noun phrase in Russian. I investigated several factors influencing the ordering effects of the acquisition of these morphological features derived from different accounts depending on their take on the agreement features being derived from meaning or form. Such factors are semantic grounds, canonicity, and feature specificity. I also took a closer look at the acquisition of gender in Russian nouns to compare competing accounts of gender and declension class representation in Russian. The dissertation is based on the data from two experimental studies performed with Russian monolingual children between the ages 2;5 and 5 years old. Both studies were set up as elicited production. The first study focuses on the ordering effects in the acquisition of agreement features of number, gender and case within the noun phrase. The second study focuses on the debate between two competing accounts of the representation of gender in Russian. These accounts differently answer the question of whether gender in Russian is derived from declension class, or if, on the contrary, declension class is derived from gender.

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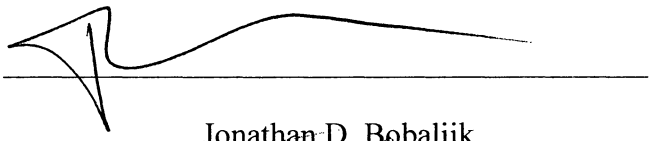
Associate Advisor 

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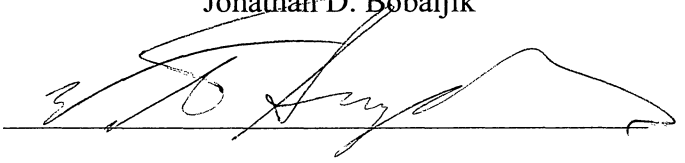
Associate Advisor 

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INTRODUCTION

In this dissertation I focus on the process of the acquisition of agreement features such as number, gender and case within a noun phrase (NP) by children acquiring Russian. I start with the assumption that Universal Grammar (UG) makes agreement in principle available for children acquiring any language. The data from earliest to the latest stages of language acquisition exposes the ordering effects of morphological features of number, gender and case. It also provides evidence for the extension of underspecified forms in children's production.

I elicit morphologically marked known and novel nouns and adjectives in different contexts from children aged 2;5 – 5. The purpose of the study is to focus on the further process of the acquisition of agreement where, given the basic knowledge of it, children still have to learn language-specific factors, such as the choice of agreement features, the basis for feature assignment and their morphological realization in a given language. The goal is to analyze collected data on the timing of the acquisition of agreement features by which I refer to the adult-like production of nominal and adjectival morphemes that bear the specific morpho-syntactic information. That will allow us to look at agreement as a process in children's grammar and evaluate the role and interaction of the factors that influence this process, such as semantic factors for feature assignment,

morphological and phonological complexity[1], and morphological markedness compared to canonicity of features/feature values. I make comparisons in terms of the age and order of acquisition of morphological features and evaluate the representation of gender and nominal declension in Russian. The study involves two aspects from which I look at the multiple factors that contribute to the timing of acquisition: (i) within individual features, i.e. comparing the feature values, and (ii) comparison across features, i.e. comparing the data across categories for an overall analysis of children's performance on the acquisition of the different features.

[1] Phonological complexity is not in the focus of the present study, even though it is relevant for the process of acquisition. Clark (2001) proposes that phonological transparency is a factor that is considered first by children acquiring Russian. Only if phonological cues are inconsistent, children rely on other factors, for example, semantic ones. Partly, the role of the phonological factor is controlled for in my study. In order to test the role this factor would play in language acquisition in the current study, the stimuli would need to be designed in a different way from what I have done.

CHAPTER 1 RESEARCH QUESTIONS AND RELEVANT BACKGROUND LITERATURE

1 BACKGROUND

1.1 AGREEMENT WITHIN THE NP IN RUSSIAN

There are four gender classes of nominals in Russian (masculine – class I, feminine – class II and class III, and neuter – class IV). Nominals are also morphologically marked for case (nominative, accusative, genitive, dative, instrumental and locative) and number (singular and plural). Within the NP the adjective agrees with the noun in gender, number, and case[2]. In both nouns and adjectives, exponents of masculine and neuter oblique cases are the same. The gender feature is neutralized in the plural forms of the adjective. Nominal declension class information does not play a role in adjectival agreement.

There have been numerous approaches to the analysis of nominal agreement morphology in Russian. In this dissertation, I will compare several alternatives, including two models within the framework of Distributed Morphology (Halle and Marantz 1993). These proposals will be discussed later in this chapter, within the context of the research questions addressed in the present project. First, I will review previous studies on the acquisition of NP agreement.

1.2 PREVIOUS STUDIES ON THE ACQUISITION OF NP AGREEMENT

[2] For the complete paradigm of NP agreement please refer to the appendix.

Different studies on acquisition of grammar focus on how efficient acquisition of grammatical categories is, and the results vary. For example, in some languages, such as Turkish, Spanish, or Polish, a noun gender system is acquired successfully by the age of three (Aksoy and Slobin 1985; Anderson and Lockowitz 2009; Smoczynska 1985; Weist 1990), while in others, like Russian, the acquisition of a gender system which is highly similar to the Polish one takes significantly longer (Slobin 1973).

In his chapter on the Acquisition of Grammar, Maratsos (Maratsos 1998) draws our attention to some basic findings of acquisitional data analyses, among which is the fact that young learners are generally good at acquiring 'complex' structures.

Another generalization that Maratsos focuses on in his chapter is that the data from acquisitional studies show a greater rate of omission rather than commission errors in children's spontaneous production. This serves as an indication that children do not begin to produce morphemes until their acquisition is almost complete. The actual process of most of their development in a child's grammar thus occurs "underground" – that is how Maratsos refers to this intermediate stage. During this stage omission errors are not informative enough about the state of underlying knowledge that children have. In Maratsos' opinion, researchers whose goal is to unveil the underlying processes of grammar development could count on commission rather than omission errors to be able to shed some light on the nature of this processes. This, however, can be rather

problematic due to the above mentioned fact that the relevant type of errors are missing from spontaneous production. That is why I conducted an elicited production study aiming at getting children to expose their intermediate stage knowledge in overt linguistic behavior where highly informative commission errors are more likely to occur.

The acquisition of inflection is the focus of another researcher, E. Clark (2001), who, contrary to Maratsos' (1998) point, claims that more complex morphemes are acquired later, and one can expect errors as late as age five. Clark is concerned with the general question whether all children go through a similar sequence of stages, and she makes specific testable predictions about the order of inflection acquisition. Learning inflections ultimately demands attention to both lexical meaning and syntax, since their grammatical functions are not limited to the domain of the word, but rather extend across phrases through agreement. Examining the order of acquisition of case, number and gender, Clark concludes that the major factors that determine this ordering are (i) semantic complexity, and (ii) formal complexity in the expression of a specific meaning. One argument in favor of the influence of complexity is the later acquisition of case systems where the forms of each case interact with the gender and number of nouns (German, Russian and Polish) versus systems where a single affix serves all forms of nouns (Turkish). Another argument comes from the discussion of the observation that languages with a high number of plural affixes and conditions on their use postpone the point of acquisition of number, as in Egyptian Arabic, for example (Clark 2001, 381). In the nominal

domain number is acquired sooner than in verbs, and the acquisition proceeds through stages where, at first, children signal the number distinction through modifiers, and then add regular plural affixes and over-regularize irregular plurals. Finally, observations of gender acquisition report that in languages offering a less clear guide to gender marking, e.g. Icelandic, the mastering of gender is a longer process, which makes children rely more on semantic rather than formal factors (Mulford 1985).

The study by Chirsheva (2009) of Russian-English code-switching, however, revealed the opposite pattern of gender assignment strategy used by both adults and children. Having compared semantic, phonological and morphological criteria for assigning gender to code-switches from English, which lacks inherent gender, Chirsheva comes to the conclusion that a semantic criterion is significantly less important for bilingual speakers who prevailingly rely on phonological rules. Thus, both adult and children bilingual speakers assigned masculine gender to 68.45% of code-switches, feminine gender to 27.75%, and neuter to as little as 6.45% of English words used in Russian contexts (Chirsheva 2009, 81). In the case of semantic analogy, the gender of the NP with a code-switch noun was that of the Russian equivalent: ADJ-*aja*$_{f}$ *violin* (cf. Russian *skripka*$_{f}$). In the case of the phonological criterion, the NP with a code-switch noun depended on the last phoneme of the code-switch noun, for example masculine if it ended in a consonant: ADJ-*oj*$_{m}$ *violin*. Had the experiment participants used a semantic criterion in assigning gender to English code-switches, the results would be different since only 5% of the English stimuli

equivalents were actually semantically masculine. Therefore, children's assignment of masculine gender to code-switches is almost 13 times more frequent than their actual masculine equivalents used in the experiment (Chirsheva 2009, 83). Such a pattern reflects the frequency of gender distribution in Russian. It can also be attributed to masculine being the unmarked gender in Russian. However, there is yet another conclusion Chirsheva draws in explaining these results: the phonological structure of English code-switches gives more options for finding similarities with Russian masculine nouns (that end in a non-palatal consonant) than feminine or neuter (that end in a vowel). This conclusion is also supported by the results from Leisiö (2001, 238-240) that show a different pattern of Finnish code-switches used by Russian bilingual speakers.

Pereltsvaig (2004) performed another study of bilingual Russian speakers, in particular, speakers of American Russian, also known as 'heritage speakers'. Like other researchers working on agreement features, Pereltsvaig (2004) discusses phonological and semantic cues. Although her study is dedicated to adult grammar of a variant of Russian, she claims that L1 children's grammar is similar to American Russian, which she concludes lacks syntactic agreement. The comparison she makes is based on the conclusion that children use the same strategies that heritage and monolingual speakers use in a situation when 'normal syntactic agreement mechanisms are suspended' (Pereltsvaig 2004, 87). These freely alternating strategies are reported to be phonological overgeneralization and semantic markedness.

The above mentioned noun-internal strategies for gender feature assignment have also been of interest for Anderson and Lockowitz (2009) whose general conclusion is similar to that of Chirsheva. The comparison of Spanish semantic and morpho-phonological cues resulted in the latter being utilized more efficiently than the former by the participating children in the study. Similar results for Spanish had been previously reported by Pérez-Pereira (1991).

Children's acquisition of gender in Spanish is a popular topic in recent research. Thus, a study by Mariscal (2009) discusses both spontaneous and elicited production data of gender acquisition in a noun phrase with respect to two alternative views to the process of acquisition of agreement. The author argues in favor of the constructivist approach that views gender acquisition as a complex construction process (Spears and Tomasello, 2003), as opposed to the generativist approach, proponents of which claim that gender acquisition requires operation of the formal features of the functional category D from early on (Sicuro Corrêa and Name 2003, Lleó 1997, 2001). The results of Mariscal's study show acquisition of gender agreement in the NP as a developing complex process during which children employ all available cues, such as phonological, distributional and functional. As the process develops, variability in children's production of grammatical forms decreases.

The question of the acquisitional stages of gender and number features was also addressed by N. Müller (1994), who presented her account of German/French bilingual first language acquisition data. One interesting

suggestion is that at the earliest stage (up to 2;0) children have not yet recognized the importance of the AGR-features gender and number and have not classified the respective nouns according to their gender and number specification. Thus, number which is clearly marked during this developmental stage seems to be a semantic feature of numerals rather than a grammatical feature of nouns, the former being referentially adequate, and the latter being used in an unsystematic way with the numerals. Adjectives at this stage are reported to be uninflected. A similar observation holds for gender markings.

As for the acquisition of Russian agreement morphology, most previous research is based on the observation of longitudinal data. One of the first and well-cited works in this area was done by Gvozdev (1961), who conducted a case study of his son from birth till age 7. Among other findings, Gvozdev found evidence for the following order in the acquisition of case forms in Russian, as in (1):

(1) Nominative → Accusative/Genitive → Dative/Locative → Instrumental.

Voeykova (1997) presents an interesting study of the acquisition of Russian adjectival inflections guided by the idea of early modularization of grammar. This study is also based on longitudinal data. In her study the author hypothesizes three types of adult Russian noun-adjective agreement: (i) tautological pairs, where the adjective and noun inflections are identical, as in *bol'sh-oj mashin-oj* 'big car', feminine, class 2, instrumental, singular; (ii) reduplicative pairs, where the adjectival inflection is in fact the corresponding gender/ case/ number

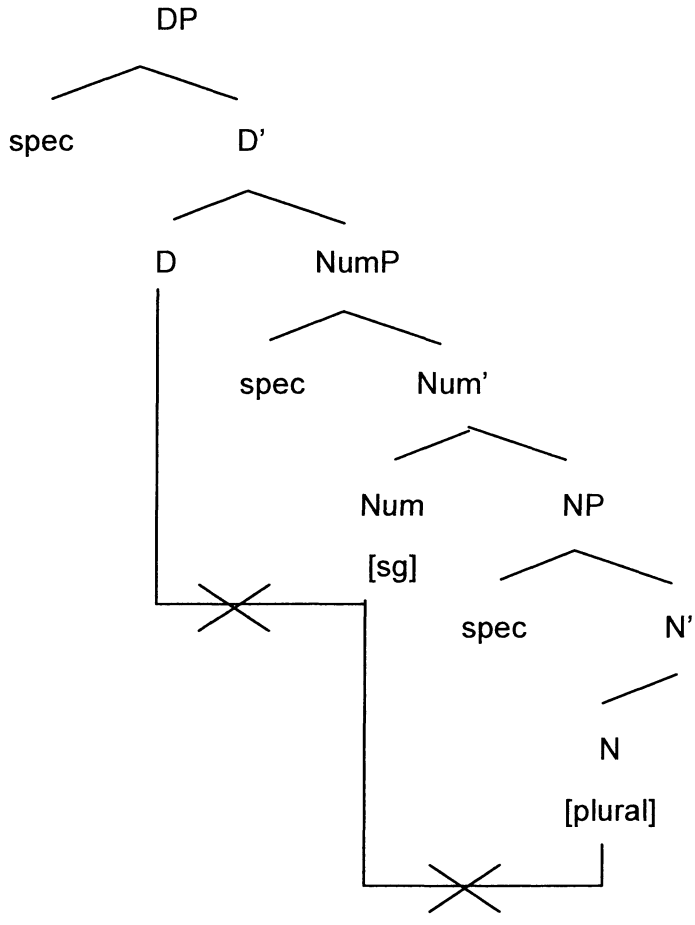
inflection of the noun reduplicated with one of the four adjectival liaison consonants (/m/, /v/, /j/, /x/[3]) between them, such as feminine class 2 accusative singular *bol'sh-uju mashin-u* 'big car'; (iii) contrastive pairs, where the adjectival and nominal inflections do not bear any resemblance, as in *bolsh-oj mashin-y* 'big car', feminine, class 2, genitive, singular. Voeykova examined the longitudinal data from a child aged 1;7 to 3;6 and came to the conclusion that for this particular child the contrastive agreement was the last one to emerge while the reduplicative agreement not only dominated throughout all tested ages, but also was the type of agreement with the lowest rate of errors. Voeykova emphasized the need for further research in this area to see whether such conclusions could not be subject- or language-specific. The results of my study support her observations for Russian children and even extend them to children of older ages. The author also reported several types of errors typical for the longitudinal data she investigated. I return to one such type in chapter 3 when I discuss error patterns that I observed in the present study.

One of the most recent studies of spontaneous speech data was performed by Gordishevsky and Schaeffer (2008), who investigate the interaction of case and number in early child Russian. Gordishevsky and Schaeffer argue in favor of the Full Competence Hypothesis (Hyams 1992; Wexler 1992; Poeppel and Wexler 1993), on the one hand, and the Underspecification Hypothesis (Hoekstra and Hyams 1995, 1996), on the other. They argue that functional categories are

[3] The fact that adjectival inflections have only these four consonants where /v/ is the orthographic /g/ was reported by Jacobson (Jakobson, 1958).

present in children's grammars from the beginning, but some of the functional categories, such as number, are underspecified. The results of their study show that at the early stages of the acquisition of morphology (before age 2;5) children produce case forms correctly in the singular, but not in the plural. The authors take this as evidence that the nominal number head is underspecified[4] and represents only [+singular], and it blocks case licensing in plural nouns, as illustrated in (2):

(2) D-N chain breaking within a DP (Gordishevsky and Schaeffer, 2008, 44)



[4] 'Underspecified' is not used to mean 'lack of contrast' by the authors.

Gordishevsky and Schaeffer predict that children's failure to use the correct case in the plural can result either in the use of singular nouns in plural contexts, or in the use of default plural case for all plurals. As predicted, the children used either singular nouns in plural contexts or plural nouns in the Nominative case in non-nominative plural contexts. Since Nominative singular is marked with a –ø morpheme in some classes, the children's errors may be seen as errors of omission in these cases. However, the Nominative plural forms are all non –ø, so these substitutions would be errors of commission.

Plural context is also a trouble-maker in Nicol's study of case agreement errors by adult Russian monolingual speakers (Nicol 1999). She reports more frequent performance errors in a complex NP if the non-head NP is plural.

Finally, I would like to review the work of Kempe, Seva, Brooks, Mironova, Pershukova and Fedorova (2009), which partially overlaps with the present research. The main goal of this work was to evaluate the role of diminutives as a strong facilitator of the acquisition of case and gender. The authors conducted elicited production experiments with Russian and Serbian children that contrast simplex vs. diminutive and familiar vs. novel nouns in different cases. Their data sample does not cover the whole paradigm, but is still interesting for comparison purposes, since it involves a similar experimental design to mine and some of the relevant parts of the nominal paradigm that I analyze further in this dissertation. In particular, this study focused on genitive and dative singular, masculine and

feminine class 2. Kempe et al report a high rate of errors in familiar feminine dative nouns which is due to a specific error when children provided a feminine genitive singular morpheme *–i/-y* instead of dative *-e*.[5] The results from our experiments are different since our subjects exhibited a different pattern: if there was an error in dative singular feminine nouns, the subjects were more likely to use masculine dative singular rather than feminine genitive singular. Another important result of the study by Kempe at al is the advantage of diminutive forms to children's case marking in both Russian and Serbian. The diminutive advantage is reported to be unrelated to the frequency of diminutive forms in child-directed speech, since it is only typical of Russian, not Serbian. In my study I did not test the role of diminutives per se, but the subjects of our experiments did employ the strategy of producing a diminutive form in difficult contexts quite frequently. Finally, Kempe et al discovered no effect of gender, which questions the bad effect of phonetic vowel reduction on the acquisition of case in Russian.

Since most, although not all, research in the area of the acquisition of agreement is performed on the basis of spontaneous data analyses, a lot of researchers emphasize the need to collect and analyze data from a structured

[5] Despite the potential confound of the study due to vowel reduction in an unstressed position when these morphemes might not be distinct, the study's results are reliable for the following 2 reasons: (i) 3 out of 12 stimuli words were finally stressed, thus they had distinct forms in dative and genitive singular; the rest of the stimuli had stress on the first syllable, yet dative/genitive forms were distinct due to the palatalization of the preceding consonant in dative and lack of it in genitive. (ii) Moreover, the statistical analysis showed no main effect of gender, which means that there was no contrast in children's performance on masculine vs. feminine nouns. If the children were experiencing problems with disambiguating feminine and neuter nominative singular unstressed forms, they would perform worse on feminine than masculine stimuli. The authors also recall the main effect of gender in a study of case acquisition (Kempe 2007) with the opposite result when performance on masculine nouns was worse than on feminine.

experimental task. Thus, Gordishevsky and Schaeffer (2008) believe that the elicitation of NPs in the plural context is an open research question that would provide a more reliable result. They also point out the need to elicit data from children in their further stages of the acquisition of agreement morphology, i.e. after the age of 2;6, when the full convergence on the adult-like grammar is gradually achieved. Polinsky (2000) makes a similar point in her review of the acquisition of nominal categories in Russian. She mentions that conducting an experiment on the acquisition of gender would be particularly beneficial, taking into account the potential insight that the interaction between formal and contextual cues can have in gender assignment. Targeting these open research questions is my goal.

2 RESEARCH QUESTIONS

Research on the nature of agreement in the adult grammar may be divided into two different approaches investigated in Wechsler (2009): lexicalist and derivational. These alternative accounts provide different answers to the question of whether agreement is determined by form or meaning. Taking off from these accounts of agreement, we can relate them to the alternative models of its acquisition discussed in this chapter.

There are several competing models of the factors which may influence the acquisition of agreement within the NP. (i) The first model is based on the semantic value of agreement features (Clark 2001). According to such a model, meaning aids acquisition, so that the more transparent agreement features should be acquired before the less transparent features. (ii) The second model is based on Corbett's proposal that agreement systems can be described in terms of canonicity (Corbett, MUMSA 2008). Taking canonicity and non-canonicity patterns proposed by Corbett for adult grammar as means of identifying the features not only for adults and linguists, but also for a child acquiring a language (Pesetsky, MUMSA 2008), canonicity might be a factor in the acquisition of agreement features. On this model, the more canonical features / feature values should be acquired before the less canonical ones. (iii) The third model tests the relevance of markedness hypotheses. Blom, Polišenska & Weerman 2006 (BP&W), following in the spirit of Pinker and others, propose that children acquire morphological systems by proceeding from more general feature specifications to

more specific ones (accounting for the frequent observation that children produce overgeneralized forms).

These models will be tested by examining data on the acquisition of nominal inflection in Russian. I will use experimental methods to determine 2;5- to 5-year-old children's knowledge of agreement marking on number, gender, and case. The experimental methods are described in some detail in chapters 2 and 3.

I will use the acquisition evidence to test these models, described in more detail in sections 2.1 - 2.3. It is also possible that the evidence will give partial support to multiple models. Furthermore, this study of the acquisition of nominal inflection will shed light on the interpretation of my previous study examining the representation of gender and declension class, introduced in the third section of this chapter and discussed more thoroughly in chapter 4. Finally the collected acquisition evidence will bear on alternative theoretical approaches to allomorphy within Genitive Plural in Russian, as discussed in chapter 5.

2.1 SEMANTIC FACTOR

Agreement features are different in their nature in a number of ways. One of them is the degree to which the feature assignment can be based on semantic grounds. Even though a more fine-tuned analysis of the degree of the semantic role is vital, a number of general observations can still be made:

- Animacy is the feature that matches the semantics to the most degree;

- Number is more semantically-based than gender and case;
- 'Direct features' (Zwicky 1992), such as number, gender, person, are more associated with semantic content than 'indirect features', such as case.

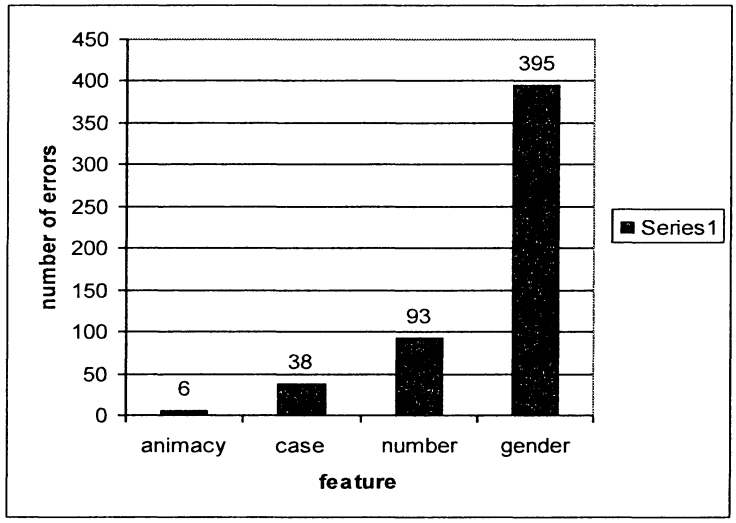
Given these general observations, and the hypothesis that the more semantically transparent a feature is, the easier/sooner it is acquired, it is possible to predict the order and relative ease/difficulty of the acquisition of different agreement features within an NP, which will surface in an examination of the timing and the errors in the acquisitional data in a cross-sectional (across features) comparison.

Before we discuss what we expect to obtain from the data from children, it is helpful to look at the results of the study by Rusakova (2001) reported in Corbett (2006) where she evaluates the rate of agreement errors of NPs in attributive position in spontaneous speech by Russian adults. This study shows the ranking of features in terms of the rate of errors in

Figure 1. As expected, the most semantic-based feature (animacy) resulted in the least number of errors[6]. I am not surprised at this result. Nor would I be surprised if children performed similarly with respect to the animacy feature. For the current purpose, animacy will not be in the focus of my attention from now on.

[6] The numbers are absolute numbers of errors. There is no information about the percent correct rate.

FIGURE 1 *SPEECH ERRORS IN ATTRIBUTIVE POSITION IN RUSSIAN (RUSAKOVA 2001)*



The expected relationship concerning number and gender is also supported by this data. However, the smaller rate of errors on case contradicts the semantic hypothesis. These results could serve as an indicator of a possible counter-argument to the general semantic hypothesis.

The semantic hypothesis can be also tested by acquisitional data comparing across feature values (within a feature). Such analysis may be interesting due to the fact that both gender and case features are partially based on semantic grounds. Gender is semantically- based for Russian animate nouns, and oblique case feature values bear more semantic information than the structural cases. The task I undertake here is twofold: (i) I investigate whether the semantic factor will play a role with respect to the most semantically-based feature (excluding animacy it is number) vs. more arbitrary features of gender and case. I will not try to test the potential differences for the acquisition of

[±animate] nouns, but would rather conduct a cross-sectional comparison of gender and case categories from a different perspective which I will discuss later. (ii) I test the role of the semantic factor within a category, i.e. analyze the potential differences between semantically-marked feature values within a feature, for example, oblique vs. structural case feature values.

2.2 CANONICITY

Apart from the semantics, several other factors are potentially involved in the process of the acquisition of agreement features: factors that presumably play a role both for the choice of agreement features in a language (across features), and the morphological realization of feature values (within a feature).

One such factor is canonicity, which, according to Corbett (2008), is a variable characteristic along the following lines:

(3) (Corbett 2008) The realization of a canonical feature is:

a. unique, not shared with another feature (no syncretism);

b. never suppressed by the presence of some other feature;

c. not suppressed in specific parts of speech;

d. not suppressed in specific lexical items.

Looking at the relative degree of canonicity of different features, Corbett proposes the hierarchy summed up below in (4) where the degree of feature canonicity decreases from left to right[7]:

(4) NUMBER > GENDER > PERSON > (RESPECT) > CASE > (DEFINITENESS)

Even though completely canonical features are rare, number feature is claimed to be close enough to being the most canonical one with respect to the criteria of feature realization given above. Number being the nearest to canonical form

[7] Presumably, such hierarchy of degree of non-canonicity is universal; however, it seems more plausible that such a hierarchy should be language-specific since languages differ in the inventory of grammatical features available for different parts of speech and which feature values are available to a particular part of speech. The hierarchy in question is relevant to Russian, though, given the idea that every value of the most canonical feature should be available to every lexical item for every part of speech. For the purposes of my study I take into consideration number, gender and case. Number has two feature values: singular and plural, both of which are available for every noun (excluding singularia/pluralia tantum), adjective and verb. Gender is less canonical in that respect since a lexical item noun can only be one gender, but all adjective LIs can be marked with feminine, masculine and neuter feature values. Case is the least canonical feature because verbs are not marked with case. Case also violates other cannicity criteria. I expect the model would work differently in a different language. For example, in English even number is far from being canonical since no lexical item of an adjective is marked with any number feature value. Yet, the hierarchy is proposed to be universal, and I assume (I may be wrong) it is because across languages the feature to the left edge of the hierarchy is more canonical than its right neighbors within any language. What yet needs to be determined in future research is whether it matters for this general prediction how the deviation from canonicity is evaluated, i.e. which criteria are violated vs. which are not. For example, the feature of case seems to be more canonical from the point of view of availability to nearly all lexical items (excluding verbs), but is characterized with non-canonical behavior of its values (suppressed by number). If non-canonicity patterns are going to play a role in language acquisition, what is this role?

satisfies the definition of a canonical feature, where 'every value for every feature is available for every lexical item for every part of speech' (Corbett 2008). For non-canonical features, for example, gender, its value is not available for every lexical item. Particular features are associated with particular patterns of non-canonicity across languages. As Pesetsky (2008) suggests, "*These patterns may serve as means of identifying the features for a child acquiring a language, or for the language user, or for the linguist, independent of their semantic content – a characteristic signature for the feature.*"

The general prediction following the canonicity hierarchy is similar to the semantics hypothesis: features / feature values closer to being canonical are acquired earlier than features/ values with a higher degree of non-canonicity. A child is looking for systematicity, and the more complete the 'paradigm', the easier it is to acquire. So, if a given feature has a one-to-one mapping between form and meaning, the degree of canonicity is high, and the higher are the chances for a child to acquire this category early on in the process.

To see if this prediction comes out true I suggest looking at the way different case exponents are acquired by children. Cases where there is a lot of contextual syncretism should yield lower performance than cases with a more straightforward mapping.

2.3 COMPETING ACCOUNTS OF PARADIGM FORMATION

Contrary to the canonicity approach, other theoretical predictions can be made. Whenever there is a competition for a morphological slot, it can be resolved in

very different ways. That is why I consider two competing accounts of case syncretism, an instance of this morphological competition within the feature of case, which should give an insight on the different views of the acquisitional path.

I would like to discuss the possible acquisition hypotheses that state opposite ways of how this competition goal is achieved:

(5) **Hypothesis A**: 'Paradigm' formation "proceeds through an incremental specification metric, according to which only one feature is added at a time". (Blom, Polišenska & Weerman 2006, 321).

Under this hypothesis, the child initially assumes an underspecified set of features for a particular form and uses it in a greater range of morphological contexts. Underspecified vocabulary items will be acquired before specified ones. Representatives of this view are: Pinker (1986), Blom and Don (2005), (2006), Adger (2005), G. Müller (2008), and researchers working within an OT framework. Under this scenario type frequency plays a role: a young learner is more likely to acquire the most frequent forms sooner. Since the syncretic case exponents appear in different environments, chances are that they will show up earlier than other exponents. In any case, we should be able to evaluate types of errors and make a cross-sectional comparison between syncretic and non-syncretic case exponents.

BP&W (2006) seem to claim that hypothesis A holds for children, who make use of underspecified vocabulary items. They predict that children will use

such forms in appropriate contexts, but they will also overuse underspecified vocabulary items inserted in non-target-like contexts[8]. However, they found that children are particularly good at learning to use the syntactic position cues for specifying inflectional suffixes; thus, if the same inflectional suffix appears in different syntactic positions, as in the case of syncretism, children's use of syntactic evidence may result in two different suffixes later on in the process of the acquisition of morphemes.

One of the OT approaches that falls within the Hypothesis A approach (G. Müller 2008) is an account of syncretism that relies on the Syncretism Principle and the 'leading forms' in the input (i.e. the most frequent forms based on type frequency). This account makes use of the notion of underspecification, but at the same time incorporates constraints. The Syncretism Principle says that a child assumes syncretism to be systematic whenever possible. Thus, the leading forms become the exponents in the child's output. After the child realizes different syntactic environments for the same exponent, she derives the form for the new syntactic environment from the existing list of exponents, the process of which is guided by constraints and their ranking.

(6) **Hypothesis B**: With a universal set of features being available to the learner, the child initially assigns a highly specified set of features to each morphological entry and later rules out the features that are irrelevant or redundant.

[8] One needs to know, however, whether such use was significant and not single sporadic instances.

This hypothesis is supported by the study of a formal model of form-meaning correspondences conducted by Pertsova in her dissertation (Pertsova 2007). Pertsova proposes three learning algorithms that illustrate the following learning complexity hierarchy of form-meaning mappings:

(7) NON-HOMONYMOUS > ELSEWHERE > OVERLAPPING HOMONYMOUS INFLECTIONS

In this pattern, which is also empirically supported by typological frequency data (Pertsova 2007), non-homonymous mappings are the easiest to learn, while overlapping homonymy is the hardest [9]. The General Homonymy learner proposed by Pertsova is biased to first select a hypothesis from the most specified learning space with one-to-one mapping paradigms, and then moves to the larger learning space which includes paradigms that are dealt with by default reasoning, leaving the largest space with overlapping homonymy to be the last resort. In my study I am particularly interested in the ordering relationship of learning the first two kinds of mappings: non-homonymous and elsewhere morphemes, putting aside rare overlapping homonymy.

By non-homonymous mappings Pertsova means one-to-one patterns of form-meaning correspondence, i.e. correspondence between the phonological realization of the lexical item (a morph) and the semantic-grammatical representation (content and context). Contextual properties limit the range of contexts in which the morpheme can be inserted. In her analysis, Pertsova

[9] By overlapping homonymy K.Pertsova understands three types of patterns which 'are not amendable to an analysis in which every morph is assigned a single lexical value and some morphs have a default status' (Pertsova, 2007, 53).

includes only morphological properties of context ignoring other properties, such as phonological and lexical ones. However, for my analysis I will take one step further and extend the set of contextual properties to include phonological properties as well. This extension allows me to account for allomorphs as one-to-one mapping between form and meaning because in this case each morpheme is associated with a separate cell of a "paradigm" defined by the content/context properties.

Researchers that work within what Pertsova refers to as *blocking proposals* and those representing the underspecification framework, such as Kiparsky (1973), Halle (1997), Bailyn & Nevins (2008), as well as Corbett's canonicity approach (section 2.2), propose a similar account for adult grammar. Even though they have not argued that this is the procedure that children would follow, we would test this possibility that children learn all forms as fully specified, as the General Homonymy learner proposed by Pertsova. For spontaneous speech production, it is possible, therefore, that the forms that appear earliest and most successful in children's speech are highly specified forms. However, it may not be the case in an elicited production sample, where children are "forced" to use some morpheme in the context which they may possibly not have acquired yet. (Cf. Snyder 2007). Further I discuss what I will look for in the elicited production data.

Taking into account the above hypotheses, we can set up two types of testable predictions for acquisitional data in child Russian. One type of

predictions can be tested by overall accuracy rates in the data across subjects, and it concerns case syncretism and allomorphy. Since syncretic cases are underspecified, and allomorphic cases are more specified, taking into account phonological contextual properties, we can compare Russian dative plural vs. genitive plural case inflections and test the following predictions for each hypothesis:

(8) *Predictions with respect to case syncretism and allomorphy:*

HYPOTHESIS A: **INITIAL FORMS ARE UNDERSPECIFIED**	HYPOTHESIS B: **INITIAL FORMS ARE HIGHLY SPECIFIED**
DAT.PL >> GEN.PL (SYNCRETIC) >> (ALLOMORPHIC)	GEN.PL NOT DISTINCT FROM DAT.PL (ALLOMORPHIC) = (SYNCRETIC)

The data on the acquisition of case I collected from the experiments should provide evidence regarding these hypotheses by either showing or not showing the difference in children's performance on syncretic case values (e.g. dative plural in Russian) vs. non-homonymous case values (e.g. genitive plural in Russian). If Hypothesis A is right, the former will show up earlier and with fewer errors than the latter. If Hypothesis B is correct, we expect no difference between children's performance on the two cases in question. In order to test this prediction I performed a statistical ANOVA analysis that looks at the rate of correct production presented in chapter 2.

To test the second type of predictions of the two hypotheses I looked for consistency of responses within an individual child's production and analyzed the

forms used in their responses. The first question I am concerned with is the following: when there is a mistake in the use of morphemes, which form does the child use instead of the target morpheme in more multiple contexts? The answer to this question should shed light on whether Hypothesis A is correct, since it predicts the 'elsewhere', least specified item to be used in more multiple contexts. As far as the predictions of Hypothesis B are concerned, it would not be surprising to find that children use various other morphemes than the most specified one. There might be greater variability both within and across subjects. For example, if (i) a child does not know yet which form should be used in this context, and (ii) the child is grammatically conservative (Snyder 2007), she would not be likely to use the highly specified morpheme because its features do not match the features of the morphological slot, and she may choose to repeat the morpheme she heard in the input of the elicited production task, or choose some other form arbitrarily. So, it is necessary to be careful in interpreting the results of this analysis, because there may be coincidental overlap when the 'elsewhere' morpheme is used.

Therefore, I ask the second question: which form is being used in the most specified contexts, such as the Instrumental singular Class III nouns, for example, and I check whether the child has correct performance (as Hypothesis B predicts), or uses the elsewhere item (Hypothesis A prediction). To conclude: according to Hypothesis B, in elicited production the child should reserve more specified forms for the correct context. If children do not know which form to use in the elicited context, the assumption is that the child can go in two possible

directions: (i) she could be open-ended and use other forms; or (ii) she could pick different forms that she heard, for example, from the input of the experiment stimuli, because it does not match the context, yet, she does not want to use the most specified morpheme (which, presumably, she has already acquired) as a non-target. But according to Hypothesis A, a less specified form should be used both in more multiple, and in the most specified contexts. The answers to both of these questions are spelled out in (9).

(9) *Predictions with respect to individual children's error types:*

<table>
<tr><td>HYPOTHESIS A:
INITIAL FORMS ARE UNDERSPECIFIED</td><td>HYPOTHESIS B:
INITIAL FORMS ARE HIGHLY SPECIFIED</td></tr>
<tr><td colspan="2">(i) WHEN THERE IS A MISTAKE IN A CHILD'S PRODUCTION, THE CHILD USES _____ IN MORE MULTIPLE CONTEXTS.</td></tr>
<tr><td rowspan="3">A LESS SPECIFIED MORPHEME
(OVERGENERALIZATION ERRORS)</td><td>MORE VARIABLE ERROR FORMS, SUCH AS:</td></tr>
<tr><td>• A LESS SPECIFIED MORPHEME</td></tr>
<tr><td>• INPUT REPETITION OR OTHER</td></tr>
<tr><td colspan="2">(ii) THE CHILD USES _____ IN THE MOST SPECIFIED CONTEXTS.</td></tr>
<tr><td>AN UNDERSPECIFIED MORPHEME
(NON-TARGET PERFORMANCE)</td><td>VARIABLE FORMS SOME OF WHICH MAY BE TARGET-LIKE</td></tr>
</table>

In my analysis, I consider the data from individual children. There may be a difference between the subjects of the experiment with respect to which morphemes each child chooses as the most or least specified, given that they may be at different stages in the process of the acquisition of morphology. For this reason I will look for consistency within each subject. For this type of prediction, I will perform an error analysis.

3 RELEVANCE FOR GENDER REPRESENTATION IN ADULT RUSSIAN

The discussion in the first three chapters is centered around the process of the acquisition of agreement features by Russian children. As will be shown by the data from the study of in the first experiment, children have the basic knowledge of the agreement system. Given that, in chapter 4 I further dive into the discussion of the interrelation between gender and declension assignment in Russian by evaluating two alternative approaches to this interrelation: Declension-to-Gender model (Corbett 1982) and Gender-to-Declension model (Vinogradov 1960, 1975 among others).

I focus on the way grammatical gender is interrelated with the nominal declension class by investigating the following questions: (i) given information about declension (presented in the instrumental form of the noun), can the child figure out the gender to use on an adjective? Or (ii) given information about gender (through adjectival agreement), can the child figure out which declensional form to use in instrumental case? The results show that children (ages 3 – 5;7) could do both, but were better at the first option.

Given that the child has knowledge of agreement, and that the representation of lexical items in some way follows declension-to-gender or gender-to-declension, we draw the conclusion that both directions are possible, but gender-declension is more difficult. Therefore, the representation in child Russian is declension-to-gender.

CHAPTER 2 CHILDREN'S ACQUISITION OF AGREEMENT IN RUSSIAN: EXPERIMENT 1

1 METHODS COMMON TO ALL SUBPARTS OF THE FIRST EXPERIMENT

1.1 SUBJECTS

Forty children no younger than 2;5 and no older than 5;0 years old participated in this study. They were recruited from preschools in the area of Kostroma, Russia. With 40 subjects it is possible to have four groups varying in order of presentation and contrast the data across age (younger children vs. older children). The subjects who were included in the study satisfy the following criteria:

(i) Children are monolingual Russian speakers;

(ii) Children's vocabulary includes the nouns that are tested in the experiment;

(iii) Children demonstrate correct use of prepositions such as 'okolo' ('near'), 'iz' ('from', 'of'), 'u' ('at') and 'ot' ('away from').

1.2 PROCEDURE

The subparts of the first experiment use the procedure of elicited production. The experimenter models an adjective-noun sequence with certain number / gender / case features, and the child's job is to produce another adjective-noun sequence which differs with respect to a particular target feature. The stimuli for a particular experiment involve varying the target feature (e.g. number) and keeping the

others (gender, case) constant. Some of the materials use novel adjectives (NA) to test the child's ability to apply the appropriate morphological information on non-memorized forms.

2 THE ACQUISITION OF NUMBER

2.1 NUMBER STIMULI

The goal of this part of the experiment is to test children's knowledge of number agreement within NP. The results of this experiment should be contrasted to the test of gender agreement in terms of the age of acquisition: according to the predictions of the semantic account, we expect better performance on the number agreement even with younger children since number bears semantic properties versus the arbitrary gender feature, and according to the canoncity account because number is more canonical than gender. Each input stimulus includes an NP where the adjective agrees with the noun in gender/case/number. The children are expected to cope with the task of extracting agreement information and producing it in the output where the same NP is used in another number.

Below is a list of instrumental, dative and genitive case exponents within an NP (with their descriptive glosses) to be used in the input:

(1)

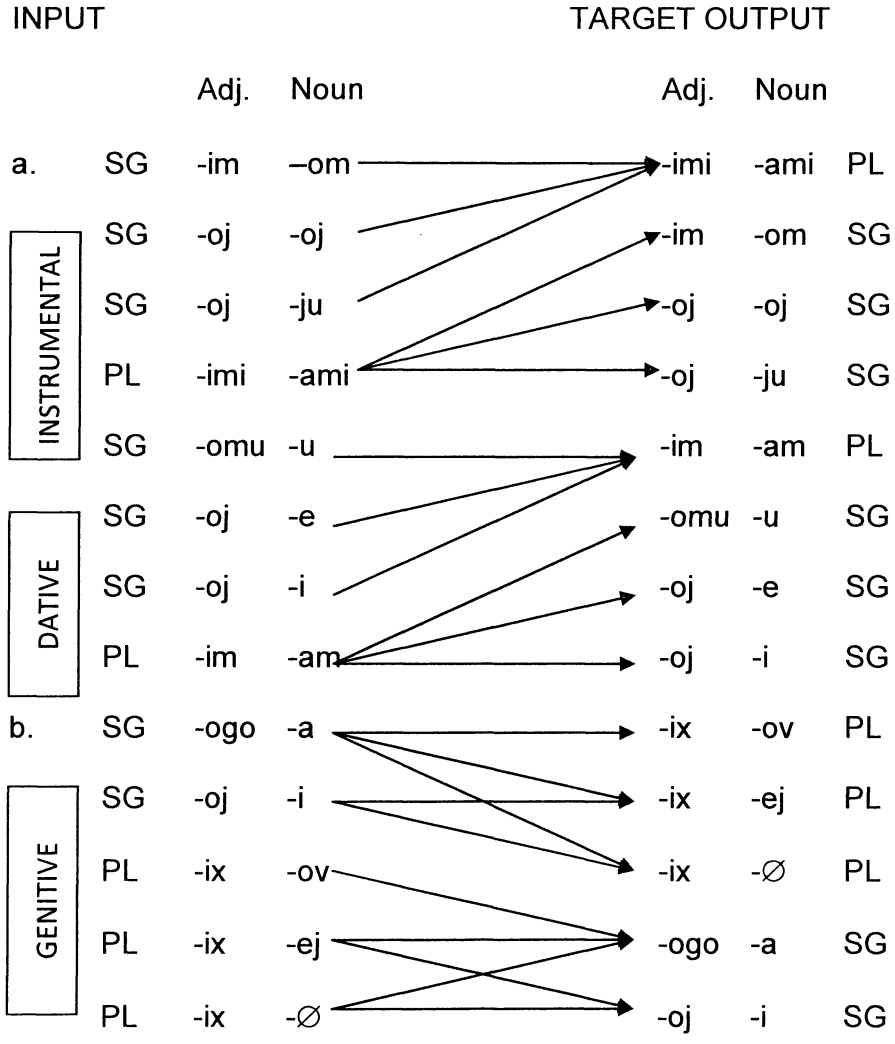
Instrumental		Dative		Genitive	
Adj.	Noun	Adj.	Noun	Adj.	Noun
/im/	/om/ - sg, 1/4	/omu/	/u/ - sg, 1/4	/ogo/	/a/ - sg, 1/ 4
/oj/	/oj/ - sg, 2	/oj/	/e/ - sg, 2	/oj/	/i/ - sg, 2/ 3
/oj/	/ju/ - sg, 3	/oj/	/i/ - sg, 3	/ix/	/ov/ - pl, 1/ 4
/imi/	/ami/ - pl	/im/	/am/ - pl	/ix/	/ej/ - pl,1 / 3
				/ix/	/∅/ - pl,1/2/4

The testing of number agreement includes two kinds of stimuli: testing number within more straightforward cases (such as dative, instrumental or locative) as opposed to the cases with allomorphy (such as accusative and genitive). The latter part of the experiment connects to one of the next proposed stages – the acquisition of case and declension, and the formation of the paradigm. Both kinds of stimuli were mixed up in the experiment set-up so that the children received the stimuli for both during one session. The reason I used dative vs. genitive as the cases for this part of the study traces back to section 2.3 of Chapter 1, where I discuss the predictions of the two hypotheses with respect to syncretic and allomorphic cases in Russian.

Both nouns and adjectives used in this study are familiar to the children. For one type of input, as mentioned above, the nouns were used in one of the straightforward cases: the dative. The other kind of stimuli served the same goal with the only difference being the case in which the tested stimuli were offered. Instead of a more straightforward case such as dative, I used genitive case which exhibits allomorphy across its exponents [see the table of nominal paradigm].
The chart in (2) is the pairing between the input stimuli items (adjectives and nouns) and their target output items in the opposing number. There is an equal number of each mapping between the input stimuli and target output: 2 items per dative stimuli, 3 items per genitive singular and 2 items per genitive plural stimuli. There are 12 instrumental, 12 dative and 25 genitive stimuli items which makes 49 total tested items. To minimize phonetic ambiguity the items whose dative

and/or genitive morpheme is /i/ and /e/ consist of the nouns that are finally stressed. However, this is only possible with the nouns of class 2. For class 3 nouns, the dative/genitive morpheme is never stressed.

(2)



A complete list of stimuli items in both dative and genitive cases is presented in the appendix.

2.2 PROCEDURE

The method for this experiment is description. The children talk on the phone with a puppet who wants to know what's going on in the game. This way the children have to describe the action. The children receive three types of input with an NP: in dative singular/ plural, in genitive singular/ plural, and in instrumental singular/ plural. The dative input is offered in a scenario where the bear puppet is giving something to an animate object (dative singular) or objects (dative plural). Please, note that there are no animacy distinctions in dative. At this stage the experimenter tells the child what the bear is doing and asks the child to tell the same to the puppet on the phone. Then the children are shown another scene where the bear is giving something to the same animate object/ objects in the opposing number. The children then should tell the puppet on the phone what the bear is doing now. An example below shows the input and target output, where the NP in dative singular or plural is in bold.

(3) Experimenter (Dative SG Input):

Mishka *daet* *seno* ***bol'sh-omu*** ***kon-u***

Bear-1,Masc,Nom,Sg give-3Sg,Pres hay-4,Neut,Acc,Sg big-Masc,Dat,Sg horse-1,Masc,Dat,Sg

'The bear is giving hay to a big horse'

Child (Dative PL Output):

Mishka *daet* *seno* ***bol'sh-im*** ***kon'-am***

Bear-1,Masc,Nom,Sg give-3Sg,Pres hay-4,Neut,Acc,Sg big-Dat,Pl horse-Dat,Pl

'The bear is giving hay to big horses'

The genitive stimuli items require a different environment in which the stimuli are introduced; however, the general scenario remains the same. The NPs are offered within a PP where the preposition takes genitive case (*okolo* 'near', *iz* 'from', *u* 'at' and *ot* 'from'). Thus, the bear puppet performs the following actions with an object: hiding (or putting something) near/ at the object (*okolo* NP/ *u* NP); taking something out of the object (*iz* NP); going away from the object (*iz* NP/ *ot* NP). The stimuli items may be both animate and inanimate. Part of these stimuli includes the nouns to be discussed in section 5 of chapter 3. The following is a sample of the input/ target output in genitive case:

(4) Experimenter (Genitive SG Input)

Mishka *prjačetsja* *okolo* ***vysok-oj*** ***sosn-y***
Bear-1,Masc,Nom,Sg hide-3Sg, Pres near tall-Fem,Gen,Sg pine-tree-2,Fem,Gen,Sg
'The bear is hiding near a tall pine tree'

Child (Genitive PL Output):

Mishka *prjačetsja* *okolo* ***vysok-ix*** ***sosen-∅***
Bear-1,Masc,Nom,Sg hide-3Sg, Pres near tall–Gen,Pl pine-tree-Gen,Pl
'The bear is hiding near tall pine trees'

A potential confound is target-deviant use of oblique noun cases with prepositions. However, as research shows (Zubkova 1996, Gvozdev 1961), the appearance of prepositions in child Russian is not affected by whether a preposition takes one or several cases, or whether it has one or several meanings, since oblique cases are acquired prior to the acquisition of prepositions. If children do use a preposition, they put the following noun in the

correct case; otherwise they just omit a preposition altogether while the noun is still used correctly.

For the purposes of covering most of the nominal declension paradigm, I introduced one more type of input – NPs in the instrumental case. The reason behind it was to test the exponent *–ju*, which is the most specified one in the list of all nominal morphological exponents (Müller 2003). The scenario for the instrumental input is exemplified in (5). The Bear puppet is performing the actions of playing with/ drawing with and similar actions that require instrumental case.

(5) Experimenter (Instrumental SG Input):

Mishka *igrajet* *s* ***bol'sh-oj*** ***myš-ju***
Bear-1,Masc,Nom,Sg play-3Sg,Pres with big-Fem,Inst,Sg mouse-3,Fem,Inst,Sg
'The bear is playing with a big mouse'

Child (Instrumental PL Output):

Mishka *igrajet* *s* ***bol'sh-imi myš-ami***
Bear-1,Masc,Nom,Sg play-3Sg,Pres with big-Inst,Pl mouse-Inst,Pl
'The bear is playing with big mice'

3 THE ACQUISITION OF GENDER

This experiment tests children's knowledge of agreement within a noun phrase on familiar nouns and novel adjectives. I focus solely on gender agreement, leaving case and number agreement aside. The prediction is that children will not have significant problems with agreement, given that this process is a simple percolation of features (Babby 1985) which should be acquired pretty early.

3.1 STIMULI

In this part we obtained data on children's production of gender agreement in noun phrases where 32 familiar nouns preceded by 8 novel adjectives (NAs) modified after unambiguous Russian adjectives (by 'unambiguous' I mean the words whose phonological form unambiguously matches with its morphological representation). Four novel adjectives are derived from novel nouns' stem with the meaning of 'made of N', and the other four represent novel words for unusual colors. Half of the nouns served as the modified input. I expected children to use the other half in the elicited production. The stimuli nouns equally represented all four Russian declensional classes and all three genders: 4 nouns per declension class of which 8 are feminine, 4 masculine and 4 neuter genders. The complete list of nouns and novel adjectives is presented in the appendix.

In order to test if the children were familiar with the nouns in these sections of the experiment, we conducted a pre-testing pilot study with a noun picture naming task. This was a necessary condition that enabled us to revise the

list of noun stimuli and test the criterion for the subjects to qualify for participating in the experiment.

The experimenter showed pictures of objects and asked the children to name what they saw on the picture. The kids were expected to name each object with a non-diminutive form of the noun. Since chances of diminutive use are usually very high, a follow-up clarification was permitted to ask the child the second time for the non-diminutive form, i.e. if the child used a diminutive, the experimenter could then say, 'Yes, but that's how a small [object] is called. How about a big one?' A similar procedure was used when the child named the object in the plural. This stage was conducted before the rest of the experiment. Depending on the results, the list of nouns was adjusted and unknown nouns were replaced.

3.2 PROCEDURE

Children's task was to describe an action where the puppet (the Bear) was matching two different objects by their common property (color or material). Thus, the children were expected to produce a noun phrase where a novel adjective heard in the input NP agrees with a different gender noun in the output. According to the scenario, the Bear puppet first saw an object and then chose another object that shared the same property with the first one (a match). The child told the other puppet (the Frog) which object the Bear now had. The child talked with the Frog puppet on the phone to ensure the use of the adjective rather than pointing to the correct match. Further I would like to explain the

stimuli pairing in greater detail. Both input noun and tested noun consist of 12 nouns each: two feminine class 2 (F-2), two feminine class 3 (F-3), four masculine class 1 (M-1) and four neuter class 4 (N-4) so that there is an equal number of nouns of each gender. In each training episode N-1 and N-2 are paired in such a way that their genders are different. Thus, all of the above nouns are paired in the following way:

(6)

Input noun	**Tested noun**
1 F-3	1 M-1
1 F-2	1 N-4
1 F-3	1 M-1
1 F-3	1 N-4
1 M-1	1 F-2
1 M-1	1 F-3
2 M-1	2 N-4
1 N-4	1 F-2
1 N-4	1 F-3
2 N-4	2 M-1

The experiment consisted of two stages. During the training stage we modeled the experiment to train children on the task (to describe a match of two different objects sharing a common property). To do so the child should have used the same adjective with a different noun of a different gender after being introduced to a familiar NP (both adjectives and nouns are familiar to the children). During this part four familiar adjectives were used. This part represents acquisition of gender and acquisition of case subparts combined. The number of nouns used in this section was twice as fewer as that of the other sections: two nouns of each declension class paired with the nouns of a different gender.

During the testing stage the experimenter (i) introduced the child to the modified input (an NP of a novel adjective and a familiar noun). At this point the gender feature information was available to the child, since the novel adjective agrees with the familiar noun on gender, case (nominative) and number. Then the experimenter (ii) elicited NPs of a different gender noun in addition to the same novel adjective being introduced in the input to see if the children use correct gender agreement on the adjective. To do that the experimenter presented the child (as well as the Bear puppet) with a choice of two objects and asked the child to tell the Frog puppet which match the Bear puppet has. The target output NP should be used in the Nominative case. One of the options was a different object than the input object, but it matched the input object in its property (this is the target object to choose), and the other option was the same object as the first one, but had a different property (the wrong choice). The sample procedure is presented below:

(7) *Sample set of pictures to be used along with the scenario in (8)*

Input (stage 2)	Choice (stage 3)
[picture of a silver-colored bucket] *smet-oje vedr-o* NA-N bucket-N NA=novel adjective	[picture of a silver-colored frying pan] A *smet-aja skovorod-a* NA-F frying pan-F [picture of a yellow-colored frying pan] B *zhelt-aja skovorod-a* yellow-F frying pan-F

(8) *Sample scenario procedure*

Experimenter: (Nominative Input)

Eto smet-oje vedr-o
This NA-Neuter,Nom,Sg bucket-4, Neuter,Nom,Sg
'This is a NA bucket'

[The Bear sees two different frying pans and picks the one that matches the bucket in color]

Experimenter: (Nominative Prompt)

Skaži Ljagušonku, čto teper' est' u Miški?
Tell Frog what-Nom now is at Bear
'Tell the Frog: what does the Bear have now?'

Child: (Nominative Output)

smet-aja skovoroda
NA-Fem,Nom,Sg frying-pan-2,Fem,Nom,Sg
'a NA frying pan'

Altogether, there are 32 NPs. Please refer to sections B (input nouns) and C (target output) of the list in (9) for the complete list of nouns used at the testing stage.

(9) *Nouns used in gender acquisition subpart*

SECTION A (TRAINING)			
INPUT		TARGET OUTPUT	
F-2	*Zvezda* 'star'	*Stakan* 'glass'	M-1
	Voda 'water'	*Moloko* 'milk'	N-4
F-3	*Pech* 'stove'	*Gorshok* 'pot'	M-1

	Fasol' 'bean'	*Zerno* 'grain'	N-4
M-1	*Divan* 'divan-bed'	*Sofa* 'sofa'	F-2
	Plasch 'raincoat'	*Shinel'* 'soldier's coat'	F-3
N-4	*Kryl'tso* 'porch'	*Truba* 'tube'	F-2
	Gnezdo 'nest'	*postel'* 'bed'	F-3
SECTION B (INPUT)		SECTION C (TARGET OUTPUT)	
F-2	*Noga* 'leg'	*Nos* 'nose'	M-1
	doska 'board'	*Chajnik* 'tea-pot'	M-1
	Luna 'the moon'	*Litso* 'face'	N-4
	Golova 'head'	*Krylo* 'wing'	N-4
F-3	*Krovat'* 'bed'	*Stul* 'chair'	M-1
	Karusel' 'carousel'	*Mototsikl* 'motorcycle'	M-1
	Dver' 'door'	*Okno* 'window'	N-4
	Jel' 'fir-tree'	*Brevno* 'log'	N-4
M-1	*Pol* 'floor'	*Stena* 'wall'	F-2
	Ogurets 'cucumber'	*Eda* 'food'	F-2
	Stol 'table'	*Mebel'* 'furniture'	F-3
	Parovoz 'steam engine'	*kachel'* 'swing'	F-3
N-4	*Vedro* 'bucket'	*Skovoroda* 'frying pan'	F-2
	Kol'tso 'ring'	*Ruka* 'hand'	F-2
	Pero 'feather'	*Tetrad'* 'notebook'	F-3
	Jajtso 'egg'	*Sol'* 'salt'	F-3

(10) *Adjectives used in gender and case acquisition subparts*

Section A

1. *golub-oj/ -aja/ -oje* 'blue'
2. *mex-ov--oj/ -aja/ -oje* 'fur'
3. *zavod-n-oj/ -aja/ -oje* 'wind-up'

4. *bol'sh-oj/ -aja/ -oje* 'big'

Section B

1. *smet-oj/ -aja/ -oje*
2. *grin-oj/ -aja/ -oje*
3. *pink-oj/ -aja/ -oje*
4. *bal't-oj/ -aja/ -oje*
5. *lust-ov-oj/ -aja/ -oje*
6. *kud'-an-oj/ -aja/ -oje*
7. *klast'-an-oj/ aja/ -oje*
8. *svex-ov-oj/ -aja/ -oje*

4 THE ACQUISITION OF CASE

As in the other two parts of the first experiment, one of the features' value – case is tested while others – gender and number feature values are constant.

4.1 STIMULI

The Input stimuli are NPs with novel adjectives and familiar nouns. The adjectives are the same novel adjectives as in the gender experiment. All nouns are Feminine class 2 introduced in the nominative case singular number. The target output is expected to consist of different NPs marked with a different value for case feature, keeping singular number and feminine gender, declension class 2. There are two case values of the target output NPs: accusative and dative case.

4.2 PROCEDURE

The procedure of this part is the same as that of part 2. In fact, both of these parts are conducted mixed together to save the children from being trained once again for the same procedure. It is only for the purposes of data analysis that we separate these parts.

(11) *Sample scenario procedure of case acquisition subpart*

a. Experimenter: (Nominative Input)

Vot smet-aja	mašina
Here NA,FemNom,Sg	car-2,Fem,Nom,Sg
'Here is a NA car'	

[the Bear sees two different carts and turns to the one that is made of the same material as the car]

Experimenter: (Accusative Prompt)

Miška xočet čto-to kupit'. Skaži Lyagušonku, na čto on smotrit?

Bear wants something-Acc buy Tell Frog on what-Acc he looks

'The bear wants to buy something. Tell the Frog what he is looking at'

Child: (Accusative Output)

Na smet-uju teležk-u

On NA-Fem,Acc,Sg cart-2,Fem,Acc,Sg

'at the NA cart'

b. Experimenter: (Nominative Input)

Vot smet-aja mašina

Here NA-Fem,Nom,Sg car-2,Fem,Nom,Sg

'Here is a NA car'

[the Bear sees two different carts and turns to the one that is made of the same material as the car]

Experimenter: (Dative Prompt)

Skaži Lyagušonku, k čem-u podxod-it Miška?

Tell Frog to what-dat comes bear

'Tell the Frog what the bear is approaching'

Child: (Dative Output)

K smet-oj teležk-e

To NA-Fem,Dat,Sg cart-2,Fem,Dat,Sg

'to the NA cart'

A complete list of stimuli items for the case acquisition subpart is available in the appendix.

5 RESULTS OF THE FIRST EXPERIMENT

The collected data was analyzed with general linear model ANOVA with repeated measures on the SPSS program. An alpha level of .05 was used for all statistical tests. The statistical tests were performed four times: the first analysis aimed at the overall children's performance comparison across the agreement features in question. The other three tests were run on the data of children's performance on each particular feature: case, gender, and number respectively. The repeated measures were the averages between 1 and 0, where 1 corresponds to the correct adult-like target performance of each child across stimuli items, and 0 to the incorrect performance. Common to all four tests, two between-subject factors were specified. (i) Between-subject factor 1 is the *age group*. This factor has two levels: young (ages 2;5 – 3;7, mean age 3;1, n = 19), and old (ages 3;8 – 5;0, mean age 3;9, n = 21). This factor was used to check for the interaction effect of group by age and children's performance on each feature (number*gender*case). (ii) Between-subject factor 2 is the *order* of presentation of the stimuli items, which has 4 levels corresponding to the four sets of 10 subjects of randomly mixed age. This factor was used to control for a possible bias any particular stimuli items and/or their presentation combinations might have had on the subjects. Ideally, there should not be a significant effect of order.

5.1 COMPARISON ACROSS AGREEMENT FEATURES

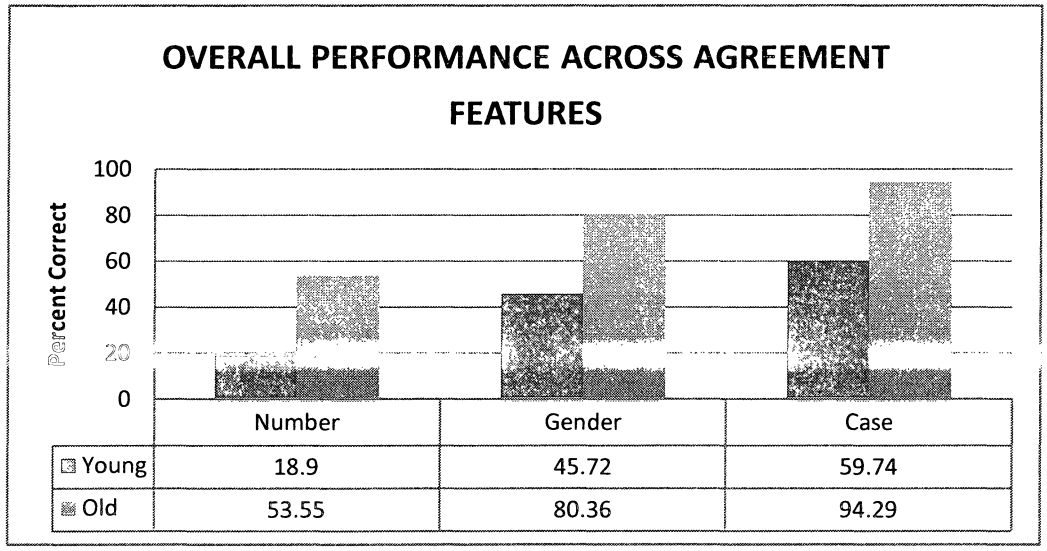
In the first statistical test of the overall performance across agreement features, in addition to both of the above mentioned between subject factors, one

within-subject factor was specified, which we called *agreement feature*. This factor has three levels, one for each feature: case, gender, and number. Therefore, there are three repeated measures for each participant.

With an alpha level of .05, the effect of agreement feature was statistically significant, F (2, 64) = 115.487, p < .001. No interactions effects are significant. In addition, there is the main effect of group, F (1, 32) = 31.774, p < .001.

Since the order factor was not significant, the results presented in the figure below are collapsed across the four orders of presentation. Both young and old age group children exhibit a similar pattern of performance.

FIGURE 2 *OVERALL PERFORMANCE ACROSS AGREEMENT FEATURES*



	Number	Gender	Case
Young	18.9	45.72	59.74
Old	53.55	80.36	94.29

A follow-up paired t-test analysis was run using SPSS program in order to see if there was a difference in performance between each pair of the agreement factor levels. In other words, I asked a further question: which pair was the one to be responsible for the significance of the agreement factor: number vs. gender,

number vs. case, or gender vs. case, if there is any difference like that at all. Having collapsed across order of presentation and age group, I performed three paired t-tests: number vs. gender, number vs. case, and case vs. gender. Treating any given contrast as significant if $p < .05 / 3 (= .0167)$, I found that all contrasts were significant ($p < .001$), which means that there was no separate pair of agreement factor levels responsible for the significance of the agreement factor effect, i.e. all of the pairs contribute equally to this effect.

For the interpretation and a brief discussion of this and forthcoming results please refer to section 6 of the current chapter.

5.2 COMPARISON WITHIN AGREEMENT FEATURES

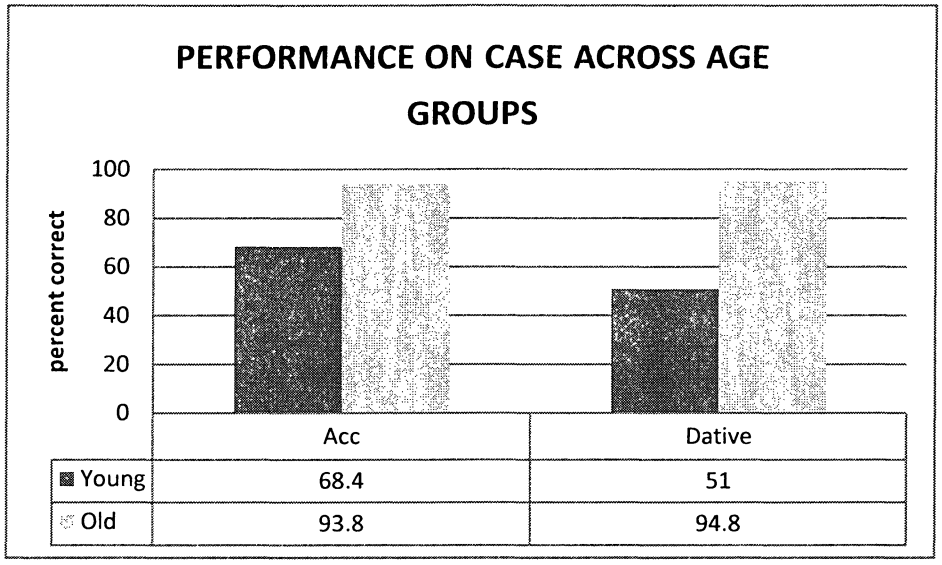
5.2.1 CASE

The second statistical test performed an analysis of children's average rate of success within the case feature. There is one within-subject factor, *case feature value*, which has 2 dependent variables: accusative and dative.

With an alpha level of .05, the effect of case was statistically significant, $F (1, 32) = 5.155$, $p < .01$. The interaction effect of case * group was also significant, $F (1, 32) = 6.282$, $p < .01$. No other interaction effects were significant.

As had been expected, there was no main effect of order, but only the main effect of age group: $F (1, 32) = 17.223$, $p < .001$.

FIGURE 3 *PERFORMANCE ON CASE ACROSS AGE GROUPS*

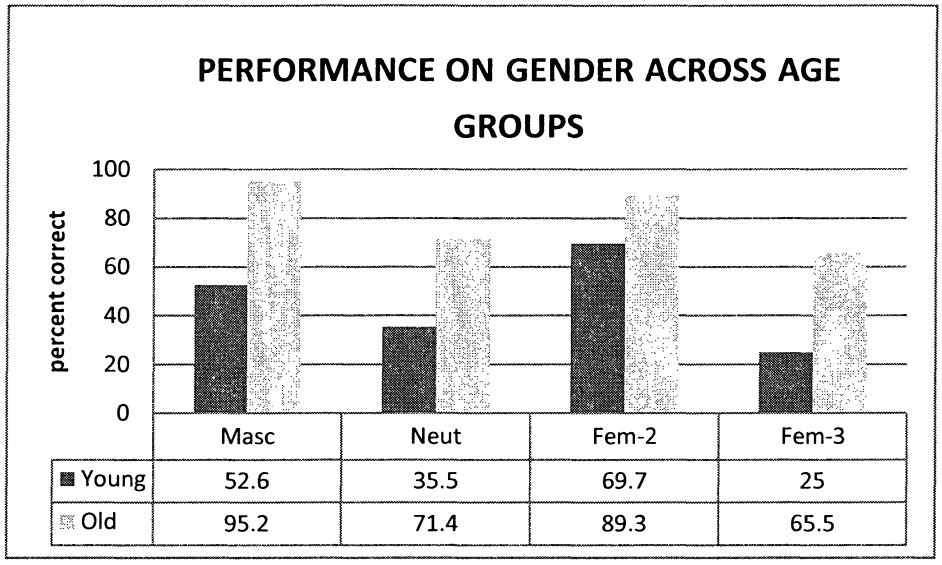


The figure above illustrates the contrast in performance patterns between young and old age group participants. Older children are successful at both case factor values, while younger children are significantly better at accusative than dative case.

5.2.2 GENDER

The third test was run to analyze children's performance within the gender feature. Collapsing between the different types of input children received during the experiment, the results of their performance on gender and declension class feature values are represented in the following Figure 4. Of the two between-subject factors, order was not significant, but age group had the main effect, F (1, 32) = 26.698, p < .01. Given that order of presentation was not statistically significant, the figure below presents the results of children's performance on gender by age group converged across all the four orders.

FIGURE 4 *PERFORMANCE ON GENDER ACROSS AGE GROUPS*



	Masc	Neut	Fem-2	Fem-3
Young	52.6	35.5	69.7	25
Old	95.2	71.4	89.3	65.5

Figure 4 also shows that younger children's results are not as good as those of older children, hence the effect of group. However, there was no interaction effect of group*conversion, so both age groups have a similar pattern of mappings between input stimuli and target output. This justifies a collapse across ages in the illustration in the later figure (Figure 5).

It is important to recognize that children's performance on each of the gender/declension value was actually composed of different types of input. For example, to test children's assignment of feminine class nouns, they were offered stimuli items of different genders – masculine and neuter, to test their assignment of masculine gender, they received feminine and neuter NPs in the input, etc. This is different from the number and case subparts of the experiment since there the tested feature (number or case) was assigned based on homogeneous input with only one feature value, not 2 or 3 (to assign plural children always

received a singular NP in the input; to assign dative they were given nominative all the time). This justifies the way of looking at the results of the gender subpart in terms of the factor called *conversion*, with 8 levels. The repeated measures represent all the relevant possibilities of the mapping between input and output items with respect to gender and declension class. Below is a list of all repeated measures used in this test:

(12)

Feminine class 2 to masculine	(F2toM)
Feminine class 2 to neuter	(F2toNEUT)
Feminine class 3 to masculine	(F3toM)
Feminine class 3 to neuter	(F3toNEUT)
Masculine to feminine class 2	(MtoF2)
Masculine to feminine class 3	(MtoF3)
Neuter to feminine class 2	(NEUTtoF2)
Neuter to feminine class 3	(NEUTtoF3)

I would like to emphasize that such conversion is not based on any linguistic theory: there are no justified reasons to believe that a certain pairing of input-output NPs would be contrasted with a different pairing, but we need to see if certain declension classes are harder or easier to extract relevant gender information, for example, feminine class 3. Surprisingly, there was a significant effect of conversion: with an alpha level of .05, the effect of conversion was statistically significant, F (7, 224) = 15.224, $p < .001$. No interactions effects were found to be significant.

FIGURE 5 *CONVERSION FACTOR PERFORMANCE WITH COLLAPSED AGE GROUP FACTOR*

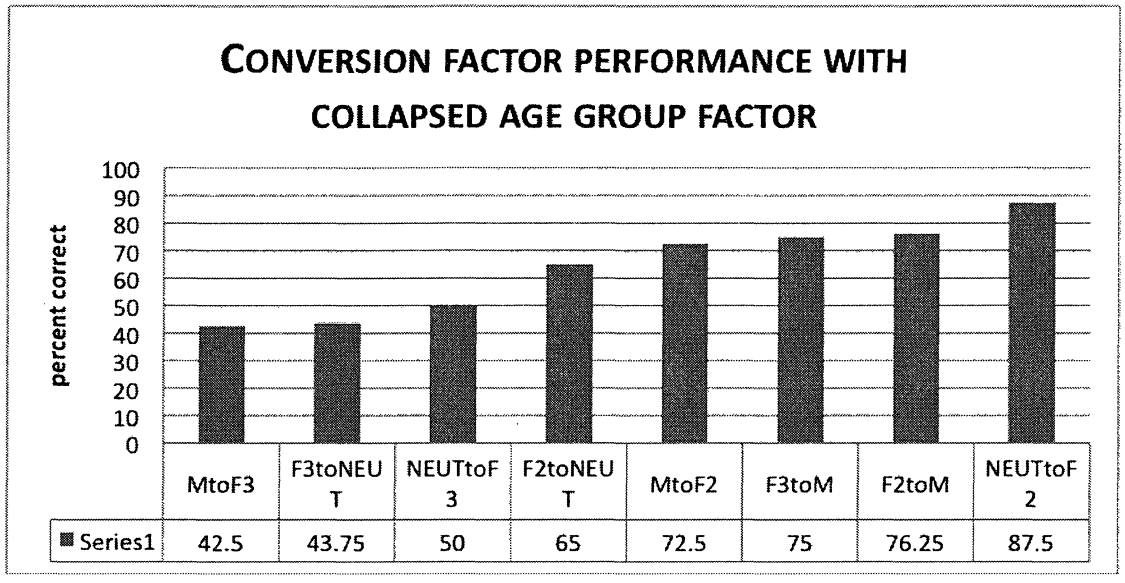
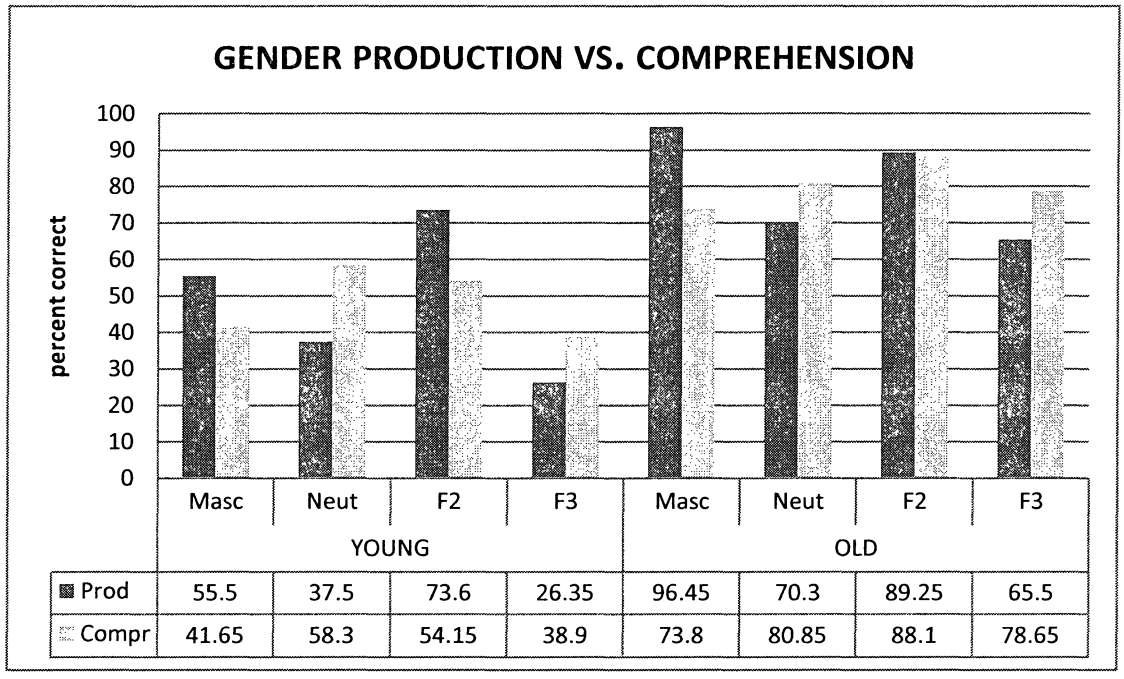


Figure 6 illustrates the difference between the way children succeed at producing and processing different gender/class NPs. For this comparison I contrasted children's performance rates depending on the type of NP in the input to get the comprehension percentile (so masculine comprehension rate, for example, includes all instances where masculine is the source of gender information in the input), and the rates depending on the type of the targeted NP to get the production percentile (for example, masculine production rate are all cases when the child was expected to produce a masculine NP). Younger children's results differ from older children's performance which depends on whether a specific gender/class is used in their production or comprehension.

FIGURE 6 *GENDER PRODUCTION VS. COMPREHENSION*



5.2.3 NUMBER

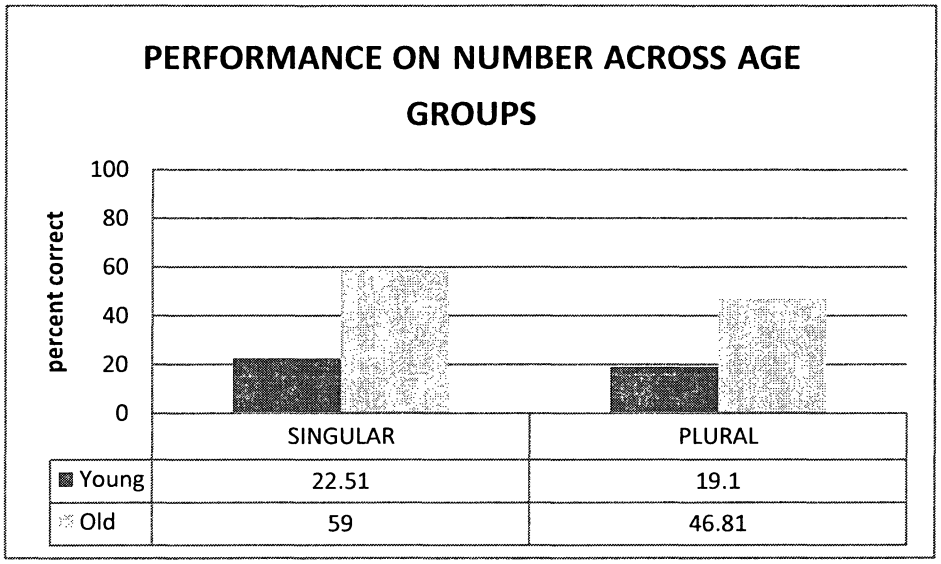
In the last statistical test I analyzed children's performance within the number feature. There were three within-subject factors: (i) number feature value (2 levels): singular, plural; (ii) case feature values (3 levels): instrumental, dative, genitive; (iii) class feature values (3 levels): class 1 - masculine, class 2 - feminine, and class 3 - feminine.

With an alpha level of .05, the statistical test showed significant main effects of all the factors as well as significant effects of some of the interactions.

Similar to the results from the statistical tests reported above, the only significant effect of between-subject factors was that of group, F (1, 32) = 39.335, $p < .001$.

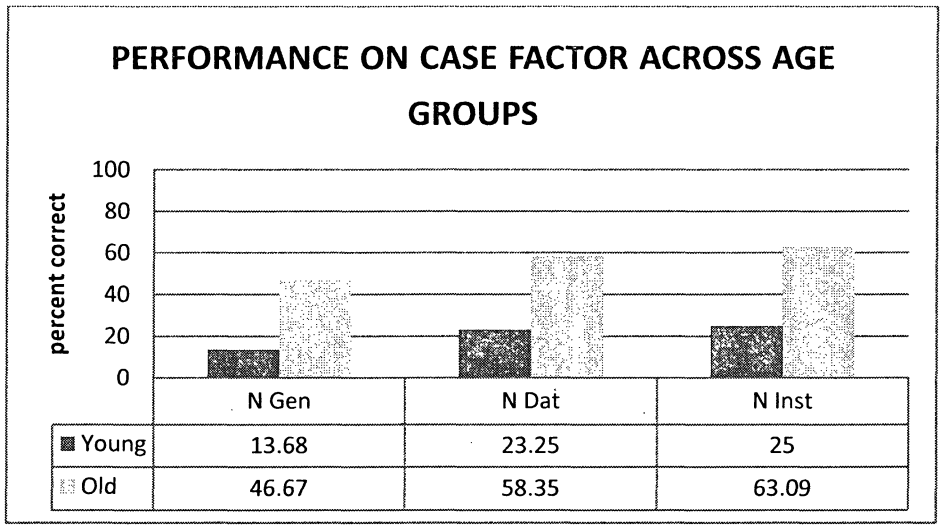
Since there was no main effect of order, the figure below (Figure 7) illustrates overall children's performance on number: the number feature value had a significant effect: F (1, 32) = 7.343, p < .05; and class feature, F (2, 64) = 54.674, p < .001. Thus the interactions effect of number*class were also statistically significant: F (2, 64) = 21.515, p < .001

FIGURE 7 *PERFORMANCE ON NUMBER ACROSS AGE GROUPS*



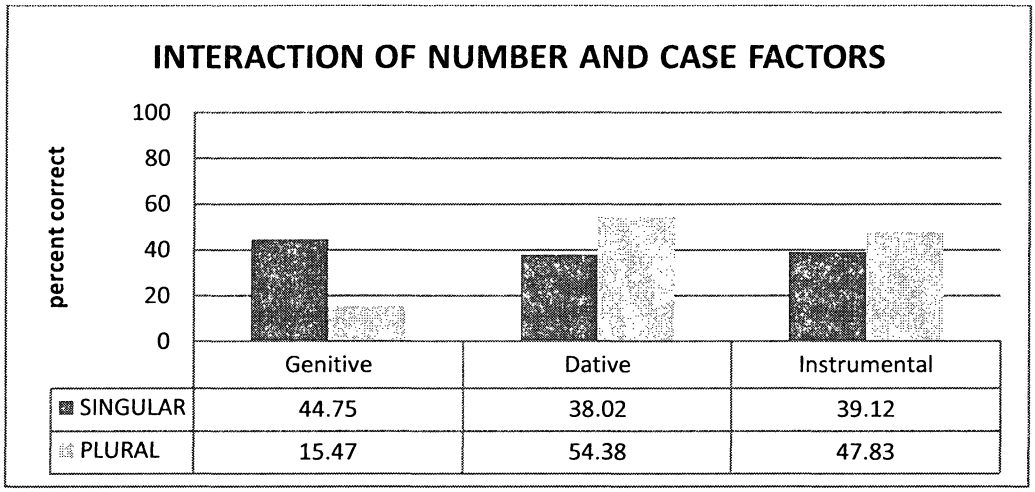
The next figure shows children's performance on the case factor within the number subpart of the experiment. There was a statistically significant main effects of case feature value, F (2, 64) = 18.340, p < .001. Older children are more successful in their production than younger children, but both groups' performance was of a similar pattern, that is why there is no interaction effect of case*group.

FIGURE 8 *PERFORMANCE ON CASE FACTOR ACROSS AGE GROUPS*



Because there was no interaction effect group by number, or group by case, the following figure shows the results of the interaction of number and case factors, for both age groups together: case*number, F (2, 64) = 29.408, p < .001. This interaction effect was significant. As can be seen from the figure above, children's performance on singular items was almost equal across all cases, but in the plural number, genitive case items were the most troublesome. I discuss the performance on genitive plural in the further sections.

FIGURE 9 *INTERACTION ON NUMBER AND CASE FACTORS*

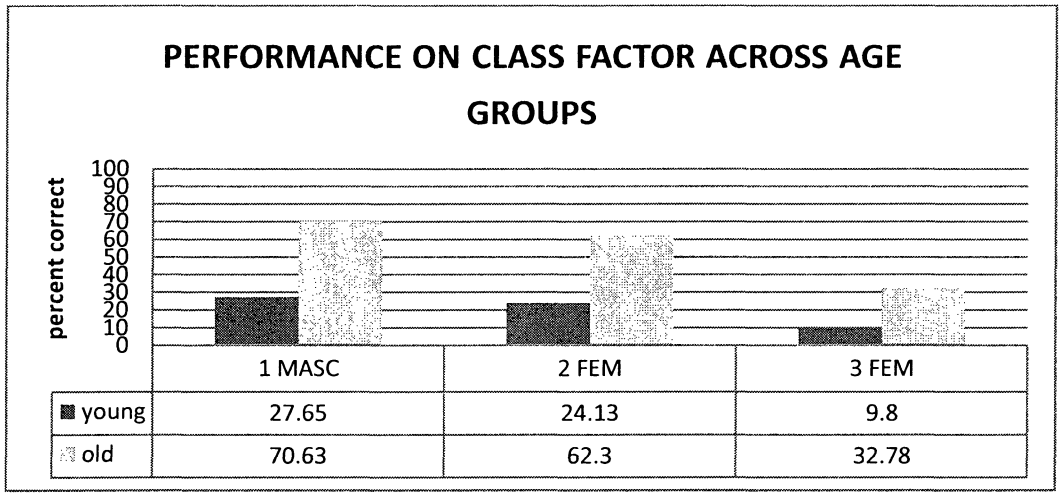


In this part of the experiment results, age group mattered only in the interaction with the class factor. The interaction effect of class*group was significant: class*group, F (2, 64) = 7.437, $p < .01$, and the results are presented in the figure below in

Figure 10.

FIGURE 10 *PERFORMANCE ON CLASS FACTOR ACROSS AGE GROUPS*[10]

[10] Recall that neuter was not a feature value offered in the stimuli of the number subpart of the experiment since in oblique cases neuter nouns are identical to masculine. That is why there is no neuter gender found in this and further figures.



Note that figure 9 shows the floor effect on younger subjects: although this interaction was significant, this seems to be due to floor effects.

The interaction of group*class was significant; therefore in the figure below I present the statistically significant results of the interaction of number by class factors (Figure 11) for each age group separately: number*class*group, F (2, 64) = 4.016, $p < .05$[11].

FIGURE 11 *INTERACTION OF NUMBER AND CLASS FACTORS ACROSS AGE GROUPS*

[11] The three-way interactions effects could have turned out to be significant due to a large number of factors involved in the ANOVA analysis without any obvious reason why it happened.

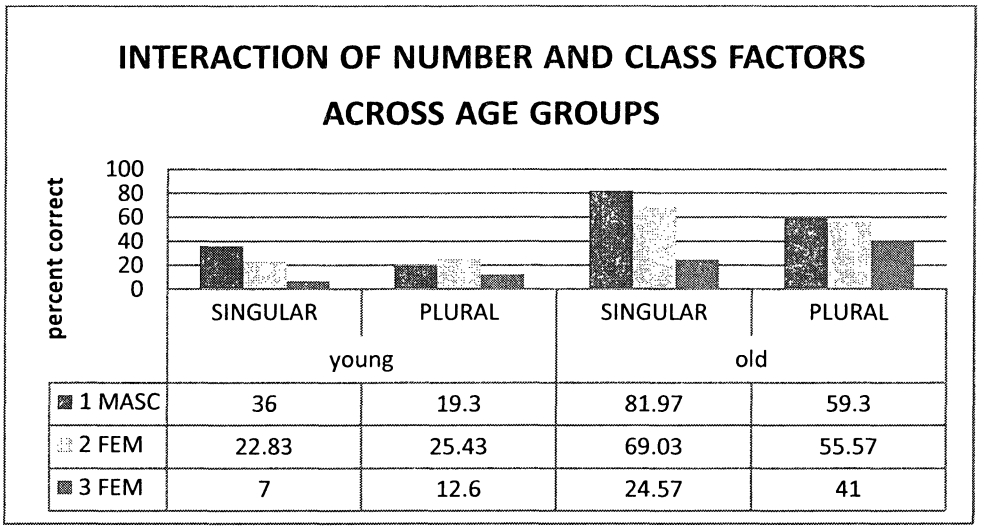
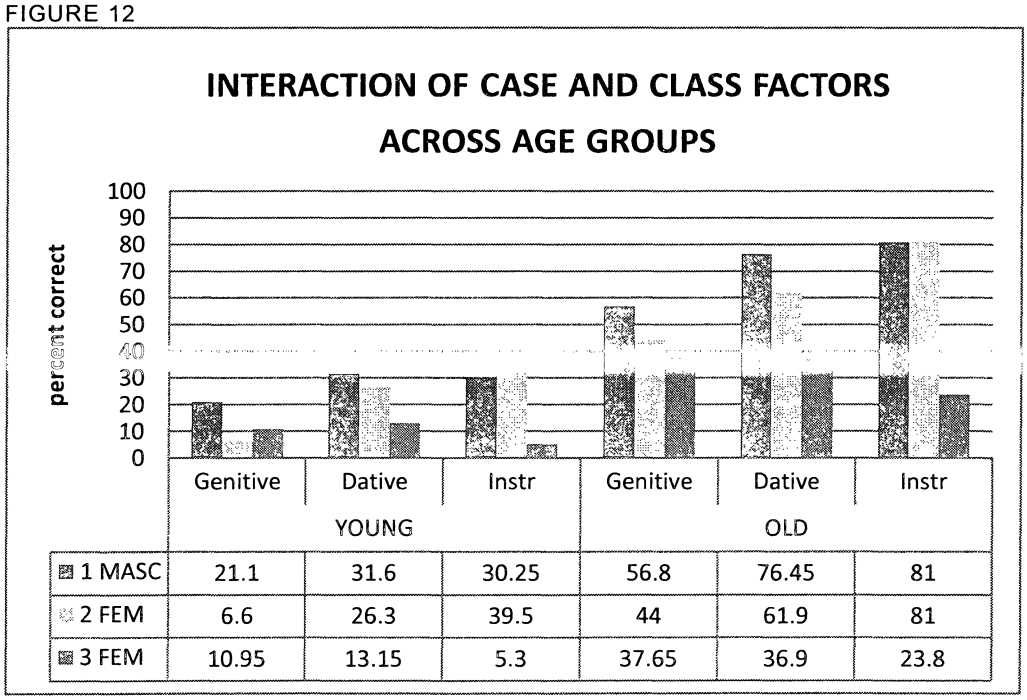


Figure 12 illustrates a significant interaction effect of case*class: F (4, 128) = 14.083, $p < .001$.

FIGURE 12



A spell-out report of the results from the tables and graphs in this section is outlined in the next section with a more extensive discussion of the results and their implications to theoretical assumptions to be presented in Chapter 5.

6 REPORT OF THE RESULTS

6.1 TESTS OF BETWEEN-SUBJECTS EFFECTS

Out of the two between-subject factors (order of presentation and age group), neither order nor any interactions with order had a significant effect, as expected. This eliminates a possible confound of the experimental set-up that a certain order of stimuli items presentation to the children could have affected their performance in any way. The other between-subject factor, age group, has reached significance in all subparts of the experiment. Also expected, this shows that in every part of the experiment younger children were overall less successful at their production than older children.

The interactions of age group are significant in case and number subparts, but not in the overall and gender subparts of the experiment. For the latter, there is no difference in the pattern of correct performance percentage between the two age groups: both young and older children perform similarly on the agreement and gender conversion factors. However, these groups exposed different results for the other sections. Thus, in the case section, where there was a significant interaction of case*group effect, young children were better at the production of NPs in the accusative case than in the dative case, whereas older children were equally good at both cases. This can be explained by the so-called ceiling effect which means that older children in general were performing much better than younger children, and any extra difficulty with dative case was obscured by the ceiling effect: their performance is 93.8% - 94.8% for the accusative and dative cases respectively. In the number section of the

experiment, where the interaction of group*class feature was significant, older children had their best performance for masculine class 1 nouns both for singular and plural. Younger children, however, perform best on feminine class 2 nouns in plural. Not only there is a difference in the comparison of singular and plural number patterns between the age groups, but they also exhibit different result patterns for plural number (Figure 11). When we combine singular and plural number results for the average performance (

Figure 9), it is obvious that while younger children produce almost the same results for class 1 and 2 nouns, older subjects are better at class 1 than class 2.

6.2 TESTS OF WITHIN-SUBJECTS EFFECTS

As for the within-subject factors, there were main effects of all of them in this experiment. For the test of the overall performance across the three agreement features, there was a main effect of agreement factor. This result shows that children's performance on the agreement features increased from number through gender to case where number is the least successful feature and case is the most successful accomplishment of both young and older children[12].

6.2.1 THE EFFECT OF CASE

There was also a main effect of case in the results of the case subpart of the experiment. Even though, as mentioned above, older children are equally good at both accusative and dative cases, the significance of the case factor is reached by the difference younger children have in their mastery of accusative as opposed to dative cases where accusative is significantly better than dative case production.

In the gender section of the experiment, there was a main effect of the conversion factor (see Figure 5). What this means is that children were not equally successful while being tested on different gender/class input-output

[12] Such results are unintuitive, and more discussion of this is presented in chapter 5.

pairs[13]. The worst performance was on the conversion from masculine class 1 to feminine class 3 NPs while the best results were shown in the conversion from neuter to feminine class 2 NPs. The conversion factor involves the mapping between the NPs from the list of the stimuli items to the NPs children produce in the target output. In order to understand how the conversion factor was significant I would like to compare gender/class feature values in terms of their comprehension in the input NPs vs. their elicited production in the output NPs (

[13] It is surprising that there are differences between pairings involving the same declension classes (F2 to N or N to F2), but this is part of the results. As I mentioned earlier, I did not expect these differences to relate to any particular theory.

Figure 6). Such comparison reveals that children's performance on feminine class 3 as well as neuter noun phrases is poorer in their production than in comprehension. In contrast to F3 and neuter NPs, masculine and F2 NPs show the opposite pattern, especially for the younger children: such NPs are produced with a greater rate of success than they are comprehended, i.e. than the right information is extracted from them. In terms of the comparison of production performance between age groups, it should be noted that younger children differ from older ones because their best performance is on F2 NPs, while older children do their best on masculine NPs (

Figure 6). As for the comprehension performance, young and old age groups differ in their patterns as well. Younger children showed their best results in the comprehension of neuter nouns whereas older children were the best at F2 NPs. The least successfully comprehended NPs were F3 for the young and masculine for the old group. Finally, it is worth noting that the test results of the gender section of the experiment revealed the importance of class within feminine gender: feminine NPs behave differently in children's performance depending on whether they are of class 2 or 3.

6.2.2 THE EFFECT OF NUMBER

The statistical test of the number subpart of the experiment shows main effects of all within-subject factors, i.e. number, case and class feature values, as well as several interaction effects that reached significance most probably due to the nigh number of factors in the ANOVA test. The main effect of number feature value shows that while younger children were not generally good at producing both singular and plural NPs having almost the same percent of target-like responses, older children exhibited a difference. For them, NPs in plural number caused poorer performance than singular number. Such difference in the pattern of children's responses resulted in the significance of the number feature value effect. The case feature value factor is significant as well. Both young and old children exhibit their best results when tested on instrumental case stimuli items. They do worse on dative, and the worst on genitive case NPs (refer to Figure 8).

Both of the just mentioned within-subject factors in the number study produce a significant interaction effect (number*case). This effect shows that

children's performance on genitive NPs is low specifically due to the low performance on genitive NPs under the plural number condition (

Figure 9). Genitive singular, as opposed to genitive plural noun phrases were the best in children's performance. In Chapter 3, I connect this result to the discussion of allomorphy. Another contrast to the singular-plural apposition of genitive case is the fact that for dative and instrumental cases children were better on plural than singular NPs.

The last within-subject factor of the number section of the experiment was the case feature value factor, which also had a main effect. Both age groups again behave within the same pattern and perform poorly on F3 NPs, better on F2 and best on masculine NPs. Similarly to the results of the gender subpart of the experiment, feminine class 3 noun phrases present a problem for children's elicited production. F2 and masculine NPs seem to compete for children's success again, but as these results show, masculine is the winner in this section.

Class feature value interacts significantly with case feature value in this test producing a significant interaction effect of class*case. As seen from Figure 12, the significance of this interaction means that one of the factors in question matters for the performance of the other. Thus, case feature matters for class feature, or vice versa. As far as the role case feature plays for class feature, the explanation here is that children, both young and old groups, have a similar pattern where F3 noun phrases stand in contrast to F2 and masculine class 1 NPs. In other words, F2 and masculine NPs were best or equally well performed on in instrumental and worst in genitive cases. However, F3 noun phrases are worst in instrumental and almost equally better in genitive and dative cases. Regarding the interaction effect class feature value has on case feature value,

we observe that masculine class 1 nouns are best performed on in genitive and dative cases, but in the instrumental case F2 is better than masculine for younger, and equal for older children. So, some differences are found between the age groups here. F3 NPs are the worst in all cases except the genitive case for the young group.

Finally, I would like to provide an interpretation of the interaction effect of number and class feature values within-subject factors for the number part of the experiment. When children were tested on the singular noun phrases, they produced their best performance on masculine class 1 NPs and worst on F3 noun phrases. Similar to singular NPs, in the plural number F3 NPs also caused a lot of trouble, but the best performance differs in its pattern for the age groups: younger children are best at F2 while older ones at masculine noun phrases of class 1.

The theoretical implications of these results are discussed in greater detail in Chapter 5.

CHAPTER 3 DATA ON ERRORS AND THEIR ANALYSIS

1 INTRODUCTION

The data collected in the first experiment was analyzed in terms of children's overall performance on the acquisition of agreement of morphological features. The results of that analysis are presented in the previous chapter. However, the previously presented overall analysis does not provide a detailed insight on the processes taking place in children's morphological acquisition. That is why in this chapter I would like to focus on children's errors: the responses that the subjects had not received credit for and that were marked as non-target performance. In particular, this chapter discusses the types of errors children are making in the elicited production task, presents samples of children's individual nominal and adjectival paradigms at different stages of acquisition, and follows the algorithm of error analysis of two random subjects from both age groups to relate those non-target performance cases to the theoretical predictions of the two hypotheses made in chapter one.

I will analyze children's erroneous responses by studying eight individual children's data samples and pointing out the common tendencies. I chose eight subjects, one from each age subgroup, which creates an equally spread representation of the whole population of participants. Each child produced a lot of errors of different types, so any classification that I will make will pertain to the errors of each child. In order to give myself the benefit of the doubt, I need to

state the assumptions I make in interpreting the given data. First of all, I need to be consistent in glossing the children's responses. In the following section I talk about issues concerning ambiguity of the data which can cause differences in data interpretation.

2 AMBIGUITY OF THE DATA

2.1 ASSUMPTIONS FOR AMBIGUOUS DATA INTERPRETATION

The non-target data samples cannot always be unambiguously interpreted. In this section I would like to contrast straightforward, relatively easy to analyze samples with those that can be interpreted in more than one way. The example in (1) is one of the former:

(1) Subject 8 Subgroup 2, Age 3;0; Item # 28

Input:	(okolo) malen'k-ogo m'ach-a
	Near small-Gen,Sg,M ball-Gen,Sg,M1
	'Near a small ball'
Target:	(okolo) malen'k-ix m'ach-ej
	Near small-Gen,Pl ball-Gen,Pl
	'near small balls'
Elicited production:	(okolo) malen'k-imi m'ach-ik-ov
	Near small-Inst,Pl ball-dim-Gen,Pl

Comparing the elicited NP with the target one, it is obvious that the child's error is easily identifiable as the following type: *C/Inst(A) dim*Agr/case[14], which means that the child made an agreement error by putting the adjective in the instrumental case. Moreover, the child used the diminutive form of the noun that

[14] This notation is used as a shortcut of an error description where C, N, G, Cl, Agr, or Cex after an asterisk respectively correspond to case, number, gender, class, agreement, or case exponent non-target use in child production. After the slash I specify which case, number, gender or class is used by the child. (A) or (N) in the parenthesis indicate whether such feature marking was used in the adjective (A), or the noun (N). If both the adjective and the noun in the production NP have the same erroneous marking, no parenthesis is found. Such notations are followed by a brief description of the specific error.

resulted in a different noun case exponent from what was expected. The diminutive form, however, is used correctly in the genitive plural context with the default morpheme *-ov*. So, this particular child's strategy was to use the more familiar diminutive noun which resulted in correct performance on the noun part of the NP. The child did not, however, cope with adjectival agreement on case.

The data samples below are different from that in (1) because the errors are not that easy to gloss and, hence, identify. For example, elicited production in (2) is ambiguous:

(2) Subject 8 Subgroup 2, Age 3;0; Item # 24

Input: bol'sh-im rys'-am
big-Dat,Pl lynx-Dat,Pl
'to big lynxes'

Target: bol'sh-oj rys'-i
big-Dat,Sg,F lynx-Dat,Sg,F3
'to the big lynx'

Elicited production: bol'sh-oj rys'-ø

Interpretation ambiguity arises from the options including but not limited to the following:

(3) bol'sh-oj rys'-ø
big-Dat,Sg,F lynx-Nom,Sg,F3

On the one hand, the presented elicited production can show an error of the type *C/Nom(n)*Agr/case in (3) where the child's production deviated from the target

one in using the default nominative case in a difficult class 3 feminine nouns context keeping the adjective faithful to the expected target performance. In other words, such interpretation creates the impression that the child is trying to be maximally productive and, assuming that she knows she needs to produce a dative singular feminine NP, she does her best with what she can: puts the adjective in the expected dative singular case, but resorts to the default nominative for the difficult feminine class 3 noun.

On the other hand, nominal case syncretism in adult Russian grammar gives more options for such data sample classification, as in (4):

(4) bol'sh-oj rys'-ø
big-Nom,Sg,M lynx-nom,Sg,M1

Zero morpheme in adult grammar is present in both masculine and feminine class 3 singular nouns, hence we could classify such error as *C/Nom*G/M*CI/1 where agreement is OK, but the child produced non-adult NP using default masculine gender and, therefore, class 1 noun when dealing with the difficult F3 context. In this case, the child did not make an agreement error.

Moreover, I should note that most F3 context errors across children's non-target performance are of the kind presented in (2) where despite the correct zero morpheme of the noun, the adjective in that NP is almost always *–oj*, even in those items where the target adjective was not dative singular *–oj*, but feminine nominative singular *–aja*. Given children's grammatical conservatism (Snyder 2007), it seems unlikely that in these contexts children will choose to produce

such a costly commission error rather than using the default nominative masculine morpheme *–oj*. That is why I believe the latter interpretation to be more plausible.

The above discussion and the need to avoid the problem of inconsistent data interpretation due to ambiguity lead me to make several assumptions for interpreting the ambiguous data. In the case of the sample in (2) I will rely on the overall results presented in chapter 2. The fact that children performed poorly on feminine class 3 nouns, as you can see in Figure 10 of chapter 2, will be the basis of glossing the zero morpheme in a noun in data samples similar to that in (4) as masculine class 1 rather than feminine class 3 in (3), which I repeat below for convenience:

(5) bol'sh-oj rys'-ø
big-m,sg,nom lynx-m1,sg,nom
'A big lynx'

Another type of ambiguity in data interpretation also has to do with children's use of zero morphemes. For example, consider (6):

(6) Subject 8 Subgroup 2, Age 3;0; Item # 46

Input: (u) krasn-yx sapog-ø
(by) red-Gen,Pl boot-Gen,Pl
'by the red boots'

Target: (u) krasn-ogo sapog-a
(by) red-Gen,Sg,M boot-Gen,Sg,M1
'by the red boot'

Elicited production: (u) krasn-ogo sapog-ø

The ambiguity of interpretation lies between the possibilities of the zero morpheme being nothing but the repetition of the input, i.e. genitive plural (7), or default nominative case (8):

(7) (u) krasn-ogo sapog-ø
(by) red-Gen,Sg,M boot-Gen,Pl

In this case the child made the following error: *#/Pl(n)(IR) *Agr/#, which means that the child made an error on the noun number (failure to use the noun in the singular given the plural input) attaining the strategy of input repetition of the noun form. If this is the case, the child does not care about agreement, hence violating it.

(8) (u) krasn-ogo sapog-ø
(by) red-Gen,Sg,M boot-Nom,Sg,M1

This is different from the input repetition strategy. The error type in (8) is *C/Nom(n) *Agr/case where the child's strategy is to use default nominative case on the noun. I should point out that during this particular item production the child first used the diminutive of a synonym noun *botin-och-k-a (*Boot-dim-dim-Gen,Sg,M1) in the expected target genitive singular case with the correct case exponent. It shows that the child is able to assign genitive singular case, however, has been puzzled by the zero morpheme in the input. Even though this first attempt makes (8) a more plausible option of data interpretation, I will use input repetition principle to deal with such ambiguous data samples. Input

repetition principle asserts that if the child's output can be possibly analyzed as a commission error with a non-adult form (in the case of (6) it is a zero morpheme), or a repetition of the presented input stimulus item, I assume the child repeats the input rather than produces the non-target adult form, to follow the most conservative path. As a result of this principle application, such data becomes uninterpretable because it is not possible to make sure whether the child just parroted the input item using short-term memory, or consciously assigned feature values to this input item.

The following data sample represents cases when both principles of input repetition and feminine class 3 low performance provide the same guidance in dealing with ambiguous children's responses.

(9) Subject 8 Subgroup 2, Age 3;0; Item # 65

Input: svexov-oj parovoz-ø
NA-Nom,Sg,M engine-Nom,Sg,M1 *NA= novel adjective*
'a NA engine'

Target: svexov-aja kachel'-ø
NA-Nom,Sg,F swing-Nom,Sg,F3
'a NA swing'

Elicited production: svexov-oj kachel'-ø

The ambiguity of interpretation is between (10) and (11):

(10) svexov-oj kachel'-ø
NA-Nom,Sg.M swing-Nom,Sg,M1

The error type under this interpretation is *G/M*Cl/1 with no error on adjectival agreement. The child assigned masculine gender to the feminine noun and agreed the adjective with masculine gender creating a non-adult output. Such glossing would be used when guided by the principle of low F3 context performance because children, in particular younger group children like this subject, produce F3 nouns correctly only in 9.8% of the time (

Figure 10, Chapter 2). Therefore, we assume that the zero morpheme used in the noun represents the default masculine class 1 noun. Moreover, the input repetition principle guides us into the same data interpretation since the child copies the masculine adjective from the input stimuli item: *svexov-oj*. As a result, there is no error on agreement even though the elicited form is non-adult.

(11) svexov-oj kachel'-ø
NA-Nom,Sg.M swing-Nom,Sg,F3

The alternative option is *G/M(A)*Agr/gender where the child correctly assigns feminine gender to the noun but fails to use the feminine morpheme on the adjective. The child's strategy in this case is the same as the one in (10): input repetition of the adjectival form; however, ignoring the other principle (F3 context) we would have to give the child credit for assigning feminine gender for a class 3 noun. Again, to be on the most conservative path, I assume (10) to be the most plausible option for the purposes of the errors analysis.

Input repetition is one of the popular means to produce an unfamiliar form in the elicited production that the children in the experiment referred to. However,

there are different types of input repetitions in children's production. Consider an example below:

(12) Subject 19, Subgroup 3, Age 3;4, item # 9

Input:	vkusn-ymi	kotlet-ami
	Delicious-Inst,Pl	cutlets-Inst,Pl
	'(with) delicious cultets'	
Target:	vkusn-oj	kotlet-oj
	Delicious-Inst,Sg,F	cutlet-Inst,Sg,F2
	'(with) a delicious cultet'	
Elicited production:	vkusn-ymi	kotlet-ami
	Delicious-Inst,Pl	cutlets-Inst,Pl
	'(with) delicious cultets'	

The error type is *#/Pl (IR) with false number assignment (plural) resulting in input repetition. In such error the child's production differs from the targeted NP by the plural number instead of singular which is due to the fact that the child simply repeated the input plural phrase. This kind of input repetition is complete. Even though the produced phrase is grammatically correct from the point of view of adult grammar, it does not tell us anything about the child's actual competence on feature assignment or adjectival agreement. Therefore I will consider such cases only as informative about the strategies children attain to when forced to produce a specific grammatical form, and will exclude them from children's paradigm templates presented in section 3 below.

The subject whose example I just presented uses input repetition strategy approximately two times out of three cases for which he has not ever produced the correct nominal or adjectival morpheme. However, there is a tendency to use a different strategy, for example, no answer, or wrong morpheme use, for those cases for which he sometimes produces the target nominal morpheme. This only illustrates that input repetition is a productive means children use to overcome their difficulties.

Input repetition is not always complete as in the example above. Often times the child repeats either the input adjective, or the input noun. Such input repetition is partial, and these data are partially interpretable, for example:

(13) Subject 21, Subgroup 1, Age 2;5, item # 8

Input:	golub-ymi flomaster-ami blue-Inst,Pl markers-Inst,Pl '(with) blue markers'
Target:	golub-ym flomaster-om blue-Inst,Sg,M marker-Inst,Sg,M1 '(with) a blue marker'
Elicited production:	golub-ymi flomaster-om blue-Inst,Pl marker-Inst,Sg,M1

The error type is *#/Pl(A) (p IR) with false number assignment (plural) on the adjective: partial input repetition. This data sample shows that the child failed to produce the singular adjective despite the fact that she did correctly produce the

singular noun. This results in the noun phrase that lacks noun-adjective agreement on number. Even though the repeated adjectival input is uninformative on the child's competence about number agreement on the adjective, such item still shows the child's correct number on the noun, thus at least half of the data item is interpretable.

Finally, let us consider some other ambiguous data samples where stress can play a crucial role in error recognition.

(14) Subject 8 Subgroup 2, Age 3;0; Item # 48

Input: (iz) chern-yx nor-ø
(from) black-Gen,Pl hole-Gen,Pl
'from the black holes'

Target: (iz) chern-oj nor-y
(from) black-Gen,Sg,F hole-Gen,Sg,F2
'from the black hole'

Elicited production: (iz) chern-ogo nor-A *(stressed A)*

In this example, the child's possible error type could be one of the two below:

(15) (iz) chern-ogo nor-A
(from) black-Gen,Sg.M hole-Nom,Sg,F2

(16) (iz) chern-ogo nor-A
(from) black-Gen,Sg,M hole-Gen,Sg,M1

If we gloss the child's production sample as in (15), the error type is *C/Nom(n)*G/M(A) *Agr/case and gender, i.e. the child made an error on noun

case assignment assigning nominative case on the noun and an error on gender adjectival agreement using masculine adjectival morpheme. The child's strategy in this case is to not care about agreement, but use the default nominative case of the noun. This is the same strategy as that discussed in case (8). If, however, we gloss the child's response as in (16), the error is *G/M*Cl/1, hence there is no error on agreement. This error type means that the child erroneously assigned masculine gender to the noun triggering class change, and agreed the adjective with the masculine noun gender. The child's strategy is to use default masculine gender and be faithful to agreement.

In these kinds of cases, word stress is the determining factor for data interpretation. If stress disambiguates the elicited form, I rely on stress being crucial. For instance, in (8) the child puts final stress in the noun *'nor-A'* (hole), so I assume the child assigned nominative class 2 feminine singular features to this noun rather than genitive masculine class 1 singular: variant (8a). If it were not the case that stress disambiguated the response, and there were no input repetition, I would give preference to (16) in suchlike cases[15].

Despite the assumptions that I make, I would like to point out that these assumptions do not cancel alternative data interpretations, and therefore are used for the sake of current data analysis.

[15] The stress assumption is based on unanimous native speakers' intuitions that if the noun had been masculine *nor-ø, the genitive singular would be *nOr-a, with the stress on the first syllable (tested on Russian native speakers).

2.2 NON-ADULT PHONETIC EXPONENTS

In this section I would like to present some other cases with partially uninterpretable children's production. These kinds of responses were strikingly frequent among some children in both young and old groups. In these kinds of responses children produce one of the forms (either adjective or noun) with a non-adult phonetic exponent. Even though such exponents may resemble adult morphemes, they are modified in children's use in a way that makes them not only non-target, but also non-adult. The question is whether or not we should be able to interpret these forms, and if yes, what would this interpretation be based on. Consider a sample in (17):

(17) Subject 8 Subgroup 2, Age 3;0; Item # 27

Input:	(u) malen'k-ogo brat-a
	(at) little-Gen,Sg,M brother-Gen,Sg,M1
	'At the little brother's'
Target:	(u) malen'k-ix brat'-jev
	(at) little-Gen,Pl brother-Gen,Pl
	"At the little brothers'"
Elicited production:	(u) malen'k-ov brat-ov
	(at) little-? brother-Gen,Pl

The type of error here is *Cex/-ov(A)-ov(n) where the child produces non-adult case exponent –ov in the adjective. Notice that the same case exponent is used in the noun, but –ov exists in adult nominal paradigm as a genitive plural morpheme. In this context the noun's case exponent is the default one for the

genitive plural context. This example shows how the child is using alliteration. The adjectival morpheme in the child's production cannot be interpreted as genitive plural because there is no such morpheme in the adjectival paradigm, but intuitively the child seems to be on the right track resorting to the familiar default nominal genitive plural form to use on the adjective. Even though this particular subject has produced the adjectival morpheme *–ix* in the target genitive plural context, and, moreover, in combination with the same nominal morpheme *–ov*, she has not completely mastered genitive plural in either nouns or adjectives.

Alliteration has also been used by other children in the study. Thus, for example, in the next sample we find that the nominal dative plural morpheme *–am* is copied onto the adjective in dative plural context:

(18) Subject 28 Subgroup 4, Age 3;7; Item # 14

Input:	malen'k-omu medved'-u
	little-Dat,Sg,M bear-Dat,Sg,M
	'to the little bear'
Target:	malen'k-im medved'-am
	little-Dat,Pl bears-Dat,Pl
	'to the little bears'
Elicited production:	malen'k-am medved'-am
	little-Dat?,Pl? bears-Dat,Sg,M

This subject made the following error: *Cex(A), which means that he used incorrect case exponent on the adjective. The noun is produced correctly

according to the expected target. One explanation of this production could derive from the phonological processes. Keeping in mind the fact that the elicited adjectival form is not stressed, *-am* could be due to the child not palatalizing the preceding consonant. If that is the case, the child produces forms similar to those used in the so called old-Moscow accent (Durnovo, Sokolov, Ushakov, 1915). Despite the fact that people in Kostroma (where the experiment was conducted) do not typically speak that variety, it is still present in children's input in old soviet cartoons, radio staged children's performances, and suchlike child-directed speech. In this case we could attribute the child's correct use of dative plural morpheme in the adjective with some peculiar phonetic production. Otherwise such interpretation is not possible. Following the same strict approach to such ambiguous cases, I exclude such forms from the correct ones in the overall performance analysis, but would like to draw attention to them.

A similar type of error has been noted in a longitudinal data study conducted by Voeykova (1997) who accounts for such errors as the child making a false morphemic division of the adjective influenced by the nominal inflection experience. She reports that by the age of 2;7 her subject showed mastery of the nominal inflection system. However, the child attached the nominal morpheme to the false stem of the adjective: the stem 'extended' including part of the adjectival inflection, as shown below:

(19)	Adult		Child		
	Adj.	Noun	Adj.	Noun	
Fem.Nom.Sg.	bel-aja	rek-a	*belaj-a	rek-a	'white river'

Fem.Dat.Sg.	bel-uju ruk-u	*belaj-u rek-u	'white river'

In my study children made a high number of errors of this type.

Subject 28 above as well as other children produced a variety of other forms in all instrumental and dative contexts, both on the nouns and adjectives, in singular and plural. Dative and instrumental cases are in the stage of emergence in this child's grammar as I will show in section 3 of this chapter. The generalization I would like to point out is that for these contexts the most frequent form the child produces is a form that has a vowel and consonant *m*: *-Vm*, which are *-am*, *-om*, and *–im*. Notice that the same forms are used both for the noun and for the adjective, and sometimes correspond to the adult adjectival *–im* (dative plural) and nominal *–om* (instrumental singular masculine). This form *–Vm* is used in the adjective whenever the same *–Vm* form is used in the noun, but not vice versa. This could also be the alliteration effect and/or the phonological effect described above.

The following sample makes the same point: a non-adult adjectival form *–ami* is used in dative plural context which due to the phonological reason above could in fact be the instrumental plural *–imi*, the difference being a non-palatal preceding consonant. Instrumental case would be false anyway:

(20) Subject 8 Subgroup 2, Age 3;0; Item # 13

Input:	malen'k-omu kot-u
	little-Dat,Sg,M cat-Dat,Sg,M

'to the little cat'

Target: malen'k-im kot-am
little-Dat,Pl cats-Dat,Pl
'to the little cats'

Elicited production: malen'k-ami kot'-at-am
little-Inst?,Pl cats-dim,Dat,Pl

The error in (20) is *C/Inst(A)*Cex/-ami(A),dim: with respect to the expected target, the child made a commission error of using instrumental case on the adjective, a non-adult case exponent *–ami* in the adjective and using the diminutive form of the noun. There is no problem with the noun other than the diminutive – the noun class is the same, hence the dative plural morpheme is the same. The instrumental form is considered instrumental given the assumption of the phonological non-palatalization effect discussed above.

I would like to add a note on the non-stressed adjectival inflection. Originally I planned to elicit these inflections in the adjectives with the final stress which would disambiguate the cases discussed above. However, children sometimes did not produce the desired adjective like *bol'sh-oj/bol'sh-aja* 'big'. Therefore I have to deal with what the subject actually said. Yet the final-stressed adjectival inflections exhibit the same tendencies as the non-final stressed ones, for example forms like *bol'sh-om kon'-om* (big horse-instrumental singular masculine) or *golub-om flomaster-om* (blue marker-instrumental singular masculine) were very frequent.

One other interesting but not as frequent phonetic effect that resulted in the production of a non-adult exponent is the reduplication of the nominal morpheme, as in the following example:

(21) Subject 8 Subgroup 2, Age 3;0; Item # 14

Input:	malen'k-omu medved'-u
	little-Dat,Sg,M bear-Dat,Sg,M
	'to the little bear'
Target:	malen'k-im medved'-am
	little-Dat,Pl bears-Dat,Pl
	'to the little bears'
Elicited production:	vesel-ymi medved'-amam
	merry-Inst,Pl bears-Dat?,Pl?

The error type is *C/Inst(A)*Cex/-amam(N). The reduplication part is in the noun where the nominal dative plural morpheme *–am* is used twice on the noun: *-amam*. Such cases are rare, and should be excluded from the correct performance list even though it could be a slip of the tongue.

Some more interesting samples of non-adult production that can be attributed to erroneous morphological parsing are those cases where various children produced adjectival inflections like *–ojem, -oju, -aju*, or *–ojo* in instrumental, dative, or accusative singular contexts. Let me illustrate such cases.

(22) Subject 28 Subgroup 4, Age 3;7; Item # 8

Input:	golub-ymi flomaster-ami
	blue-Inst,Pl markers-Inst,Pl
	'with blue markers'
Target:	golub-ym flomaster-om
	blue-Inst,Sg,M marker-Inst,Sg,M
	'with a blue marker'
Elicited production:	golub-ojem flomaster-om
	blue-? marker-Inst,Sg,M

The child used a non-target case exponent on the adjective, so the error type is *Cex/-ojem(A). However, such form can be parsed into *–oj*, which is the adjectival nominative masculine inflection and *–em*, which is the noun instrumental singular masculine inflection, hence such production comes as no surprise given that in other cases children also use both nominative case morphemes and noun morphemes for the adjectives.

(23) Subject 19 Subgroup 3, Age 3;4; Item # 78

Input:	smet-aja trjapk-a
	NA[16]-Nom,Sg,F cloth-Nom,Sg,F2
	'a NA cloth'
Target:	smet-uju trjapk-u
	NA-Acc,Sg,F cloth-Acc,Sg,F2

[16] NA stands for a 'novel adjective'.

'a NA cloth'

Elicited production: smet-aju trjapk-u

NA-?,Sg,F cloth-Acc,Sg,F2

Following the same logics, we can see how in other examples above children attached the accusative feminine singular morpheme *–u* to the nominative feminine singular morpheme *–aj* producing *–aju*.

The error in (23) is *Cex/-aju(N): wrong case exponent in the noun. Suchlike examples appear to be very frequent in the collected data, and are present in several children's samples. Forms like these are used in other cases as well.

Sometimes the reasons why a child uses such non-adult forms are not so easy to identify. Thus in the following data sample the child seemed to use the masculine form of the noun to attach the accusative inflection *–u*, even though the noun is feminine:

(24) Subject 8 Subgroup 2, Age 3;0; Item # 74

Input: svexov-aja kol'ask-a

NA-Nom,Sg,F stroller-Nom,Sg,F2

'a NA stroller'

Target: svexov-uju teleg-u

NA-Acc,Sg,F cart-Acc,Sg,F2

'a NA swing'

Elicited production: svexov-oju teleg-u

NA-?,Sg,F cart-Acc,Sg,F2

This child made the same error as the above: *Cex/-oju(A). The difficulty of interpretation of this error is because *–oju* could also be an obsolete/formal instrumental feminine singular inflection. That is why I exclude such production from the list of correct performance.

In the following example the child even 'fixed' the received input his own way by producing a non-adult form of the above kind:

(25) Subject 8 Subgroup 2, Age 3;0; Item # 26

Input:	malen'k-ogo vorob'j-a
	little-Gen,Sg,M sparrow-Gen,Sg,M
	'(near) the little sparrow'
Target:	malen'k-ix vorob'j-ov
	little-Gen,Pl sparrows-Gen,Pl
	'(near) the little sparrows'
Elicited production:	malen'k-ij vorobej-a
	little-Nom,Sg,M sparrow-Gen,Sg,M
	'(near) the little sparrow'

The error is *C/Nom(A)*N/Sg, which means that the child made an error on adjectival case agreement using the default nominative case, and failed to produce the plural form of the NP. The noun is marked with genitive singular masculine morpheme *–a* like in the input, but the child used the nominative form

of the noun (which also coincides with the noun's stem – base form) to attach the genitive inflection to, thus producing a non-adult form of the noun.

The obsolete form above is not the only non-adult form that actually is present in the adult grammar. Other examples of the kind include the use of single vowel inflections that resemble the so-called 'short' adjectival inflections such as nominative feminine *–a*, accusative feminine *–u*, nominative neuter *–e,* or plural *-i*[17]. I will illustrate these uses by one example below:

(26) Subject 19 Subgroup 3, Age 3;4; Item # 62

Input:	grin-oj	zabor-0
	NA-Nom,Sg,M	fence-Nom,Sg,M
	'a NA fence'	
Target:	grin-aja	sten-a
	NA-Nom,Sg,F	wall-Nom,Sg,F2
	'a NA wall'	
Elicited production:	grin-a	sten-a
	NA-?	wall-Nom,Sg,F2

On the one hand, we could credit the child with correct performance on the nominative singular feminine agreement on the adjective since morpheme *–a* exists in adult Russian as the adjectival nominative singular feminine 'short' inflection, as, for instance, in *devushka bol'n-a* ('the girl is sick'). On the other hand, it could also be an omission error where the child simply uses the base

[17] For the discussion of short adjectives please refer to Halle and Matushansky, 2006.

form of the novel adjective where *–a* is the theme vowel. Since this case is ambiguous, I prefer to not credit the child with correct production. Additional grounds for making such decision are that this particular subject has shown incomplete mastery of adjectival nominative case paradigm attaining to input repetition and omission of the adjective altogether strategies.

Finally, I would like to mention a couple of other data samples where the non-adult form does not seem to be interpretable. Such cases include the use of a zero morpheme in a non-adult way, and the use of other non-adult forms, like those below:

(27) Subject 8 Subgroup 2, Age 3;0; Item # 34

Input:	(u) zolot-oj medal'-i
	(by) golden-Gen,Sg,F medal-Gen,Sg,F3
	'By the golden medal'
Target:	(u) zolot-yx medal'-ej
	(by) golden-Gen,Pl medal-Gen,Pl
	'by the golden medals'
Elicited production:	(u) medal'-ee zolot-ogo
	(by) medal-? golden-Gen,Sg,M

The child made the following error: *Cex/-ee(N)*G/M(A)*N/Sg(A) which means that there was a problem with the noun case exponent, the adjective gender and the adjective number. The noun's form is hard to interpret here.

(28) Subject 8 Subgroup 2, Age 3;0; Item # 36

Input:	(iz) bol'sh-oj forel'-i
	(by) big-Gen,Sg,F trout-Gen,Sg,F3
	'From the big trout'
Target:	(iz) bol'sh-yx forel'-ej
	(from) big-Gen,Pl trout-Gen,Pl
	'from the big trouts'
Elicited production:	(iz) bol'sh-oj forel'-ava
	(from) big-Gen,Sg,F trout-?

The error type is *Cex/-ava(N)*N/Sg(A): non-adult case exponent of the noun as well as an error on the adjective's number. The non-adult noun's exponent could be the possessive adjectival *–ego*, and could be genitive, but I would not like to push it that far for the interpretation.

3 CHILDREN'S PARADIGM TEMPLATE CONFIGURATIONS

In the preceding chapter I presented overall results regarding children's performance on case, number and gender agreement features. In this section I briefly summarize these results because they are reflected in each child's individual responses that are the focus of this part. There are three main findings from the overall performance part of the analysis:

(i) Children perform best on case feature and worst on number feature, with gender feature being in the middle.

(ii) There is a significant difference between successful production rate in genitive and dative plural contexts, the latter being more successful.

(iii) Feminine class 3 nouns present a great challenge to both younger and older experiment subjects.

In order to consider individual children's performance and particular types of errors on the elicited production task, I organized the subjects' responses according to nominal and adjectival paradigm templates based on Russian nominal and adjectival paradigms representing the tested sections. I looked at each context (paradigm cell) and listed all variants the child had in his or her production for that context, highlighting the one (if present) that matches the adult variant. Sections that have not been tested are marked with gray. For a complete adult paradigm please refer to the appendix.

Even though children's paradigm templates configurations differ to a certain extent from one another, there are a number of generalizations that I

would like to make before I discuss children's paradigms in detail. When we look at these charts, we see three kinds of responses for each of the contexts (paradigm cells). For some contexts children always produce adult-like responses. Such contexts are the ones that have been fully acquired. Other contexts show the use of incorrect morphemes along with adult-like forms. These would be cases of emerging acquisition. Finally, there are contexts in which children always make an error. The goal of this section is to study these cases in detail. In particular, we are interested in the forms children produce in a certain context in error and in the strategies they use in the elicited production when faced with the necessity to make a response when they may not be certain of the adult form. Children vary in their choice of a strategy. As I mentioned in the previous section, some children make use of the conservative strategy of repeating one or both input stimuli items, or, they produce another omission type of response, providing no answer whatsoever. Children's abundant use of diminutive forms of the nouns also signals their conservatism: it has been reported (Kempe at al, 2009) that diminutives serve as facilitators in adult-like production of nouns. In my study children used this strategy to avoid the context of feminine class 3 nouns, which remains a problem for them until age 5;0. The diminutive form of F3 nouns is class 2 which has a better rate of correct performance. Another strategy used by some children is to use the adult grammar default form in certain contexts. This strategy is particularly revealing in that it shows children's sensitivity to the adult default form. Yet other children, especially younger ones for the most part, make up their own inflection in certain

contexts. Even though the made-up forms are non-adult phonetic exponents, these forms do not seem to be arbitrary. I will have a more extensive discussion of them both in this section and in the discussion chapter. There is one context where children do not use any specific strategy: genitive plural. All subjects vary both between themselves and among their own responses to that context. I will focus on the discussion of genitive plural allomorphy in section 4 of the current chapter.

The analysis of children's individual errors in section 3.1 is based on the data from the younger four children, aged 2;5 (Subject 21), 3;0 (Subject 8), 3;4 (Subject 19, and 3;7 (Subject 28). Following this section, I will present the same for the older four children, aged 3;11 (Subject 17), 4;3 (Subject 6), 4;7 (Subject 13), and 4;11 (Subject 1).

3.1 YOUNGER CHILDREN'S GROUP

3.1.1 NOMINAL PARADIGMS

I begin this section with a summary of the data collected from four selected subjects from the younger group in the form of a nominal paradigm template chart described in the introduction above. There is a separate chart for each subject arranged in the order of the subjects' age beginning from the youngest child. These paradigms are followed by the discussion that refers back to them. I refer to the subject number from each chart in the discussion.

TABLE 1 *SUBJECT 21 SUBGROUP 1 AGE 2;5*

Subject 21 Subgroup 1 Age 2;5				
SINGULAR				
GENDER	NEUTER	MASCULINE	FEMININE	FEMININE[18]
CASE CLASS	IV	I	III	II
NOMINATIVE	-o/-e	-∅		-a
ACCUSATIVE				-u
GENITIVE	-a, -∅, IR		-i, WW	-i, IR
DATIVE	-u		-u	-e, WW
INSTRUMENTAL	-om/-em		-ej, -em	-oj/-ej, -em
PREPOSITIONAL				
PLURAL				
NOMINATIVE				
ACCUSATIVE				
GENITIVE	-ov/-ev → -∅, IR	-∅ →-∅, -ov, -ej, -a, no A, IR	-ej → -ej, -ov, -e, -∅, no A	
DATIVE	-am, om			
INSTRUMENTAL	-ami, -em, -∅			
PREPOSITIONAL				

TABLE 2 *SUBJECT 8 SUBGROUP 2 AGE 3;0*

Subject 8 Subgroup 2 Age 3;0				
SINGULAR				
GENDER	NEUTER	MASCULINE	FEMININE	FEMININE
CASE CLASS	IV	I	II	III
NOMINATIVE	-o/-e	-∅	-a	-∅
ACCUSATIVE			-u	
GENITIVE	-a, IR		-i, -a	<dim F2 -i>
DATIVE	-om, -∅		-e, -u	-∅, IR
INSTRUMENTAL	-om/-em		-om	-om
PREPOSITIONAL				
PLURAL				

[18] Please note different set-up of feminine II and III class columns in different children's paradigms. This is done to show individual differences.

NOMINATIVE	-i, -a		
ACCUSATIVE			
GENITIVE	-ov → IR /-ev → -ov	-∅ →-∅, IR, -ax, -ami	-ej → -ov, -eje, -eva, -∅, IR
DATIVE	-am, -ami, -amam		
INSTRUMENTAL	-ami, -ja, IR		
PREPOSITIONAL			

TABLE 3 *SUBJECT 19 SUBGROUP 3 AGE 3;4*

Subject 19 Subgroup 3 Age 3;4				
SINGULAR				
GENDER	NEUTER	MASCULINE	FEMININE	FEMININE
CASE CLASS	IV	I	II	III
NOMINATIVE	-o/-e	-∅, no A	-a	-∅, -a
ACCUSATIVE			-u	
GENITIVE	-a, -∅, -i, IR		IR	-i, no A
DATIVE	-u		-u, IR	-ju, -∅
INSTRUMENTAL	-om/-em		-oj/-ej, -om, IR	-∅
PREPOSITIONAL				
PLURAL				
NOMINATIVE	-i			
ACCUSATIVE				
GENITIVE	-ov/-ev → IR	-∅ → IR, no A	-ej →-ej, -i, IR	
DATIVE	-i, -∅, -u, IR			
INSTRUMENTAL	-i, -∅, -em, IR, no A			
PREPOSITIONAL				

TABLE 4 *SUBJECT 28 SUBGROUP 4 AGE 3;7*

Subject 28 Subgroup 4 Age 3;7				
SINGULAR				
GENDER	NEUTER	MASCULINE	FEMININE	FEMININE
CASE CLASS	IV	I	II	III

NOMINATIVE	-o/-e	-∅	-a	-∅
ACCUSATIVE			-u	
GENITIVE	$-i_{pl}$, -∅		-i, -∅	-∅, -om, IR
DATIVE	-a		-e, -u, IR	IR
INSTRUMENTAL	-om/-em		-om	-om
PREPOSITIONAL				
PLURAL				
NOMINATIVE	-i, -a			
ACCUSATIVE				
GENITIVE	-ov/-ev → IR, -om, -a	-∅ → -i, -a, IR	-ej →$-e_{sg}$, -a, IR	
DATIVE	-am, -i, Vm			
INSTRUMENTAL	-am, -a, -Vm			
PREPOSITIONAL				

Most obviously, all children in question have almost perfect performance on the tested [-obl] cases. This is not surprising, since nominative and accusative are acquired first and pretty early, reportedly prior to the age of the youngest subject in this experiment (2;5 years old). I would not call performance on these cases absolutely perfect solely due to feminine class 3 nouns. Even though all children correctly marked these nouns with a zero morpheme, the adjective in those NPs was either masculine (subjects 8, 21) or neuter and non-adult (subject 19). The only child who correctly assigned feminine gender to the adjective (still, not always) was subject 28.

Feminine class 3 nouns present the biggest challenge, as can be observed from the results of the experiment. None of the represented children have mastered adult-like case exponents for these nouns. Thus, for instance, F3 instrumental morpheme *–ju* which is the highest specified morpheme in the list of

nominal singular morphemes by G. Müller (2004) appears in the data of just one subject, moreover used in the incorrect context (dative singular F3).

One of the experiment's tasks was to compare children's mastery of accusative and dative singular feminine class 2 inflections. The results emphasize the contrast between these in favor of better performance on the accusative since the two subjects (19 and 28) who do not yet produce a dative singular inflection *-e* use the accusative morpheme *–u* in that context. Even though the other two subjects (21 and 8) have strong performance on both accusative and dative singular, their use of the dative morpheme is not perfect with the accusative *–u* or a wrong word there.

Masculine instrumental singular morpheme *–om* is the one that is overgeneralized into instrumental context for feminine gender of both class 2 and 3 nouns, for different children to a different extent. Thus, for subjects 8 and 28 *–om* is the only instrumental morpheme in their data, while the other two children (21 and 19) occasionally use feminine class 2 morpheme *–oj* correctly, still offering the masculine morpheme *–om* a lot.

Children's worst performance within the masculine gender is dative *–u* and genitive *–a*. The latter is occasionally correctly used by three of the children, and the former by two of them. The generalization is that the dative masculine *–u* is the morpheme that appears last in a child's inventory of masculine morphemes (subjects 28 and 8) replaced by a default *–a* (28) or zero, or instrumental *–om* (8), but once children have it, they do not use any other inflection in the dative

context (19, 21). The masculine genitive *-a* appears earlier than the dative, but remains unstable in the genitive context when children make use of other incorrect choices, the most common of which is the default zero morpheme. This type of substitution tells us about the early use of the default option strategy by children.

Another obvious generalization is children's worse performance on plural as compared with singular. Even when plural nominal morphology is correctly used, flawless performance is present only in the nominative case while in other plural cases contexts children provide erroneous morphemes, especially in the genitive plural context.

Genitive plural is a highly allomorphic case with three morphemes: *-ov, -∅* and *–ej* (see Bailyn and Nevins 2008 for discussion), which turned out to be the most problematic for children's performance. This can be shown by the fact that no child from the data sample has so far figured these out. None of them have even produced the correct set of these allomorphs. Instead, children tend to use instrumental or dative plural, genitive singular, nominative singular or plural, non-adult case exponent or input repetition. The most frequent (although still only occasional) correctly used genitive plural allomorph is *–ej* (subjects 19, 21). Another morpheme correctly used twice is the zero (subjects 8, 21).

In the experiment setup genitive plural context has been contrasted with dative plural as a highly allomorphic case vs. a syncretic case. Despite their low performance on the latter context as well, the represented subjects exhibit a

tendency to appeal to a more defined set of strategies to provide a morpheme; in particular (i) zero, (ii) dative singular, and (iii) instrumental plural and singular.

The subjects with the worst performance on the plural (19, 28), who have only nominative plural morpheme in their production, usually use either nominative plural for all cases, or use a singular morpheme, nominative or the target case. Such variation in the use of cardinally different methods of overcoming the unfamiliar form does not show us whether they have a strong preference for being faithful to case rather than number, or vice versa.

3.1.2 ADJECTIVAL PARADIGMS

Now I would like to discuss the ways the younger group of participants responded to the tasks of agreeing the adjective with the head of the noun phrase. Below are charts summarizing the four subjects' adjectival paradigms where, similar to the nominal charts, the highlighted case exponents correspond to the adult-like target inflections while the rest are the ones used by the subjects in the elicited production task.

TABLE 5 *SUBJECT 21 SUBGROUP 1 AGE 2;5*

Subject 21 Subgroup 1 Age 2;5				
CASE GDR-SG/PL	NEUTER-SG	MASCULINE-SG	FEMININE-SG	PLURAL
NOMINATIVE	-oje	-oj/-ij	-aja, -oj	-ije
ACCUSATIVE			-uju	
GENITIVE	IR, no A	-ogo/-ego	-oj, -ogo, IR	-ix, -ije, ij, -ogo, i, no A, IR
DATIVE		-omu/-emu	-om, -omu	-im
INSTRUMENTAL		-im, IR	-oj, -im, -ix	-imi, -im, -ix
PREPOSITIONAL				

TABLE 6 *SUBJECT 8 SUBGROUP 2 AGE 3;0*

Subject 8 Subgroup 2 Age 3;0				
CASE GDR-SG/PL	NEUT-SG	MASC-SG	FEMININE-SG	PLURAL
NOMINATIVE	-oje, IR	-oj/-ij	-aja, -oje, -oj, IR	-ije
ACCUSATIVE			-uju, -oje, -oju, -ojo	
GENITIVE	-ogo/-ego, IR, -oj		-oj, -ogo	-ix, -ij, -imi, -ogo, -ov, -ije, IR
DATIVE		-om, -ij	-oj, -omu, IR	-im, -imi -ami, -omu
INSTRUMENTAL		-im, -om	-oj, -om, IR	-imi, -om, IR, no A
PREPOSITIONAL				

TABLE 7 *SUBJECT 19 SUBGROUP 3 AGE 3;4*

Subject 19 Subgroup 3 Age 3;4				
CASE GDR-SG/PL	NEUTER-SG	MASCULINE-SG	FEMININE-SG	PLURAL
NOMINATIVE	-oje, -a, IR	-oj/-ij, IR, no A	-aja, -a, IR	-ije
ACCUSATIVE			-uju, IR, no A	
GENITIVE	-ogo/-ego, -oj, no A		-ogo, -ij, IR, no A	-ije, IR
DATIVE		-omu/-emu, -ij	-omu, -ogo	-ije, -ij, -omu
INSTRUMENTAL		-im, -omu	-ij, IR, no A	-omu, IR, no A
PREPOSITIONAL				

TABLE 8 *SUBJECT 28 SUBGROUP 4 AGE 3;7*

Subject 28 Subgroup 4 Age 3;7				
CASE GDR-SG/PL	NEUTER-SG	MASC-SG	FEMININE-SG	PLURAL
NOMINATIVE	-aja, -aju	-aj, IR	-aja, -oj	-ije
ACCUSATIVE			-uju, -aju	

GENITIVE	-oj/-ij, -om, no A		-oj, -ij, no A	-ije -aja, -ij, -im, -e, IR
DATIVE		-ij, -om	-oj, -om, -oju, IR	-im, -ije, -i, -am
INSTRUMENTAL		-im, -ojem	-im, -om, -∅, -ij	-im, -i, -oj, -om, -∅
PREPOSITIONAL				

First of all, it should be noted that no child from the younger group of participants has shown the complete mastery of the adjectival paradigm; however two of the four children – the youngest subjects 21 and 8 – have instances of correct inflections in most of the paradigm cells. All subjects are at the emergence stage where they still make a lot of omission or commission errors.

Even [-obl] cases are still under construction for three out of the four subjects. The youngest child, subject 21, is the only subject who has almost adult-like performance on the nominative and accusative cases of adjectival inflections. Other children differ in terms of the means they use to agree the adjective with nominative or accusative nouns. Thus, subject 8 has both masculine and neuter inflections across all genders as well as non-adult exponents and input repetition. Subject 19 is the most conservative child who prefers omission errors such as input repetition or no answer at all. The only other morpheme he uses in these contexts is *–a* which is the short adjective feminine singular morpheme (a similar case was presented earlier in (25)). Finally, subject 28 presents a feminine-based paradigm where most of the correct performance is in the feminine gender and the feminine morphemes are also used across other genders and plural number.

The plural number part of the paradigms show one tendency common to all subjects, i.e. the use of nominative plural inflection *–ije* in plural contexts: subjects 28 and 19 use it in genitive and dative plural, subjects 21 and 8 do so in plural genitive.

The plural context in adjectival paradigms was more difficult than singular just as in nominal paradigms. Certain children use several non-adult case exponents especially in the plural. These include *–ov* and *–ami*, both of which are nominal inflections, and *–i* and *–e*, which are short adjective inflections used by subjects 8 and 28. All children use singular inflections in error in plural contexts, especially nominative singular *–ij* (all subjects) and *–ogo* (subjects 21 and 8).

Comparing the performance on genitive plural and dative plural, we reported earlier that in the nominal paradigm there is a significant difference where genitive plural context is a more difficult one for children. Adjectival paradigm performance does not exhibit such a difference because of a significant variation in children's production in these cases. The paradigm of subject 21, the youngest and most adult-like, is perfect in dative plural but not in genitive plural, which replicates the nominal results. Subject 28 has a similar pattern: there are no correct inflections in genitive plural, but in dative there is one in addition to other (incorrect) variants. Other children's paradigms, however, display no evidence of any preference. Subject 8 exhibits the use of instrumental plural morphemes in all three contexts (genitive, dative and instrumental plural) in addition to other inflections, which shows no difference between the first two –

they are both still not acquired. Subject 19 does not have any single correct use of the relevant inflection in any of these contexts. Given that this is the most conservative child, and that he uses more incorrect variants (commission errors) in dative rather than genitive, where he uses only input repetition or nominal plural, we can hypothesize that he feels more confident with dative than genitive.

In the singular domain [+obl] masculine morphemes are generalized to be used in feminine contexts. Moreover, there is no difference whether the noun in the NP is class 2 or 3. In the older group data, however, there is a striking difference between children's production with class 2 or 3 nouns NPs, which is presented later in section 3.2.2.

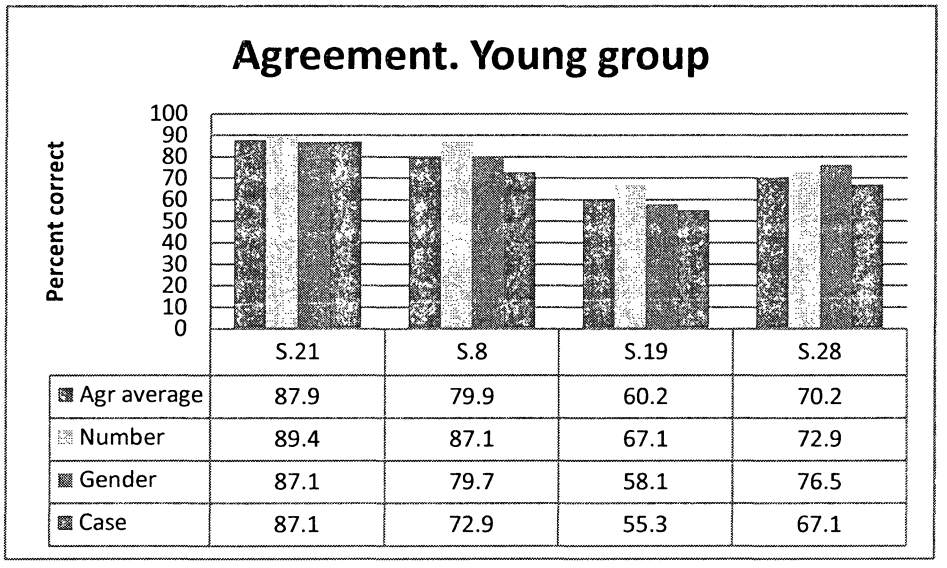
Finally, I would like to point out a split in the genitive singular section of subject 21 paradigm between neuter and masculine gender. In adult grammar these grammatical contexts have the same exponent, but this child shows a difference – masculine NPs are perfect while neuter has no correct exponent. In fact, the child does not choose to provide any adjective or repeats the input stimuli item.

3.1.3 TYPES OF ERRORS AND AGREEMENT

Overall, children are not bad on agreement. Even though children make mistakes in feature assignment, they do their best to make the adjective agree with the noun within the tested NPs. The lowest percent of overall correct agreement among all children is 60.2%. Younger children, though, do not perform better than 87.9% on agreement.

The subject who shows the lowest results on agreement is subject 19, who is the most conservative subject from the whole experiment. Her results on agreement on number are the highest: 67.1%, but very low on case agreement (55.3%) and gender agreement (58.1%). Other children from the younger group differ from each other by approximately 10% on overall successful agreement performance. The exact numbers are available in the chart below.

FIGURE 13 *YOUNG GROUP: AGREEMENT*



	S.21	S.8	S.19	S.28
Agr average	87.9	79.9	60.2	70.2
Number	89.4	87.1	67.1	72.9
Gender	87.1	79.7	58.1	76.5
Case	87.1	72.9	55.3	67.1

Children show a similar pattern of being almost equally successful on agreement on all features.

It should be noted that subject 21, the child who was most successful at agreement in the younger group, shows 100% performance on agreement in the case and gender subparts of the experiment. This is also a tendency for other children, most of whose agreement errors occur in the number experiment subpart.

The types of errors children make vary. In general, children of the younger group make errors on all feature assignments on the noun and adjective, and on agreement. Here is an example of an error where agreement appears correct, but the feature value is not target-like.

(29) Subject 28 Subgroup 4, Age 3;7; Item # 27

Input:	(u) malen'k-ogo brat-a
	(at) little-Gen,Sg,M brother-Gen,Sg,M1
	'At the little brother's'
Target:	(u) malen'k-**ix** brat'-**jev**
	(at) little-Gen,Pl brother-Gen,Pl
	"At the little brothers'"
Elicited production:	(u) malen'k-**im** brat-**om**
	(at) little-Inst,Sg,M brother-Inst,Sg,M

This child made an error of the following type: *C/Inst*N/sg, which means that the child incorrectly assigned instrumental case singular number to the noun, and the adjective is also marked with instrumental singular in the genitive plural context. But the adjective agrees with the noun in the elicited NP, hence there is no mistake in agreement[19].

Older children make more consistent types of errors, which are discussed in a later section.

[19] Agreement in these cases discussed in this section is rather 'concord' where the noun and adjective show matching features rather than feature assignment.

3.2 OLDER CHILDREN'S GROUP

3.2.1 NOMINAL PARADIGM

I expect subjects of the older group to be similar in their production but different from the younger children's production. In this section I would like to point out some generalizations of the older group children's production the summaries of which are presented below.

TABLE 9 *SUBJECT 17 SUBGROUP 5 AGE 3;11*

Subject 17 Subgroup 5 Age 3;11				
SINGULAR				
GENDER	NEUTER	MASCULINE	FEMININE	FEMININE
CASE CLASS	IV	I	II	III
NOMINATIVE	-o/-e	-∅	-a	-∅
ACCUSATIVE			-u	
GENITIVE	-a, -i		-i	-i, IR
DATIVE	-u		-e, -u	-i, -u
INSTRUMENTAL	-om/-em		-oj/-ej, -om	-om, IR
PREPOSITIONAL				
PLURAL				
NOMINATIVE	-i			
ACCUSATIVE				
GENITIVE	-ov → IR /-ev → -ov	-∅ →-∅, -ov, -i, IR	-ej →-ej, -ov, IR	
DATIVE	-am, -ami			
INSTRUMENTAL	-ami, -i_{sg}, IR			
PREPOSITIONAL				

TABLE 10 *SUBJECT 6 SUBGROUP 6 AGE 4;3*

Subject 6 Subgroup 6 Age 4;3				
SINGULAR				
GENDER	NEUTER	MASCULINE	FEMININE	FEMININE
CASE	IV	I	III	II

CLASS				
NOMINATIVE	-o/-e	-∅	-∅	-a
ACCUSATIVE				-u
GENITIVE	-a		-i, <dim>	-i
DATIVE	-u		-i, -u	-e
INSTRUMENTAL	-om/-em		-om/-em	-oj/-ej
PREPOSITIONAL				
PLURAL				
NOMINATIVE				
ACCUSATIVE				
GENITIVE	-ov/→ -ov, -av/ -ev→ -ov	-∅ → -∅, -ov, IR	-ej → -ej, -ov, -∅	
DATIVE	-am			
INSTRUMENTAL	-ami, IR			
PREPOSITIONAL				

TABLE 11 *SUBJECT 13 SUBGROUP 7 AGE 4;7*

Subject 13 Subgroup 7 Age 4;7				
SINGULAR				
GENDER	NEUTER	MASCULINE	FEMININE	FEMININE
CASE CLASS	IV	I	III	II
NOMINATIVE	-o/-e	-∅	-∅	-a
ACCUSATIVE				-u
GENITIVE	-a		-i, <dim>, IR	-i
DATIVE	-u		-i, -u	-e
INSTRUMENTAL	-om/-em		-ju, -om	-oj/-ej
PREPOSITIONAL				
PLURAL				
NOMINATIVE				
ACCUSATIVE				
GENITIVE	-ov/→ -ov, -∅/ -ev→ <dim>	-∅ → -∅, -ov, IR	-ej → -ej, -ov, -e, -ev, -av	
DATIVE	-am			
INSTRUMENTAL	-ami, IR			
PREPOSITIONAL				

TABLE 12 *SUBJECT 1 SUBGROUP 8 AGE 4;11*

Subject 1 Subgroup 8 Age 4;11				
SINGULAR				
GENDER	NEUTER	MASCULINE	FEMININE	FEMININE
CASE CLASS	IV	I	III	II
NOMINATIVE	-o/-e	-∅	-∅	-a
ACCUSATIVE				-u
GENITIVE	-a		-i	-i
DATIVE	-u		-i, -u	-e
INSTRUMENTAL	-om/-em		-ju, -ej	-oj/-ej
PREPOSITIONAL				
PLURAL				
NOMINATIVE				
ACCUSATIVE				
GENITIVE	-ov/→ -ov / -ev→ -ov	-∅ → -∅, -ov, no A	-ej → -ej, -ov, -ev	
DATIVE	-am			
INSTRUMENTAL	-ami, IR			
PREPOSITIONAL				

As can be seen from the above charts, older group participants show absolutely perfect performance on [-obl] cases. Younger children are not that near such mastery. That is why the question of comparing the use of feminine class 2 inflections in accusative and dative singular contexts is not legitimate with older children since there is no difference unlike with younger children.

Feminine class 3 is still a problem for this age group. However, the problem narrows down to [+obl] cases; moreover, for subjects 6, 13 and 1, the older ones in the group, it is the only problem in the singular domain. All other

singular contexts are adult-like, so these children have transitioned to the mastery level from the emergence stage.

What these children still have not mastered shows in their ungrammatical use of masculine dative and instrumental morphemes *–u* and *–om*. The oldest child, subject 1, is the only one who does not generalize masculine instrumental *–om*, but instead generalizes F2 *–ej* which shows the child's understanding of gender.

Another difference from the younger children is the emergence of the highest specified morpheme *–ju* in the correct F3 instrumental singular context in the two oldest subjects of the group (subjects 13 and 1). Thus, they demonstrate a complete set of adult nominal singular (and plural) morphemes at their disposal. For the other children this morpheme appears to be the only one missing in their inventory.

Yet another piece of evidence that indicates how difficult F3 context is even for older children is the use of F2 diminutive forms of F3 nouns by subjects 6 and 13 in genitive singular. They referred to this strategy along with the grammatical use of the relevant morpheme in this context, though.

Unlike younger children's production, the use of non-adult exponents is rare. In fact, only subjects 6 and 13 have just one non-adult exponent, and it is the same for both children: *-av*. Not surprisingly, they both use it in genitive plural context.

Genitive plural context is another major issue with both age groups. However, the age groups differ in their patterns. Older children's plural paradigms look strikingly similar for all subjects in this group where genitive singular is still a troublemaker in children's grammar. But in contrast to younger children, all older subjects except subject 17 (the youngest from the older group) have an instance of a correct morpheme use for all allomorphs. In addition to the correct ones, the children still produce other variants. This shows how much they struggle with genitive plural. All subjects used the default morpheme *–ov* in place of all other allomorphs. Subject 17 uses *–ov* elsewhere except when needed. Subject 6 does not exhibit the use of phonologically conditioned allomorph *–ev*. He also shows a difference in his use of allomorph *–ej* which is used correctly only with F3 nouns, not with masculine ones. These nouns are ambiguous in their nominative singular form ending in a palatalized consonant with a zero morpheme. In the input, however, such stimuli were presented in genitive singular. This serves as evidence that the child realizes the distinction between these nouns and pays attention to the unambiguous genitive singular form. Subject 13 has trouble using exponent *–ej* in the correct context making a lot of commission errors. Subject 1, the oldest child in the whole experiment, is the only one who does not use any other variant in place of the morpheme *–ov*. He is also the only one who does not use the zero morpheme in an inappropriate context. However, he still struggles with allomorph *–ej* and allophone *–ev*.

All of the above observations about genitive plural use stand in contrast with the perfect performance of dative plural by three out of four children, the

older ones. Only subject 17, the youngest in this group, still uses instrumental plural *–ami* in dative plural context.

Instrumental plural is the context that shows a very similar pattern across all subjects who employ the input repetition strategy along with the correct use of the relevant morpheme *–ami*.

3.2.2 ADJECTIVAL PARADIGM

Like older participants' nominal paradigms, their adjectival paradigms are also very similar to each other except the paradigm from the youngest subject of the older group – subject 17, whose paradigm is not much different from that of a younger group child. First, let us take a closer look at the charts representing children's production on the adjectives within the NPs in the elicited production.

TABLE 13 *SUBJECT 17 SUBGROUP 5 AGE 3;11*

Subject 17 Subgroup 5 Age 3;11				
CASE GDR-SG/PL	NEUTER-SG	MASCULINE-SG	FEMININE-SG	PLURAL
NOMINATIVE	-oje, -aja	-oj/-ij, -aja	-aja, -oj, -oje	-ije
ACCUSATIVE			-uju, -aja, -onu	
GENITIVE	-ogo, -aja	-ogo/-ego	-oj, IR	-ix, -ije, ij, IR
DATIVE		-omu/-emu	-oj, -omu	-im, -ij, -imi, -ami
INSTRUMENTAL		-im	-oj, -im	-imi, -im, -ami, IR
PREPOSITIONAL				

TABLE 14 *SUBJECT 6 SUBGROUP 6 AGE 4;3*

Subject 6 Subgroup 6 Age 4;3				
CASE GDR-SG/PL	NEUT-SG	MASC-SG	FEMININE-SG	PLURAL
NOMINATIVE	-oje	-oj/-ij	-aja	

ACCUSATIVE			-uju		
GENITIVE	-ogo/-ego		-oj		-ix, IR
DATIVE		-omu	-omu	-oj	-im
INSTRUMENTAL		-im	-im	-oj	-imi, IR
PREPOSITIONAL					

TABLE 15 *SUBJECT 13 SUBGROUP 7 AGE 4;7*

Subject 13 Subgroup 7 Age 4;7					
CASE GDR-SG/PL	NEUT-SG	MASC-SG	FEMININE-SG		PLURAL
NOMINATIVE	-oje, -aja	-oj/-ij	-aja		
ACCUSATIVE			-uju, -aju		
GENITIVE	-ogo/-ego		-oj, IR		-ix
DATIVE		-omu	-omu	-oj	-im
INSTRUMENTAL		-im	-im	-oj	-imi, IR
PREPOSITIONAL					

TABLE 16 *SUBJECT 1 SUBGROUP 8 AGE 4;11*

Subject 1 Subgroup 8 Age 4;11					
CASE GDR-SG/PL	NEUT-SG	MASC-SG	FEMININE-SG		PLURAL
NOMINATIVE	-oje	-oj/-ij	-aja		
ACCUSATIVE			-uju		
GENITIVE	-ogo/-ego		-oj		-ix
DATIVE		-omu	-omu	-oj	-im, <numeral -im>
INSTRUMENTAL		-im	-oj, <numeral –oj>		-imi, <numeral –ami>
PREPOSITIONAL					

The paradigm of subject 17 in general is similar to that of younger children's paradigms. For example, in plural context there is no distinct set of morphemes for each case as in adult grammar. In contrast to subject 17 and

younger group children, subjects 6, 13 and 1 do not make any commission errors in plural contexts. Sometimes children use input repetition strategy, and subject 1 uses numerals in place of adjectives. The numeral agreement morphemes are the same as those of the adjectives, and the child uses them correctly, as in the following example:

(30) Subject 1 Subgroup 8, Age 4;11; Item # 17

Input:	malen'k-oj loshad-i
	small-Gen,Sg,F horse-Gen,Sg,F3
	'to a small horse'
Target:	malen'k-im loshad'-am
	small-Gen,Pl horses-Gen,Pl
	'near small balls'
Elicited production:	obe-im loshad-k-am
	two-fem-Dat,Pl horse-dim-Dat,Pl

The three oldest subjects of the experiment display identical dative and instrumental scenarios for the adjectives where the noun in the NP is F3: the pattern is identical to that of masculine whereas F2 NPs show adult-like inflections. This is different from the pattern of the younger group and that of subject 17 where both F2 and F3 NPs share the same masculine inflections.

In the singular domain all subjects produced perfect results in masculine contexts with the exception of subject 17 who uses feminine *–aja* in nominative. Feminine, on the other hand, still has a lot of ungrammatical variants which for

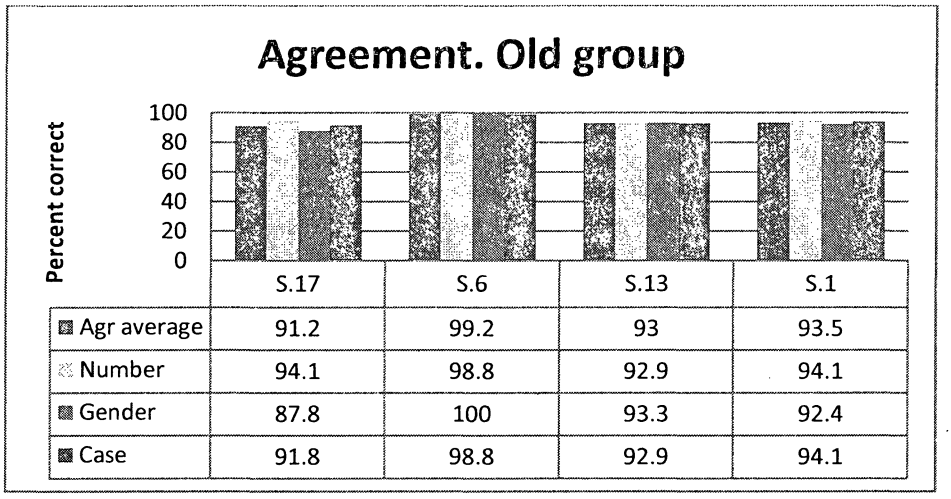
subjects 6, 13 and 1 are due to the problematic F3 phenomenon discussed earlier.

Lastly, I would like to comment on the genitive vs. dative plural contexts. For younger children it is not possible to say whether they are better at one or the other in the adjectives. The same is true about the older group but due to a different reason: while younger subjects' performance is equally poor on both, older children perform equally well on both genitive and dative adjectives in plural.

3.2.3 ERROR TYPES AND AGREEMENT

While younger children show steady but not perfect overall results on agreement, older group subjects proved they have mastered agreement almost completely. The percent correct numbers are above 90%, as can be seen from the chart above. As we can see, there is little difference in the performance on agreement between older subjects. Thus, for example, subject 6 made only two errors, and these errors are due to the production of non-adult adjectival exponent *–av* in the genitive plural.

FIGURE 14 *OLD GROUP: AGREEMENT*



	S.17	S.6	S.13	S.1
Agr average	91.2	99.2	93	93.5
Number	94.1	98.8	92.9	94.1
Gender	87.8	100	93.3	92.4
Case	91.8	98.8	92.9	94.1

Children of the older group are also very similar with respect to the types of errors they make. Mostly the only two types of errors that still remain in the elicited production data are the wrong case exponent in the genitive plural where children choose to mark the noun with *–ov* rather than the target genitive plural morpheme: *Cex/-ov(N), or the error of assigning masculine gender to F3 nouns: *G/m*Cl/1. As for the younger subjects, the older ones also very rarely produce errors in the case and gender subpart of the experiment.

4 ALGORITHM OF ERROR ANALYSIS

To analyze each child's error pattern and test the predictions of the two hypotheses that are spelled out in chapter 1, I developed an algorithm for error analysis. Before I specify how I analyzed the data with the help of the algorithm, I would like to summarize the two hypotheses from chapter 1 for convenience.

(31) **Hypothesis A**: 'Paradigm' formation "proceeds through an incremental specification metric, according to which only one feature is added at a time". (Blom, Polišenska & Weerman 2006, 321).

(32) **Hypothesis B**: With a universal set of features being available to the learner, the child initially assigns a highly specified set of features to each morphological entry and later rules out the features that are irrelevant or redundant.

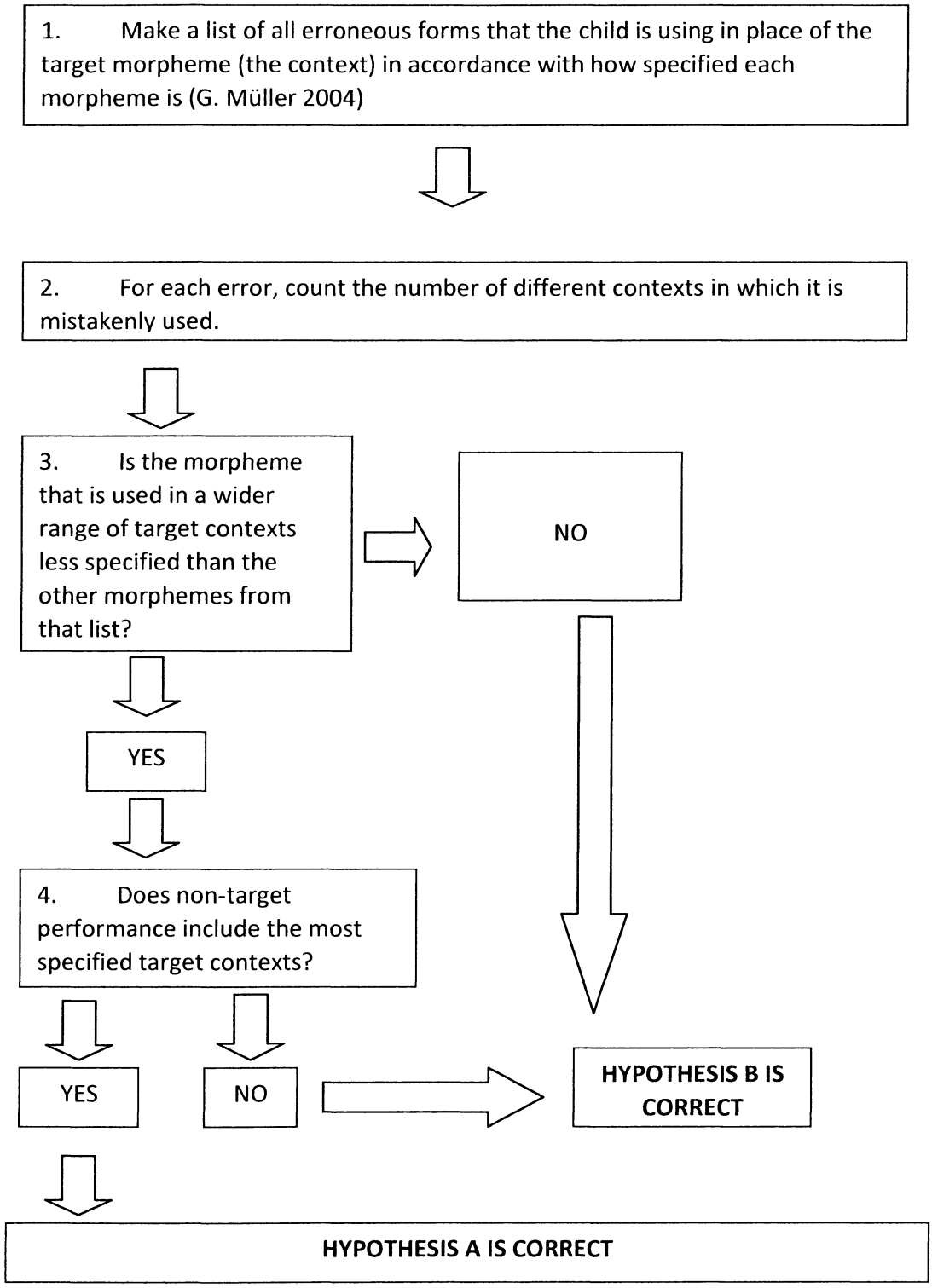
These hypotheses make the following predictions, repeated here also for convenience:

(33) *Predictions with respect to individual children's error types:*

<table>
<tr><td>HYPOTHESIS A:
INITIAL FORMS ARE UNDERSPECIFIED</td><td>HYPOTHESIS B:
INITIAL FORMS ARE HIGHLY SPECIFIED</td></tr>
<tr><td colspan="2">(i) WHEN THERE IS A MISTAKE IN A CHILD'S PRODUCTION, THE CHILD USES _____ IN MORE MULTIPLE CONTEXTS.</td></tr>
<tr><td rowspan="3">A LESS SPECIFIED MORPHEME
(OVERGENERALIZATION ERRORS)</td><td>MORE VARIABLE ERROR FORMS, SUCH AS:</td></tr>
<tr><td>• A LESS SPECIFIED MORPHEME</td></tr>
<tr><td>• INPUT REPETITION OR OTHER</td></tr>
<tr><td colspan="2">(ii) THE CHILD USES _____ IN THE MOST SPECIFIED CONTEXTS.</td></tr>
<tr><td>AN UNDERSPECIFIED MORPHEME
(NON-TARGET PERFORMANCE)</td><td>VARIABLE FORMS SOME OF WHICH MAY BE TARGET-LIKE</td></tr>
</table>

When there is a mistake, I first made a list of all forms that the child is using in place of the target morpheme (the context) in accordance with how specified each morpheme is. For that purpose I refer to the list of Russian case morphemes' specification provided by G. Müller (2004). Then for each of those morphemes I counted in how many different contexts it is mistakenly used. If Hypothesis A is correct, then I expect that the morpheme that is used in a wider range of target contexts is less specified than the other morphemes from that list, and, importantly, non-target performance includes the most specified contexts. To further distinguish between the different predictions, I considered the most specified contexts and expected target-like performance if Hypothesis B is right; or errors if Hypothesis A is correct. These steps are spelled out in the following algorithm:

(34) *Algorithm of error analysis*



4.1 YOUNGER CHILD SAMPLES (WORST PERFORMERS)

I tested the predictions of the two hypotheses above with the data from several children. The algorithm analysis from all tested children, both young and old, concludes with the idea that the predictions of Hypothesis A are verified. In this section I present two different paths of the analysis that leads to the same conclusion with the data from two younger group children. One of them was subject 37 aged 2;7. Her overall performance in the experiment was one of the lowest: her elicited production was target-like only 11 times out of 85 items. In all other items of the experiment she made different kinds of errors. According to steps 1 and 2 of the algorithm, the list of morphemes used erroneously and the number of different target contexts each of these morphemes is used in are presented below in the order from most highly specified to least specified morphemes, as in G. Müller (2004):

(35)

Müller:		Subject 37: #/contexts
Singular		
oj		
ju		
om	om	2/-ami, -a
e_{dat}	e_{dat}	1/-oj
o (e)	o	1/-a
ø	ø	5/-ami, -u, -i_{sg}, -ev, -ej
i		
u	u	1/-e_{dat}
a	a	4/-oj, -e_{dat}, -i_{sg}, -u
Plural		

ami		
am		
ov	ov	1/-a
ø		
i	i	5/-ju, -ami, -am, -ø, -ej
[ej][20]		

The next step of the algorithm is 3: is the morpheme that is used in a wider range of target contexts less specified than the other morphemes from that list? Both in the singular and plural domains the answer is 'yes' because the morphemes that are used in a greater variety of contexts are – ø, *-a*, and $-i_{pl}$, the last two of which being the least specified morphemes, and – ø also closer to the end of the list. Therefore, we go on to step 4: does non-target performance include the most specified target contexts? The answer to this question is also 'yes' both in singular and plural, since the most specified contexts, such as instrumental feminine 2 and 3 classes (*-oj* and *–ju* respectively) in singular and instrumental and dative plural (*-ami* and *–am*) are all among those contexts where this child made an error. The conclusion is: the predictions of Hypothesis A are true.

Even though a similar algorithm analysis was performed with most other subjects and giving similar results, there is an alternative path of the analysis of the data which can be taken. I illustrate this path using data from subject 28. Subject 28 is aged 3;7. His overall performance in the experiment task is 18.8%, which is 16 correct answers out of 85 items. When making errors, this subject

[20] Morpheme *–ej* is not on Müller's list. He follows Halle (1994) in assuming there is a morpho-phonological rule that accounts for *–ov* being realized as *–ej* under certain conditions.

shows a tendency towards some patterns depending on the input stimulus item. One of the patterns is favoring feminine gender on novel adjectives in the gender and case parts of the experiment, which resulted in absolutely correct performance on the NPs with feminine nouns, but exclusively incorrect on the NPs with masculine or neuter nouns. The other pattern is the use of accusative case both for accusative and dative NPs. The former type of error is not reflected in the algorithm analysis because it has to do with gender on the adjective. As for the latter example, we can see it in (36) where morpheme *–u* is used in place of -e_{dat}, but due to the unified nature of such error, it is used only in one type of context. The complete list of erroneous morphemes in comparison to Müller's list is shown below:

(36)

Müller:		Subject 37: #/contexts
Singular		
oj		
ju		
om	om	6/-oj, -ju, -ami, -am, i_{sg}, -ev
e_{dat}		
o (e)	o	1/-ej
ø	ø	2/-a, -i_{sg}
i		
u	u	1/-e_{dat}
a	a	4/-ami, -u, $ø_{pl}$, -ej
Plural		
ami		
am	am	1/ -ami

ov		
ø		
i	i	3/-am, -a, -ø
[ej]		

As we can see, the results are not the same for singular and plural morphemes. The answer to step 3 question (Is the morpheme that is used in a wider range of target contexts less specified than the other morphemes from that list?) is 'yes' for plural, but 'No' for singular because morpheme *–om* that is used in 6 different contexts is pretty high in Müller's list. Therefore we again conclude that the predictions of hypothesis A are true.

4.2 OLDER CHILD SAMPLE (BEST PERFORMER)

The peculiarities of the older group's data are such that they do not make as many errors as younger children do. Basically, all children make most errors in the genitive plural context with a few errors elsewhere. Nevertheless, this error makes the algorithm analysis for older children proceed the same way it does for younger children and with the same conclusion supporting Hypothesis A. The reason is the fact that genitive plural morpheme *–ov* is the one that all children use in error in more contexts than other erroneous morphemes. Let us go through the algorithm with the data from one of the most successful subjects – subject 1, age 4;11, with the overall successful performance rate of 83.3% (70 correct responses out of 85). The first two steps of the algorithm analysis are presented in (37):

(37) Müller: Subject 1: #/contexts

Singular

oj	oj	1/-ju
ju		
om		
e_{dat}		
o (e)		
ø		
i		
u	u	1/-i_{sg}
a		

Plural

ami		
am		
ov/ev	ov	3/-ev, -ej, -ø
ø	ø	1/-ej
i		
[ej]		

The above list shows that morpheme –ov is used in 3 different contexts in error while other errors are used in only 1 context. Since this morpheme is not as highly specified as other morphemes in Müller's list, we say 'Yes' to step 3 question (Is the morpheme that is used in a wider range of target contexts less specified than the other morphemes from that list?). This answer takes us to step 4 where we look at whether the child made any errors in the most highly

specified contexts, such as *–oj*, *-ju*, *-ami*, and *–am*. Similar to all other children, this child also produced errors in the context of *–ju*. Therefore we conclude that the algorithm analysis performed with these data again supports Hypothesis A.

5 GENITIVE PLURAL ALLOMORPHY IN CHILD RUSSIAN: A 'ZOOM-IN' AT PARADIGM FORMATION

The context of genitive case in the plural remains one of the most problematic for all children tested in the experiment. Moreover, this context is one of the two remaining problems for the oldest experiment subjects up to age 5 who, otherwise, produce no errors. In this section I consider acquisition data on genitive plural allomorphy with respect to two different accounts of Russian allomorphy proposed by G. Müller (2004) and Bailyn and Nevins (2008).

In distributed morphology (DM) underspecification approaches, the 'paradigm formation' involves three steps: (i) decomposition of morpho-syntactic features into primitive features; (ii) primitive features define natural classes; (iii) underspecification of features gives rise to a competition for the morphological slot, which is resolved by means of the Subset Principle (a.k.a. the Elsewhere Principle). In the focus of this section are different views on how to decompose the agreement features into primary features (step (i)), the predictions of these views with respect to adult grammar case exponents in an instance of case allomorphy (genitive plural in Russian), and an analysis of acquisition data from experiment 1 that can be brought to bear on these alternative accounts.

First, I briefly summarize the genitive plural allomorphy in Russian in (38), adapted from (30) of Bailyn and Nevins (2008):

(38) *Examples of Genitive Plural Allomorphy in Russian*

(Trad.) Stem	Gender	Class	Nom.Sg	Gen.Pl	"Ending"

kn'ig *book*	F	CLASS I	kn'iga	kn'ig	-∅
stol *table*	M	CLASS II	stol	stolov	-ov
zv'er' *beast*	M	CLASS II	zv'er'	zver'ej	-ej
nozh *knife*	M	CLASS II	nozh	nozhej	-ej
gospodin *mister*	M	CLASS II	gospodin	gospod	-∅
ok(ъ)n *window*	N	CLASS IV	okno	okon	-∅
dv'er' *door*	F	CLASS III	dv'er'	dv'er'ej	-ej
noch' *night*	F	CLASS III	noch'	nochej	-ej

Even taking out the so-called 'exceptional' words (such as a handful of class III neuter nouns that end in *–mja* and the only masculine class III noun *put'* – 'way'), there are three genitive plural (*-ov, -ej, -∅*) exponents. As Bailyn and Nevins (2008) put it, class or gender information alone is not sufficient to predict the distribution of the genitive plural endings.

Case syncretism and allomorphy, including genitive plural allomorphy in particular, has been studied by several researchers who developed their analyses that differ from each other in the way morpho-syntactic features are decomposed. One of them is the analysis by Bailyn and Nevins (2008) who argue that the distribution of genitive plural allomorphs depends on the decomposition of Russian nouns into a root and a theme vowel. An alternative approach by Müller (2004) employs binary features α and β to classify inflectional classes. A summary of the morpho-syntactic feature decomposition in both alternatives is presented in (39):

(39)

Class	Gender	Theme (B&N)	Features (Müller)
1	M	-∅-	[+α,-β]
2	F/M	-A-	[-α,+β]
3	F	-∅-	[-α,-β]
4	N	-O-	[+α,+β]

Both of these views make specific predictions about genitive plural case exponents in adult Russian grammar based on different principles ('elsewhere' principle in Müller 2004 and 'markedness' principle in B&N(2008)), as shown in (40).

(40)

	B&N	Müller:
stem ends in V →	-∅	[+β] → -∅
stem ends in C' →	-ej	[-β] → -ov
stem ends [elsewhere] →	-ov	

There is a notational difference in the predicted genitive plural exponents made by the above accounts. While class [+β] and the class of vowel-final stems coincide, Müller's account for morpheme /ej/ in adult Russian is due to it being a realization of /ov/ after [-back] consonants as the result of a morpho-phonological rule (Müller, 2004, 214; Halle, 1994, 53). In several cases both of these proposals predict exponents that are different from adult Russian grammar, as illustrated in (41). We can then look at acquisition data for possible support of these analyses.

(41) *More Genitive Plural Allomorphy: Comparing Predictions*

NOUN-NOM, SG	GEN, PL (ADULT)	GEN, PL (MÜLLER)	GEN, PL (B&N)
Class I, -∅-, [+α,-β]			
soldat 'soldier'	soldat-∅	*soldat-ov	*soldat-ov
gospodin 'mister'	gospod-∅	*gospodin-ov	*gospodin-ov
glaz 'eye'	glaz-∅	*glaz-ov	*glaz-ov
zjat' 'son-in-law'	zjat'j-ov	*zjat'-ej	*zjat-ej
put' 'way'	put-ej	put'-ej	put-ej
brat 'brother'	brat'j-ev	*brat-ov	*brat-ov
sapog 'boot'	sapog-∅	*sapog-ov	*sapog-ov
Class II, -A-, [-α,+β]			
sveča 'candle'	svečej / sveč-∅	sveč-∅	sveč-∅
saranča 'locust'	saranč-ej	*saranč-∅	*saranč-∅
kalanča 'fire towel'	kalanč-ej	*kalanč-∅	*kalanč-∅
Class III, -∅-, [-α,-β]			
loshad' 'horse'	loshad-ej	loshad'-ej	loshad-ej
Class IV, -O-, [+α,+β]			
oblako 'cloud'	oblak-ov	*oblak-∅	*oblak-∅
more 'sea'	mor-ej	*mor'-∅	*mor'-∅
pole 'field'	pol-ej	*pol'-∅	*pol'-∅

Even though these approaches do not accurately account for all cases of general plural allomorphy in adult grammar, they can be taken as valid generalizations for which there is a certain number of irregularities. Given that, it seems reasonable

to test these accounts with acquisition data because we expect children to follow generalizations before they master any exceptions. Thus, acquisition data can show whether any of these accounts are hypothesized by children at their point of acquisition. That is why I tested if children make errors as predicted by these approaches. The tested items were in the list of stimuli on the number subpart of the experiment when the subjects were presented with a genitive singular NP and were expected to produce a corresponding genitive plural NP. The table below shows all tested nouns in such context with summarized results from all experiment participants. The results illustrate the number of children who used either of the available genitive plural morphemes as in adult grammar, or predicted by the above accounts. It should be noted that besides genitive plural morphemes children also used other forms, as could be seen from individual children's paradigms.

TABLE 17 *GENITIVE PLURAL IN CHILDREN'S PRODUCTION*

NOMINATIVE SINGULAR	GEN. PL. (ADULT)	MÜLLER AND B&N	NON-ADULT PRODUCTION
Class I, -Ø-, [+α,-β]			
soldat-ø 'soldier'	soldat-ø (6)	*soldat-ov (19)	
glaz- ø 'eye'	glas- ø (8)	*glaz-ov (9)	
brat- ø 'brother'	bratj-ev (2)	*brat-ov (17)	
Class I, C'-Ø-, [+α,-β]			
vorobej- ø 'sparrow'	vorobj-ov (9)	*vorobej-ej (0)	
m'ach- ø 'ball'	m'ach-ej (9)	*[as adult]*	*m'ach-ov (10)
kirpich- ø 'brick'	kirpich-ej (17)	*[as adult]*	*kirpich-ov (8)
Class II, -A-, [-α,+β]			
sosn-a 'pine-tree'	sosen- ø (1)		
strel-a 'arrow'	strel- ø (7)		
igl-a 'needle'	igl- ø (4)		
Class III, -Ø-, [-α,-β]			
medal'- ø 'medal'	medal'-ej (8)	*[as adult]*	*medal'-ov (5)
kost'- ø 'bone'	kost-ej (17)	*[as adult]*	*kost'-ov (3)
forel'- ø 'trout'	forel-ej (11)	*[as adult]*	*forel-ev (5)
Class IV, -O-, [+α,+β]			
jablok-o 'apple'	jablok- ø (17)		
oblak-o 'cloud'	oblak-ov (4)	*oblak- ø (6)	
mor-e 'sea'	mor-ej (3)	*mor'- ø (3)	

The data summarized in the above table shows that children indeed used a lot of the forms predicted by either one of the accounts, but the predictions are

not precisely accurate for all nouns. Here are some observations of the genitive plural data.

1. Children, especially younger ones, prefer IR and other omission errors in a lot of stimuli items, but not with all of them.
2. Even though both accounts correctly predict -ø for F2 nouns, children almost never produce this morpheme with these nouns. Instead, they do IR, say 'I don't know', use a different word or use nominative singular -a or genitive plural -ov.
3. For class 1 (masculine) nouns the predictions from both accounts are borne out, i.e. children use -ov a lot more often than adult-like –ø.
4. F3 nouns' stems also end in a palatal consonant and the predictions of both analyses are also supported by the data since children actually are quite successful at using the adult-like -ej morpheme with these nouns. This may be surprising since usually F3 nouns are a trouble. With these nouns, however, children also produced non-adult -ov forms, which shows that sometimes they have trouble following the morpho-phonological rule of [-back] environment.
5. Neuter class 4 nouns differ in their behavior. *Jabloko* 'apple' and *oblako* 'cloud' show –ø a lot more than anything else, but for 'apple' it is the correct adult version and both accounts' predictions whereas for 'cloud' it is the incorrect prediction by both accounts. Historically, *oblako* used to be masculine, and used to have a zero morpheme in genitive plural, which coincides with what both accounts and modern adult grammar for most

neuter nouns predict. *More* 'sea' gets more –ov morphemes than anything else, contrary to all accounts (they predict zero) and adult grammar (-ej) altogether.

The preliminary conclusion is that -ov is the default morpheme used by children in most cases except the context when they are expected to use -ej with palatal-final stem. For neuter -ej kids still use the default -ov. In B&N's analysis of genitive plural, -ov is the elsewhere morpheme. If their account is true, children show evidence of mastering this elsewhere variant and overgeneralizing it over to other cases, especially vowel-final stems. This serves as evidence for Hypothesis A scenario. As for Müller's account, it is similar to B&N's and has the same acquisition data test results.

CHAPTER 4 CHILDREN'S ACQUISITION OF GENDER IN RUSSIAN[1]

1 INTRODUCTION

1.1 THE PROBLEM

In this chapter I focus on children's acquisition of gender in Russian in order to compare different morphological theories about gender. I will focus on the two major divisions of research done in the area of gender assignment, which are represented by two different accounts, namely Declension-to-Gender vs. Gender-to-Declension. The two accounts provide different morphological analyses of gender forms in Russian. Thus this debate also makes different predictions about the acquisition of gender by children, my main concern. I tested these opposing predictions using children's data gathered from an experiment to identify what exactly children rely on when assigning gender to nouns. The experimental results support the Declension-to-Gender view and provide evidence that children are significantly more successful at assigning gender to novel nouns relying on the nominal declension paradigm rather than on the adjectival agreement.

The way gender is represented in adults' competence grammar might not necessarily be the correct model of children's acquisition of gender. The child

[1] This chapter is a revised version of Tarasenkova (2008) Acquisition of Gender in Russian. A brief version appeared in Harvey Chan, Enkeleida Kapia, Heather Jacob **(eds.)** ***A Supplement to the Proceedings of the 32nd Boston University Conference on Language Development***.

has to learn the gender of a significant number of nouns and extract the declensional paradigms first in order to then be able to learn and apply these redundancy rules for novel nouns. The question is whether a child will be able to make generalizations and follow certain morphological, phonological and semantic cues to assign gender to novel items, or will not be able to correctly assign gender without having been exposed to novel items and having learned their gender due to a long enough exposure to these words.

If at some point children are able to determine the gender of novel nouns, a further question can be posed: which, if any, cues will the child most readily use for gender assignment in Russian? It might turn out that the child is using all available cues from the input; or that some of them are used more readily than others. If children use certain cues more readily than others, this may have implications for our theories of the nature of the acquisition process and the target adult grammar. For this reason, the experiment reported here investigated whether children were more accurate in determining the gender of novel nouns from the use of one type of cue or another.

There are three kinds of information the child could be using, which follow directly from the morphological theories to be discussed below:

(1) *Morphological cues for gender assignment in Russian*

(i) Gender agreement on adjectives, relative pronouns, numerals and/or past-tense verbs;

(ii) Noun declension paradigm;[2]

(iii) Diminutive forms of the nouns.[3]

I am going to evaluate the first two of the cues that possibly trigger gender acquisition by children. The tested hypothesis is that to determine the gender of a novel item all a child needs is the use of the novel noun in the right context, the context being one of the cues for gender acquisition. Given the correct context, the child will apply the relevant rules and be able to derive the noun gender from this context. So, the two questions I pose for the experiment are whether the hypothesis is correct, and if yes, which cues are most effective.

1.2 THE BACKGROUND

1.2.1 DECLENSION-TO-GENDER VS. GENDER-TO-DECLENSION DEBATE

In adult Russian grammar the Gender feature of nouns is closely related to their declension class. Their relationship was a controversial question that evoked two opposing views regarding the way gender is represented in adult Russian grammar. The representatives of one view argue for gender to be derived from the noun declension class (Declension-to Gender account, Corbett 1982), while proponents of the opposite account argue for the reversed pattern, where the

[2] Because of the significant syncretism in declensional paradigms, exposure of the most salient (distinct from all) case form will be enough to serve as a cue for gender assignment. In Russian instrumental is such a case, not taking into account class 3 exceptional nouns.

[3] In the current chapter this cue will not be in the focus of my attention. For details on the diminutives as a cue to gender, please refer to Kempe & Brooks 2001; Kempe *et al* 2009; Savickienė, Kempe and Brooks 2009.

inflectional morphology can be predicted from the information on the noun gender along with a phonological cue (Gender-to-Declension account, Vinogradov 1960, Thelin 1975, Crockett 1976 among others). Before we discuss these views in detail let us consider the system of the declension classes in Russian proposed by Corbett (1991).

TABLE 18 *NOUN DECLENSION CLASSES PARADIGM* (FROM CORBETT 1991)

	I	II	III	IV
SINGULAR				
NOMINATIVE	*zakon-***Ø** 'law'	*shkol-**a***	*kost'-***Ø** 'bone'	*vin-**o*** 'wine'
ACCUSATIVE	*zakon-***Ø**	'school'	*kost'-***Ø**	*vin-**o***
GENITIVE	*zakon-**a***	*shkol-**u***	*kost'-**i***	*vin-**a***
DATIVE	*zakon-**u***	*shkol-**y***	*kost'-**i***	*vin-**u***
INSTRUMENTAL	*zakon-**om***	*shkol-**e***	*kost'-**ju***	*vin-**om***
LOCATIVE	*zakon-**e***	*shkol-**oj***	*kost'-**i***	*vin-**e***
		*shkol-**e***		
PLURAL				
NOMINATIVE	*zakon-**y***		*kost'-**i***	*vin-**a***
ACCUSATIVE	*zakon-**y***	*shkol-**y***	*kost'-**i***	*vin-**a***
GENITIVE	*zakon-**ov***	*shkol-**y***	*kost'-**ej***	*vin-***Ø**
DATIVE	*zakon-**am***	*shkol-***Ø**	*kost'-**am***	*vin-**am***
INSTRUMENTAL	*zakon-**ami***	*shkol-**am***	*kost'-**ami***	*vin-**ami***
LOCATIVE	*zakon-**ax***	*shkol-**ami***	*kost'-**ax***	*vin-**ax***
		*shkol-**ax***		

Table 18 shows the case inflections of nouns in their paradigm by declension class. 1st class nouns include masculine nouns whose Nominative case form ends in a zero inflection, hence a consonant, which can be palatal or not. Examples are in (2):

(2) *zal* 'hall'
los' 'elk'

The 2nd class includes nouns of both feminine and masculine genders whose Nominative case inflection is *–a*; examples are given in (3):

(3) *kartina* 'picture' – feminine
muzhchina 'man' – masculine

The 3rd class consists almost solely of feminine nouns also ending in a zero morpheme, but whose phonological shape has a final palatalized or sibilant consonant, as those in(4):

(4) *mysh* 'mouse'
pech 'stove'
mol' 'moth'

There are several exceptional nouns in Class 3, which are not feminine: masculine *put'* 'way', 10 neuter nouns ending in *–mja*: *bremja* 'burden', *vremja* 'time', *vymja* 'udder', *znamja* 'banner', *imja* 'name', *plamja* 'flame', *plemja* 'tribe', *semja* 'seed', *stremja* 'stirrup', *temja* 'vertex'; and neuter *ditja* 'child'. The nouns are exceptional in that even though they are not feminine, they decline as 3-rd class except in the instrumental case, in which the form is the same as in class 1 nouns.

Finally, the 4th class[4] consists of neuter nouns that end in *–o/-e* inflection, as in (5):

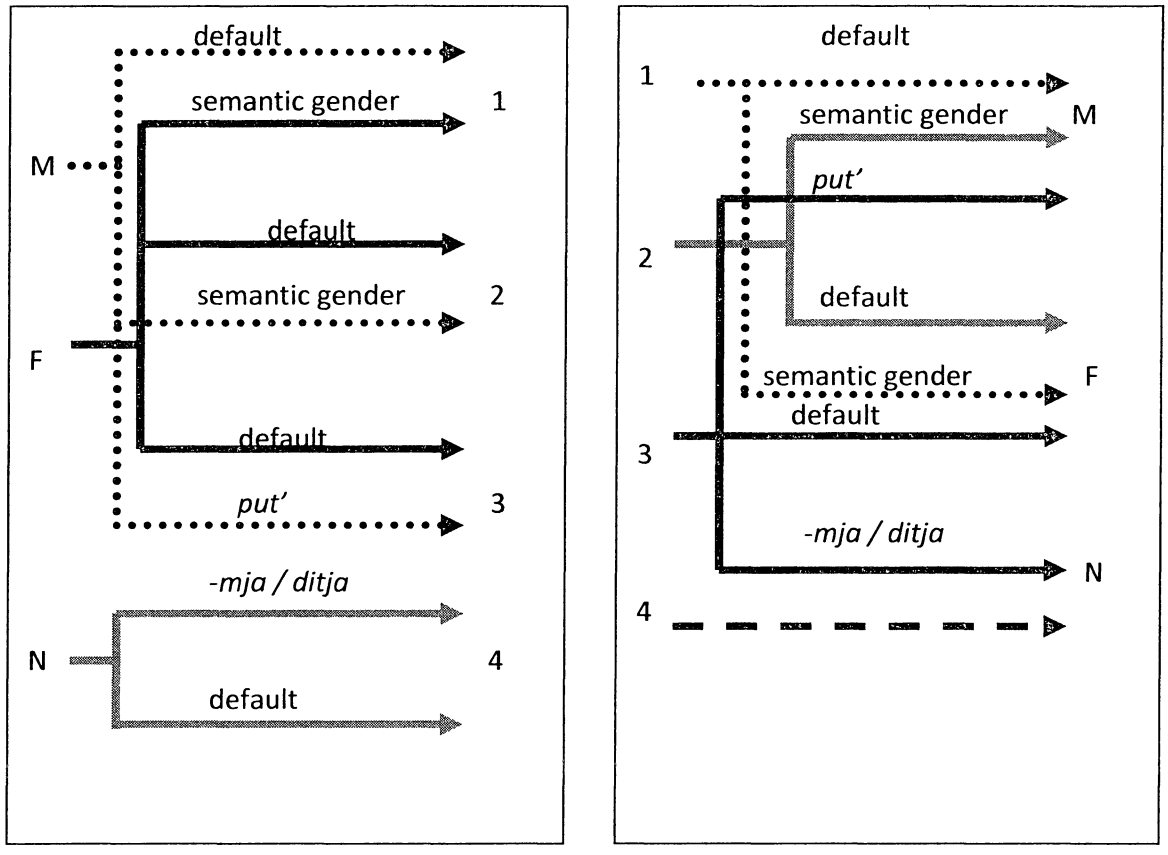
[4] In traditional Russian classification, different from Corbett's, neuter nouns belong to the same class as masculine nouns of class I from Corbett's classification, since they only differ in nominative and accusative singular, and genitive plural.

(5) *nebo* 'sky'

more 'sea'

FIGURE 15 *MAPPING BETWEEN DECLENSION AND GENDER* (ADAPTED FROM RODINA 2005)

GENDER-TO-DECLENSION DECLENSION-TO-GENDER



Now we are ready to go back to the debate about what comes first in adults' grammar: gender or declension. Figure 15 shows two different mappings between the noun gender and declension in the two opposite directions. Both of the approaches are not without problems, but as can be observed from Figure 15, the Declension-to-Gender view has fewer problems, and some of the remaining problems can be fixed with the help of semantic gender assignment.

It should seem pretty obvious that there is no straightforward correspondence between the noun gender and its declension class. The problems for the mappings are indicated by branches: the more branches, the more problematic the mapping is. In contrast to Gender-to-Declension mapping, the opposite produces better results. As we can see, no gender would unambiguously result in one declension class. For both masculine and feminine gender nouns there is a choice between two or even three different declension classes they may appear in. So there must be some other relevant information besides the noun gender which helps to determine the noun declension class. Corbett's system under Declension-to-Gender analysis reveals fewer problems: class 4 nouns are unambiguously neuter. However, there is still a choice between masculine and feminine gender in both 2nd and 1st declension classes as well as a choice between all genders in the 3rd class nouns.

Corbett (1982) argues in favor of the Declension-to-Gender view: the noun gender can be fully predicted from the declension class and the semantics of the noun while the opposite is not possible. Following Corbett we should take into account the semantic gender of the nouns so the problems we have just identified could be fixed. Corbett and Fraser (1994) suggest that 2nd class nouns get their gender due to the fact that the semantic rules of gender assignment override the formal rules of gender assignment. Thus male sex animate nouns get masculine gender notwithstanding the morphological *–a* ending form in the second class. The same rule applies for class 1 nouns where one of the branches is due to the semantic gender of the animate nouns denoting

occupations and suchlike words (e.g. *vrach* 'doctor', *patsient* 'patient' etc.). The semantics of natural sex plays a crucial role in grammatical gender assignment for such nouns and overrides the morphological shape rules thus allowing us to eliminate these branches.

One of the remaining problems arises from the existence of the exceptional class 3 nouns mentioned earlier. Their contribution to child language acquisition remains to be determined. However, even if we pretend that those words are not trouble-causing, there is yet another problem obvious in the Gender-to-Declension mapping, namely feminine gender being the default for two noun classes. This is a problem because to determine the declensional class for such nouns a child needs to know not only their gender information, but also the phonological shape of the nouns in an unambiguous case, such as Nominative, where inflection *–a* triggers class 2, and a zero inflection triggers class 3 (again, putting aside semantically marked gender). For example, a child receives an input with nominative singular *lozhk-a* 'spoon', and *kost'* 'bone', both of which are feminine. Supposing, the child knows that these nouns are not semantically marked feminine. The child is left with two default options: these nouns can belong either to class 2, or 3. The phonological shape should tell the child that *lozhk-a* is a class 2 noun, since it has a morpheme –a, and *kost'-ø*, respectively, is a class 3 noun. However, what will happen if the input gives these nouns in an ambiguous case, such as genitive singular (*lozhk-i*, *kost-i*)? Neither the nouns' gender, nor their phonological shape will be able to lead to the correct result, as proponents of the Gender-first theory argue. Given only this information

in the input, the child will be unable to conclude that these two nouns belong to different declensional classes and extract the relevant inflectional paradigms. Therefore, more declensional information is necessary. And this, already, discredits the Gender-to-Declension approach. This problem disappears in the opposite table: Declension-to-Gender approach.

Although it may now seem that Declension-to-Gender view predicts a clear-cut gender assignment, further problems still remain. These problems arise from the phonological representations of specific morphological forms, which will be discussed further in connection with the relevance of morphological cues that children might be using in order to correctly assign gender to nouns.

1.2.2 FACILITATING CUES FOR THE ACQUISITION OF GENDER IN RUSSIAN

The cues identified earlier in (1) seem to be of particular importance for a subset of Russian nouns that are usually referred to as 'opaque' (Taraban & Kempe 1999), or ambiguous. Such are the nouns whose morpho-phonological shape in certain cases, e.g. Nominative singular, does not explicitly mark their gender. One group of such nouns contains feminine class 3 nouns (ending in a palatalized consonant in the default Nominative case) and masculine class 2 nouns that also end in a palatalized consonant, as those in (6):

(6) *pech*$_{f\text{-}3}$ [5] *m'ach*$_{m\text{-}1}$[6] *m'akot'*$_{f\text{-}3}$ *lokot'*$_{m\text{-}1}$

[5] Due to the fact that *ch* in Russian does not have a non-palatal counterpart I didn't specify its palatal feature in the transcription.

'stove'	'ball'	'flesh; pulp'	'elbow'
grozd'$_{f\text{-}3}$	*gvozd'*$_{m\text{-}1}$	*vosh*$_{f\text{-}3}$	*nozh*$_{m\text{-}1}$
'bunch'	'nail'	'louse'	'knife'

Given the final devoicing these nouns are near-minimal pairs, yet they are different in their gender and declension class. So some source of evidence must be crucial for a child to rely on in order to assign the correct gender.

Another group of opaque nouns are neuter 4th class nouns with unstressed gender-declension inflection, which is reduced to a shwa vowel. Consider the following examples:

(7) *jabloko*$_{n\text{-}4}$ [jabləkə] *kofta*$_{f\text{-}2}$ [koftə]
'apple' 'blouse'

The inflections of both nouns of different gender and declension class have a homophonous morpho-phonological form; therefore there must be an additional cue to this form for a child to get the noun gender.

Finally, one more group of ambiguous nouns contains nouns that are different in gender but not in the declension class: masculine versus feminine class 2 nouns in (8) and masculine versus feminine readings of class 1 nouns in (9). The ambiguity arises from the semantic gender:

(8) *muzhchina*$_{m\text{-}2}$ *zhenshchina*$_{f\text{-}2}$
'man' 'woman'

[6] In my examples nouns will be marked for gender – f for feminine, m for masculine, n for neuter; and declension class number according to Corbett's classification summarized in Table1.

(9) *vrach*$_{m\text{-}1}$ *vrach*$_{f\text{-}1}$
'doctor'

The additional information to disambiguate the gender of the nouns in (8) is easier to track: as Corbett and Fraser 1994 state, it is the semantic rule that motivates the gender assignment in this case. The rule assigns masculine gender to animate male sex nouns and feminine gender as the default case. For the nouns in (9) the story should be more complicated, because it is not always the case that the noun denoting a profession and referring to a woman behaves as a feminine noun, for example, in (10) both sentences are grammatical:

(10) *vrach*$_{f\text{-}1}$ *prishel*$_m$
vrach$_{f\text{-}1}$ *prishl-a*$_f$
'the doctor came'

For the purpose of making this chapter more focused, I limited the study to only one group of opaque nouns, that in (7).

I will now discuss how each of these cues could be helpful on the one hand and how problematic they could be for gender acquisition on the other.

Gender agreement: adjectives and past-tense verbs

Gender agreement is the cue that has been studied for adult L1 and L2 speakers. It has been reported that gender agreement makes no difference in the processing of gender by adult L1 speakers, but that it does play a significant facilitating role for L2 speakers (Taraban and Kempe 1999). If children, similar to

adult L2 learners, rely heavily on such a cue, we, again, expect them to make no or less errors in gender assignment when provided with the relevant context, which has correctly gender-assigned adjectives, or correctly gender-marked verbs.

I focus on gender agreement with adjectives. It is necessary to consider the adjectival paradigm presented in

Table 19:

TABLE 19 *ADJECTIVE PARADIGM* ('RED' – FIRST SYLLABLE IS STRESSED, 'BIG' – LAST SYLLABLE IS STRESSED)

GENDER / CASE	MASCULINE	FEMININE	NEUTER	PLURAL
	'red' 'big'	'red' 'big'	'red' 'big'	
NOMINATIVE	*krasn-**yj** / bol'sh-**oj***	*krasn-**aja** / bol'sh-**aja***	*krasn-**oje** / bol'sh-**oje***	*krasn-**yje** / bol'sh-**ije***
ACCUSATIVE		*krasn-**uju** / bol'sh-**uju***		
INANIMATE			*krasn-**oje** / bol'sh-**oje***	
ANIMATE	*krasn-**yj** / bol'sh-**oj***			*krasn-**yje** / bol'sh-**ije***
GENITIVE	*krasn-**ogo** / bol'sh-**ogo***	*krasn-**oj** / bol'sh-**oj***		*krasn-**yx** / bol'sh-**ix***
DATIVE	*krasn-**ogo** / bol'sh-**ogo***	*krasn-**oj** / bol'sh-**oj***	*krasn-**ogo** / bol'sh-**ogo***	*krasn-**yx** / bol'sh-**ix***
INSTRUMENTAL	*krasn-**omu** / bol'sh-**omu***		*krasn-**omu** / bol'sh-**omu***	
LOCATIVE	*krasn-**ym** / bol'sh-**im***	*krasn-**oj** / bol'sh-**oj***	*krasn-**ym** / bol'sh-**im***	*krasn-**ym** / bol'sh-**im***
	*krasn-**om** / bol'sh-**om***	*krasn-**oj** / bol'sh-**oj***	*krasn-**om** / bol'sh-**om***	*krasn-**ymi** / bol'sh-**imi*** *krasn-**yx** / bol'sh-**ix***

The crucial cue from the adjectival gender agreement is helpful if the adjective is used in the singular. So, if a noun appears in the default case (Nominative) with an adjective ending in *–yj /-oj* , the child can arrive at the conclusion that the noun is masculine gender; if the adjective that goes with the noun has *–aja* ending, the noun is feminine, and so on. As can be seen from the paradigm, there is a lot of syncretism going on not only between cases, but also between gender forms, which can be a complicating factor for gender assignment.

Case paradigm – Declension class

If children use declension as a helpful cue to assign gender, they may sometimes run into trouble when trying to assign gender to the opaque nouns, the morphological and phonological form of the nominative singular form of which is not enough to assign gender for the reasons just discussed. On the other hand it may be a helpful cue to disambiguate the opaque nouns by using them in cases other than nominative, because their paradigm will differ. Let us compare two opaque nouns of different genders where they are ambiguous only in the Nominative and Locative cases:

(11)

	'robe'	'meat'
NOM	*rjas*-$a_{f\text{-}2}$	*mjas* –$o_{n\text{-}4}$
ACC	*rjas-u*	*mjas-o*
GEN	*rjas -y*	*mjas -a*
DAT	*rjas -e*	*mjas -u*
INST	*rjas -oj*	*mjas -om*

LOC *rjas-e* *mjas -e*

If this cue is helpful, the prediction is that when children rely on unambiguous forms, they will correctly assign gender, for example:

(12) a. *U menja net rjasy / * rjasa*
at me-GEN no robe$_{f\text{-}2}$-GEN-sg.
'I don't have a robe'

b. *U menja net mjasa / * mjasy*
at me-GEN no meat$_{n\text{-}4}$-GEN-sg.
'I don't have meat'

If (12) is something that children rely on, we expect them not to make errors in the corresponding sentences like those in (13):

(13) a. *rjasa /* *Ona* *bol'shaja*
robe$_{f\text{-}2}$-nom-sg / she-nom big-f-nom

But not **rjasa /* *Ono* *bol'shoje*
robe$_{f\text{-}2}$-nom-sg / it-nom big-n-nom

b. *mjaso /* *Ono* *bol'shoje*
meat$_{n\text{-}4}$-nom-sg / it-nom big-n-nom

But not **mjaso /* *Ona* *bol'shaja*
Meat$_{n\text{-}4}$-nom-sg / she-nom big-f-nom

In other words, we expect correct gender assignment, which will result in correct gender agreement on adjectives or past tense verbs, or correct pronouns.

In sum, the goal of this chapter is as follows. In order to test the different hypotheses concerning gender acquisition by Russian children I need to look at experimental data of elicited production in which a novel noun is used in the context of two different morphological cues. If the hypothesis is right, I expect the child to be able to determine the noun gender and correctly produce it in the elicited output, using a different form. Furthermore, by comparing the data obtained under two different conditions of the different morphological cues, I should be able to see which one is a more efficient trigger of novel nouns' gender determination for the children. Looking at such data will allow me to look for specific errors in child speech that we would expect to occur with certain types of 'problematic' cues on the one hand, and model the input the child gets in different ways that would go along with the two different cues to figure out the kind of information the child uses to acquire gender in Russian. For the purposes of this chapter I limited the object of my study to testing only one group of opaque nouns, namely neuter – feminine nouns with unstressed final syllable, as presented above in (7), and two cues: noun-adjective agreement and nominal declension.

2 METHOD OF THE SECOND EXPERIMENT

2.1 SUBJECTS

Prior to the full experiment, I conducted a pilot study with Russian-speaking children in the U.S. most of whom are students of a Russian learning center. The subjects from the pilot study are being brought up in a bilingual

environment to various degrees. The purpose of the pilot study was to master the experiment setup and consider possible revisions necessary for the correct procedure. I did not include the data obtained from the pilot study in the results, so as not to mix up bilingual and monolingual subjects, whose grammatical competence may be different.

My study does not address the very earliest stages of gender acquisition. By the age of testing, the children should have already gone through initial stages of extracting paradigms. Nevertheless, I think it is relevant whether the children are better at using one or another cue for determining the gender of novel nouns.

The actual experiment was conducted on 30 monolingual Russian-speaking children between 3 and 5;7 years old. The mean age of children tested is 4;4 years. This age group was selected because the age range where the acquisition of gender and case inflections have been claimed to take place in Russian is between 3 and 6 years of age (Zakharova 1973, Popova 1973). There were 20 girls and 10 boys divided into three groups as described below (5 boys and 5 girls in the first group; 2 boys and 8 girls in the second group, and 3 boys, 7 girls in the third group). All subjects were students of a full-time kindergarten in Russia.

The experiment involved the use of a modified input employing novel nouns that allowed us to test whether a child was using any cue for gender acquisition or not. When given input of a particular form, the child's task was to

produce a response which differed from the input in such a way as to reveal that child's assignment of gender to the novel noun. The children were divided into three groups, referred to as Order 1, Order 2 and Order 3 for convenience. Within each group there were 10 subjects of the same average age. The groups differ in terms of the way the stimuli were offered to them. Orders 1 and 2 received stimuli of the same gender per item, but under different conditions; Orders 1 and 3 groups received stimuli of different gender per item, but under the same conditions; and Orders 2 and 3 vary in terms of both stimuli gender and conditions under which they were offered. I will discuss the stimuli and conditions in greater details in the sections that follow.

2.2 STIMULI

I tested one group of nouns, the ones ending in an unstressed shwa vowel. A child had to determine its gender and had three options: feminine class 2 nouns, masculine class 2 nouns and neuter class 4 nouns. I did not test the masculine class 2 nouns because these are only those that involve semantic masculine sex. This group of opaque nouns was presented in (7). A sample of novel items is presented in (14), and the full list of all the stimuli is provided in the appendix.

(14)

	FEMININE	NEUTER
NOMINATIVE	*xot-a*	*xot-o*
INSTRUMENTAL	*xot-oj*	*xot-om*

A novel noun from this group was presented to the child in a modified input according to two conditions.

(15) **Condition 1 (Adjective Agreement)**: Agreement information is given in the input, but declension information is missing.

There are several ways to present agreement information: adjective, relative pronoun, numeral and verb agreement. I focused on adjective agreement for the purposes of the current chapter, but other kinds of agreement can be tested in later research. An example of input under condition 1 is given in (16):

(16) *Eto golub-oje xoto, a eto zolot-oje xoto.*
This blue-n NI[7], and this gold-n NI
'this is a blue NI and this is a golden NI.'

(17) **Condition 2 (Instrumental Case)**: Declension information is unambiguous in the input whereas agreement information is ambiguous.

The modified input presented the noun in the case form most distinct from other genders, which is the Instrumental case.

Instrumental case in the singular was used in training and testing the gender as it appears to be the most informative to distinguish between opaque nouns (see Table 18). So, instrumental case inflections of the nouns in question (class 2 and 4) are *–oj* and *–om*, respectively, which sound different from each

[7] NI stands for a novel item.

other. Other case inflections consist of only one vowel, which are not as salient for a child to distinguish, especially in an unstressed position.

For agreement I used singular adjectives (

Table 19). The choice of adjectives was determined based on their salience in terms of distinguishing between opaque nouns. In other words, I chose only those adjectives that have a final stress in order to disambiguate between neuter and feminine genders:

(18)	*golub-**oje***	*golub-**aja***	*tsvetn-**oje***	*tsvetn-**aja***
	blue-n	blue-f	colored-n	colored-f

The example in (19) shows a sample input under condition 2:

(19) *Kloun risuet xot-om, i kozlik tozhe risuet xot-om. Tol'ko oni*
Clown draws NI-n-inst and goat also draws NI-n-inst. Only they
raznye.
different
'The clown is drawing with a NI, and the goat is also drawing with a NI.
They are just different.'

The novel nouns were modeled after real nouns in Russian and were ambiguous in the same way. The use of nonce nouns as stimuli allowed us to manipulate the input as one gender for one group of subjects and another gender for another group of subjects. Each of the 32 stimuli items had its assigned number 1 through 32. They were divided into 2 lists: list A and list B, each list having 16 novel items including 8 nouns of both types of gender and presented under each condition: List A: items 1 – 16; List B: items 17 – 32. Each list had

two variants in which the gender of the nouns was reversed. This was done in order to be able to present the same novel noun in different genders to different groups of subjects. Here are the variants of each list:

(20) 32 stimuli

	List A (1 - 16)	List B (17 - 32)
Variant	Feminine (1 - 8); Neuter (9 - 16)	Feminine (17 - 24); Neuter (25 - 32)
Variant 2	Neuter (1 - 8); Feminine (9 - 16)	Neuter (17 - 24); Feminine (25 - 32)

As has been mentioned in the previous section, all the participating children were split into three groups and got the following input:

(21)

	LIST	VARIANT	CONDITION
ORDER 1	A	1	1
	B	1	2
ORDER 2	A	2	1
	B	2	2
ORDER 3	A	1	2
	B	1	1

In other words, the input of orders 1 and 2 differed in terms of the NI's gender, but the items were presented under the same conditions; whereas the input of orders 1 and 3 had nouns of the same gender but presented under different conditions.

2.3 PROCEDURE

The method of the study was elicited production. Such a method was chosen to obtain dense enough data with gender agreement on novel noun forms in the children's production, which could not be obtained by a spontaneous speech production or a comprehension or a truth-value judgment test, because children do not use novel nonce nouns in their everyday speech. Even if they do, there is hardly a way to tell whether they get the gender right, unless such nouns are used in the oblique cases or with an adjective or past-tense verb. Analyzing existing nouns' agreement can present a confound in the interpretation of the results, because the gender of existing nouns could be simply learned during the children's exposure to them.

The materials used in the experiment include toys, two puppets (the bear and the frog), and various objects that were named with a novel noun. The choice of such objects was motivated by the possibility to use the novel noun referring to it in the Instrumental case. For example, pieces of cloth, different kinds of food items, instruments of different colors, shapes and sizes, etc. The children were able to ask the bear to do a number of actions with this or that object, where the object's novel name was used in the Instrumental case. According to the scenario, the Bear puppet is learning a language that his friend Frog (another puppet) speaks. The Frog comes from the swamps and speaks a funny language – he names different things with his own words. The Bear is very shy and would not repeat after or listen to the adults. He likes only little (and not so little) children and is eager to get their help in learning how to pronounce the

Frog's words. So the Bear communicates with everyone through the child. The child is asked to 'teach' the Bear new words that the Frog is saying and then to check if the Bear got them right. To do that, the child should ask the Bear to perform a specific action with that object using the novel noun in the Instrumental case. The second puppet was introduced to eliminate children's questions and corrections about the real names of the objects used in the study.

The experiment had four stages. It began with a training period where the child was given the modified input according to the conditions described above. At this point I used unambiguous stimuli and could provide feedback to the child to hint at the correct answer so the child could understand the procedure and felt comfortable responding to the provided stimuli.

The second stage was the presentation of the tested novel item to the child in the modified input under a certain condition. This stage lasted a while until it became obvious that the child felt comfortable with the novel item.

Immediately following this period was the third, post-testing session of elicited production where the child was asked to produce the nouns in the context where their knowledge of gender and declension class was tested. Under both conditions the goal was to elicit the use of the novel item from the child in a similar setting, i.e. using the novel item in the Instrumental case, preceded by an adjective. This was done in order for the elicitation tasks under both conditions to be equally difficult. Besides, this way it was not too confusing for a child to understand the task. However, in each case the child had to use a different cue

provided in the input in order to produce the correct statement. During this stage I sometimes used unambiguous fillers, like those in the training stage, in order to control and keep the child's performance and attention.

Finally, there was a fourth stage whose aim was in part to distract the child's attention from being tested, and instead creating an impression that the subject of the experiment was the puppet, not the child. This was done by a follow-up stage resembling a truth-value judgment test. The child was asked to reward the puppet if it performed the action she had requested correctly. At the same time it served as good motivation for the child to accurately produce the required request so that the puppet was a success at fulfilling it.

There were 32 stimuli in total tested with each child. To test them all with each child, it took four 20-minute sessions. Each session was held at different days, but generally within a week's time between the first and the last session. In each session I tested 8 stimuli, 4 of each gender. Thus, for example, during the first two sessions, I tested the stimuli under one condition, and during the last two sessions, I tested the other condition. A more detailed description of each session with particular NIs is available in the appendix. It should be noted that Adjective Agreement condition was ordered first in groups orders 1 and 2, and second in order 3. This will turn out to be important for the discussion of the results, in particular, whether or not there was a simple learning effect.

The sample procedure of the experiment stages two through four are presented below.

(22) CONDITION 1: ADJECTIVE AGREEMENT WITHOUT DECLENSION

EXP: *Katja, smotri! Eto golubaja lufa. Kakaja krasivaja! Oj, a*
Katja look this blue-f-nom NI-2-nom. So-f beautiful-fem. Oh, and

vot eto zolotaja lufa.
here this gold-f-nom NI-2-nom
'Look, Katja. This is a blue NI. It's so beautiful. Oh, and here is the golden NI.'

Skazhi-ka Mishke, chto eto takoje!
Tell Bear what this such-n
'Tell the bear what this is.'

[Experimenter is pointing at the blue cloth]

CH: *Golubaja lufa.*
Blue-f-nom NI-2-nom
'Blue NI'

EX: *A eto chto*?
And this what
'And what's this?'

[Experimenter is pointing at the golden cloth]

CH: *Zolotaja lufa.*
Golden-f-nom NI-2-nom
'Golden NI'

***

EXP: *Tochno! Davaj teper' s Mishkoj poigraem. Kukla zamerzla.*
Exactly let's now with bear-inst play doll get-cold-f

Skazhi Mishke, chem emu kukolku ukryt'.

Say-imper bear-dat what-inst him-dat doll-acc cover-inf.

'Exactly! Let's play with the bear now. The doll is cold. Tell the bear what to cover the doll with.'

[The child picks up one of the two objects]

CH: *Mishka, ukroj kuklu zolotoj lufoj.*
Bear-voc Cover-imper doll-acc golden-f-instr NI-2-inst
'Bear, cover the doll with the golden NI'

***

EX: *Xorosho. Esli Mishka pravil'no vypolnil tvoje zadanije, daj*
Good if bear-nom correctly executed your-n task-n give-imper

emu jablochko.
him-dat apple-n-acc
'Good. If the bear did your task correctly, give him the apple'.

(23) CONDITION 2: NOUN DECLENSION WITHOUT ADJECTIVE AGREEMENT

EX: *Katja, smotri! Kloun risuet xot-om , i kozlik toshe xot-om*
Katja look! clown-nom draws NI-4-inst and goat-nom also NI-4-inst
risuet
draws
'Katja, look! The clown is drawing with NI, and the goat is also drawing with NI.'

Tol'ko oni raznye
Only they different-pl
'Only they are different.'

Skazhi-ka Mishke, chem kloun risuet?
Tell-imper bear-dat what-inst clown-nom draws

'Tell the bear what the clown is drawing with?'

[Experimenter is pointing at the blue cloth-paint marker, which the clown is drawing with]

CH: *golub-ym xot-om*
Blue-n-inst NI-4-inst
'with the blue NI'

***

EX: *Tochno! Davaj teper' Mihke dadim zadanije. Pust' on tozhe*
Exactly let's now bear-dat give task-n-acc let he-nom also

porisuet
draw-fut.

Skazhi Mishke, chem emu porisovat'.
Say-imper bear-dat what-inst him-dat draw-inf.
'Exactly! Let's give the bear a task now. Let him also draw. Tell the bear what to draw with.'

[the child is picking up one of the two objects]

CH: *Mishka, porisuj golubym xot-om.*
Bear-voc draw-imper blue-inst-n NI-4-inst
'Bear, draw with the bluy NI'

***

EX: *Xorosho. Esli Mishka pravil'no vypolnil tvoje zadanije, daj*
Good if bear-nom correctly executed your-n task-n give-imper

emu jablochko.
him-dat apple-n-acc

'Good. If the bear did your task correctly, give him the apple'.

3 RESULTS OF THE SECOND EXPERIMENT

3.1 ADULT CONTROL

There were two kinds of adult control testing performed on two different groups of adults: a group of five adults who were tested on replicated but simplified versions of the experiment with children on both conditions, and a group of ten adults who were tested on the novel items under completely ambiguous input, i.e. novel items were introduced under no condition that would facilitate gender assignment.

The adult control study with the tested input under conditions one and two showed 98.125% correct gender assignment, which is close to the expected result of 100% on both conditions. There were two responses where the adult subject used the novel item in the Nominative case, which is not ungrammatical, but still impossible to determine which gender was assigned to the novel item (cf. children's responses described above). Besides these, there was only one ungrammatical response. All of these three responses were produced under the Adjectival agreement condition.

The purpose of the second adult control study is different from the other studies. It aimed at identifying whether the selected novel items were not biased against any particular gender, and therefore would not have influenced the children's performance. The expected result is a chance performance on both genders. It should be noted, however, that the baseline frequency of feminine

gender in Russian is greater than the frequency of neuter nouns, which could be a factor in the adult performance as well.

The adult study of novel items under ambiguous input showed the following result.

There was 75% feminine and 25 % neuter gender assignment on the average across adult subjects and items. Only three novel items came out as exclusively feminine for all ten speakers. Crucially, these items did not appear significantly better in feminine gender in the children's responses. Other novel items were produced in the neuter gender to a greater or lesser degree.

I compared these numbers with the frequency of nouns of different genders in Russian reported in the *Frequency Dictionary of Russian* (*Častotnyj Slovar' Russkogo Jazyka*) by Zasorina L.N. (1977), which gives the following baseline frequency statistics: masculine - 45%, feminine - 37%, neuter - 18 %. Having excluded masculine statistics, I recalculated the percentage (as if 55% of feminine and neuter were 100 %), and it corresponds to 67% feminine and 32% neuter. So, the adult study showed 8% more feminine and 7% less neuter words than it was reported in Russian for existing words in that dictionary. Generally, the rough ratio of feminine to neuter 3:1 is preserved in the adult control data, which is the expected results, taking into account the frequency factor.

3.2 SUBJECTS' RESPONSES AND TYPES OF ERRORS

Children's responses to the last portion of the experiment where they had to reward the puppet based on his performance were all appropriate in all groups.

The criteria for determining if children assigned gender to the novel items correctly or not were to look at both the elicited noun and the adjective's ending in the Instrumental case. First of all, I eliminated those responses when the results appeared un-interpretable, i.e. any agreement error, or the use of the novel item in a case other than Instrumental. Then I checked whether the noun agreed with the adjective in both case and gender, and if the assigned gender matched the one in the input. In that case the response was considered to be a correct one. For example, if the noun had a morpheme -oj/-ej and the corresponding adjective had a morpheme –oj, I considered the child to assign feminine gender to the noun; if the noun had a morpheme -om/-em and the corresponding adjective had a morpheme -ym/-om' I assumed that the child assigned neuter gender to the novel item. Both the adjective and the noun were thus used in the Instrumental case in the elicited production. Then I compared the expected noun gender in the input to the elicited gender assignment and drew the conclusion based on whether the noun gender matched the input or not.[8]

[8] I should note that such a method of scoring was not the only possibility. I also ran additional scoring methods, which are less restricted and the results of which basically are the same. For one of those methods of scoring I did not take into account the gender assignment of the adjectives in the elicited

Let me report the particular kinds of children's responses that were disregarded in the scoring of the data. One such kind is the noun-adjective disagreement on gender, which was a frequent type of error. For example, a child would produce a noun as feminine and the corresponding adjective as neuter, and vice versa, as in ((24) a and b):

(24) a. **malen'k-im gatog-oj*
little-masc NI-fem

b. *malen'k-oj gatog-om
little-fem NI-masc

Expected correct response: *malen'k-oj gatog-oj*
little-fem NI-fem

or *malen'k-im gatog-om*
little-masc NI-masc

The distribution of such errors between conditions showed a steady pattern of being significantly more frequent under the Instrumental case condition than under the adjective condition. The absolute number of this type of errors within all groups is given in Table 20.

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production for determining whether the child assigned gender to the novel item correctly or not. Thus, if the input required the child to assign feminine gender to the novel noun, and the child produced a feminine NI, but masculine adjective, I still counted such answers as correct gender assignment, and the other way round. For a more strict method of scoring the child's elicited production had to be perfect in both noun-adjective agreement on case and gender, and on matching the gender of the NI to the one presented in the input. If a child produced any error described in this section, such response was not given credit in terms of correct gender assignment. For more details on those additional scoring methods and the corresponding statistical tests, please refer to the appendix.

TABLE 20 *NOUN-ADJECTIVE DISAGREEMENT ON GENDER IN SUBJECTS' RESPONSES* (IN ABSOLUTE NUMBERS)

	ADJECTIVE CONDITION	INSTRUMENTAL CONDITION
ORDER 1	3	16
ORDER 2	4	15
ORDER 3	6	20
TOTAL IN %	**2%**	**10.7%**
	12.7%	

Another typical pattern in the child production was the use of the novel item in the output in the Nominative case instead of the Instrumental. This pattern is less frequent than the previous one. This is not an error, but it is unclear from such output which gender the child assigned to the novel noun. That is why I did not consider such cases to be interpretable. Opposite from the noun-adjective disagreement error, the Nominative case on the novel item showed up mainly under the Adjective condition, as can be seen from Table 21 (the numbers correspond to the number of such cases in all groups' data):

TABLE 21 *NOMINATIVE CASE IN THE NOVEL ITEM IN SUBJECTS' RESPONSES*

	ADJECTIVE CONDITION	INSTRUMENTAL CONDITION
ORDER 1	7	1
ORDER 2	12	1
ORDER 3	3	0
TOTAL IN %	**4.6%**	**0.4%**
	5%	

Finally, I would like to mention one more type of error that occasionally occurred in the children's responses. There were a few cases (15 cases among three groups) when the subjects used the adjective in the Nominative case, but

the novel noun in the Instrumental case. Such kind of disagreement between the noun and adjective was also discarded in the results scoring.

Other errors that children made are completely irrelevant for the current study and involve overgeneralization types of errors when the children used an inappropriate allomorph of the instrumental case morpheme in the adjective. An example is in (25)

(25) **ruchn-om* *gant-om*
hand-adj-instr-masc NI-instr-masc

Expected correct response: *ruchn-ym* *gant-om*
hand-adj-instr-masc NI-instr-masc

3.3 SUBJECT ANALYSIS

To analyze the data obtained from the experiments, statistical tests were run on the SPSS program. An alpha level of .05 was used for all statistical tests. The tests were performed twice: first, to compare the data from orders 1 and 2 (differing by the gender of the novel items in the input); second, to compare the data from orders 1 and 3 of the experiment subjects (differing by which condition was presented first). The subject statistical analysis is general linear model two-factor ANOVA with repeated measures (i.e. average measures across items) on both factors (gender and condition) for two orders (two groups being compared). The measures were the averages between 1 and 0, where 1 corresponds to the correct gender assignment, and 0 to the incorrect gender assignment by each subject across items. Two factors (gender and condition) result in four repeated

measures for each subject reported further as GFC1 (Gender Feminine Condition 1), GFC2 (Gender Feminine Condition 2), GNC1 (Gender Neuter Condition 1), and GNC2 (Gender Neuter Condition 2).

The analysis of orders 1 and 2 data showed the following results.

TABLE 22 *DESCRIPTIVE STATISTICS: ORDER 1 AND 2 GROUPS*

order		Mean	Std. Deviation	N
GFC 1	1	.77940	.276195	10
	2	.83090	.218452	10
	Total	.80515	.243797	20
GFC 2	1	.94460	.098420	10
	2	.97320	.056658	10
	Total	.95890	.079525	20
GNC 1	1	.83210	.307606	10
	2	.56800	.354700	10
	Total	.70005	.350387	20
GNC 2	1	.79450	.311265	10
	2	.75350	.193237	10
	Total	.77400	.253028	20

With an alpha level of .05, the effect of condition was statistically significant, F (1,18) = 11.194, p = .004.

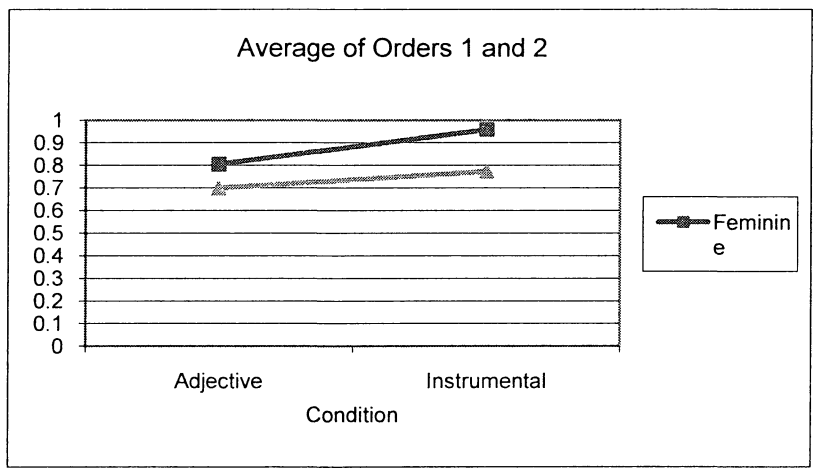
TABLE 23 *TESTS OF WITHIN-SUBJECTS CONTRASTS: ORDERS 1 AND 2*

Source	gender	cond	Type III Sum of Squares	df	Mean Square	F	Sig.
gender	Linear		.421	1	.421	3.347	.084
gender * order	Linear		.185	1	.185	1.477	.240
Error (gender)	Linear		2.261	18	.126		
cond		Linear	.259	1	.259	11.194	**.004**

cond * order		Linear	.050	1	.050	2.163	.159
Error (cond)		Linear	.417	18	.023		
gender * cond	Linear	Linear	.032	1	.032	.895	.357
gender * cond * order	Linear	Linear	.076	1	.076	2.127	.162
Error(gender*cond)	Linear	Linear	.640	18	.036		

The significant effect of condition is such that under the Instrumental case condition the children's performance was significantly higher for the novel items of both genders than their performance under the Adjectival agreement condition. As figure 2 shows, feminine nouns have a higher rate of performance under both conditions, but this effect was marginal.

FIGURE 16 *SUBJECT ANALYSIS: ORDERS 1 AND 2*



The data obtained from the subjects of orders 1 and 3 controlled for the learning effect of condition. The two conditions were now given in the reversed order: Instrumental case condition was presented first and Adjectival agreement condition second. Nevertheless, the results are very similar to those of the Orders 1 and 2.

TABLE 24 *DESCRIPTIVE STATISTICS: ORDERS 1AND 3 GROUPS*

order		Mean	Std. Deviation	N
GFC 1	1	.77940	.276195	10
	3	.81690	.293175	10
	Total	.79815	.277882	20
GFC 2	1	.94460	.098420	10
	3	.95050	.081665	10
	Total	.94755	.088071	20
GNC 1	1	.83210	.307606	10
	3	.37050	.441188	10
	Total	.60130	.439425	20
GNC 2	1	.79450	.311265	10
	3	.73530	.321972	10
	Total	.76490	.309710	20

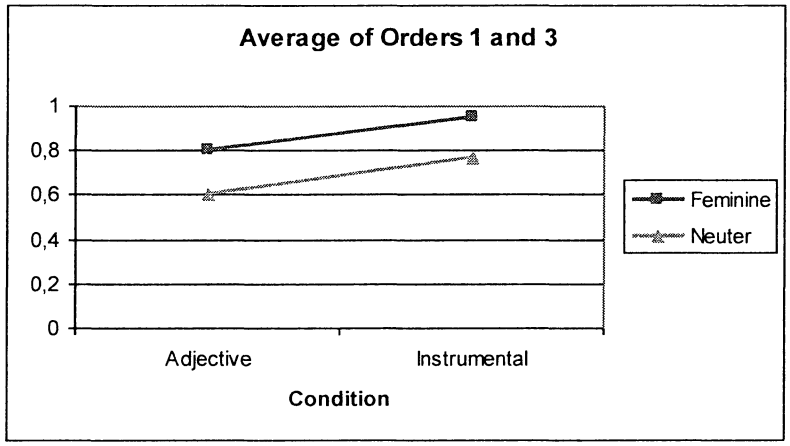
As in the groups of orders 1 and 2, there was a significant statistical effect of condition with an alpha level .05: F (1,18) = 20.350, p = 0, as indicated in Table 25.

TABLE 25 *TESTS OF WITHIN-SUBJECTS CONTRASTS: ORDERS 1 AND 3 GROUPS*

Source	gend	cond	Type III Sum of Squares	df	Mean Square	F	Sig.
gender	Linear		.720	1	.720	3.741	.069
gender * order	Linear		.398	1	.398	2.067	.168
Error(gender)	Linear		3.465	18	.193		
cond		Linear	.490	1	.490	20.350	**.000**
cond * order		Linear	.172	1	.172	7.140	.016
Error(cond)		Linear	.433	18	.024		
gender * cond	Linear	Linea	.001	1	.001	.023	.881

		r					
gender * cond * order	Linear	Linear	.235	1	.235	5.349	.033
Error(gender*cond)	Linear	Linear	.792	18	.044		

FIGURE 17 *SUBJECT ANALYSIS: ORDERS 1 AND 3 GROUPS*



The significant effect of condition in orders 1 and 3, differing by which condition was presented first, was the same as in orders 1 and 2, differing by the gender of the novel items in the input: novel nouns of both genders were produced significantly more accurately in terms of their gender assignment under the Instrumental case condition than under the Adjectival agreement condition. As in the previous pair of groups, feminine nouns again were performed better than neuter nouns, which statistically was a marginally significant result.

3.4 ITEMS ANALYSIS

Parallel to the subject analysis, I ran the univariate items analysis of variance on the SPSS program. The goal of the items statistical test is, first, to check whether the items (novel nouns) do not stand out as being biased toward one gender or the other, and second, to control the results of the subject analysis. The items of the same novel stem but different gender were treated as separate units, thus resulting in having 64 different items (originally 32 novel nouns). The items analysis is a general linear model univariate test. For each such item order, gender and condition were specified as fixed factors. The average univariate measure across subjects (children) was the dependent variable corresponding to each item. Similar to the subject analysis, the alpha level was .05. I ran the test twice to compare the two sets of data from orders 1 and 2 and orders 1 and 3 groups.

The statistical tests performed on the items again reveal a significant effect of condition, as in the subject analysis: Instrumental case condition proved to be significantly more facilitating for the nouns of both genders. The items analysis also resulted in the significance of all three factors: condition, gender and order, as well as the interaction of order and gender. This outcome is different from the subject analysis test. The descriptive statistics of the items analyses is presented in Table 26 and Table 27:

TABLE 26 *DESCRIPTIVE STATISTICS: ORDERS 1 AND 2 GROUPS*

order	gender	condition	Mean	Std. Deviation	N

1	F	1	.76000	.197701	8
		2	.93838	.066888	8
		Total	.84919	.169743	16
	N	1	.83875	.109079	8
		2	.80125	.100596	8
		Total	.82000	.103199	16
	Total	1	.79938	.159519	16
		2	.86981	.108741	16
		Total	.83459	.138977	32
2	F	1	.77500	.116496	8
		2	.97188	.052504	8
		Total	.87344	.133999	16
	N	1	.52500	.103510	8
		2	.72938	.174037	8
		Total	.62719	.173992	16
	Total	1	.65000	.167332	16
		2	.85063	.176360	16
		Total	.75031	.197447	32
Total	F	1	.76750	.156950	16
		2	.95513	.060610	16
		Total	.86131	.150936	32
	N	1	.68188	.191841	16
		2	.76531	.142249	16
		Total	.72359	.171451	32
	Total	1	.72469	.177818	32
		2	.86022	.144452	32
		Total	.79245	.174618	64

TABLE 27 *DESCRIPTIVE STATISTICS: ORDERS 1AND 3 GROUPS*

order	gender	condition	Mean	Std. Deviation	N
1	F	1	.76000	.197701	8
		2	.93838	.066888	8
		Total	.84919	.169743	16
	N	1	.83875	.109079	8
		2	.80125	.100596	8
		Total	.82000	.103199	16
	Total	1	.79938	.159519	16
		2	.86981	.108741	16
		Total	.83459	.138977	32

3	F	1	.86063	.089699	8
		2	.95125	.069987	8
		Total	.90594	.090723	16
	N	1	.33663	.128551	8
		2	.71625	.161682	8
		Total	.52644	.241540	16
	Total	1	.59863	.291010	16
		2	.83375	.170914	16
		Total	.71619	.263399	32
Total	F	1	.81031	.157146	16
		2	.94481	.066467	16
		Total	.87756	.136950	32
	N	1	.58769	.283723	16
		2	.75875	.137289	16
		Total	.67322	.235845	32
	Total	1	.69900	.252370	32
		2	.85178	.142098	32
		Total	.77539	.217264	64

The following are the results that show the significant effect of condition in both sets of orders: in orders 1 and 2 the effect of condition in the items analysis was significant: F (1, 56) = 19.130, p = 0, as seen from Table 28:

TABLE 28 *TESTS OF BETWEEN SUBJECTS EFFECTS: ORDERS 1 AND 2*

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	1.061(a)	7	.152	9.862	.000
Intercept	40.191	1	40.191	2615.978	.000
order	.114	1	.114	7.398	.009
gender	.303	1	.303	19.752	.000
condition	.294	1	.294	19.130	**.000**
order * gender	.188	1	.188	12.267	.001
order * condition	.068	1	.068	4.413	.040
gender * condition	.043	1	.043	2.826	.098
order * gender * condition	.050	1	.050	3.248	.077
Error	.860	56	.015		

Total	42.112	64			
Corrected Total	1.921	63			

A similar result is found in orders 1 and 3, where the effect of condition was significant:

F (1, 56) = 24.654, p = 0, as seen in Table 29:

TABLE 29 *TESTS OF BETWEEN SUBJECTS EFFECTS: ORDERS 1 AND 3*

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	2.126(a)	7	.304	20.044	.000
Intercept	38.479	1	38.479	2540.099	.000
order	.224	1	.224	14.808	.000
gender	.668	1	.668	44.103	.000
condition	.373	1	.373	24.654	**.000**
order * gender	.491	1	.491	32.404	.000
order * condition	.108	1	.108	7.162	.010
gender * condition	.005	1	.005	.353	.555
order * gender * condition	.255	1	.255	16.827	.000
Error	.848	56	.015		
Total	41.453	64			
Corrected Total	2.974	63			

The figures below show the results very similar to those of the subject analysis: the Instrumental case condition facilitates correct gender assignment of novel nouns significantly better than the Adjective agreement condition in both sets of groups. These figures also show that the production of feminine gender nouns is significantly better than that of neuter nouns on the average between the groups.

FIGURE 18 *ITEMS ANALYSIS: ORDERS 1 AND 2 GROUPS*

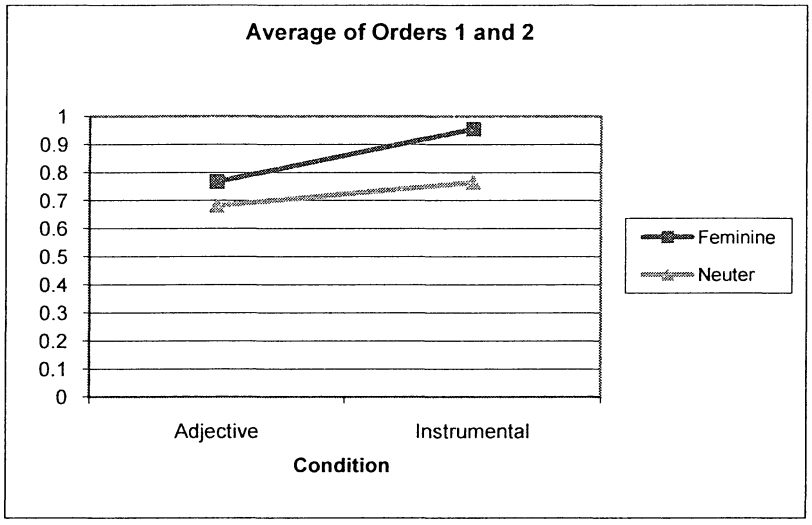
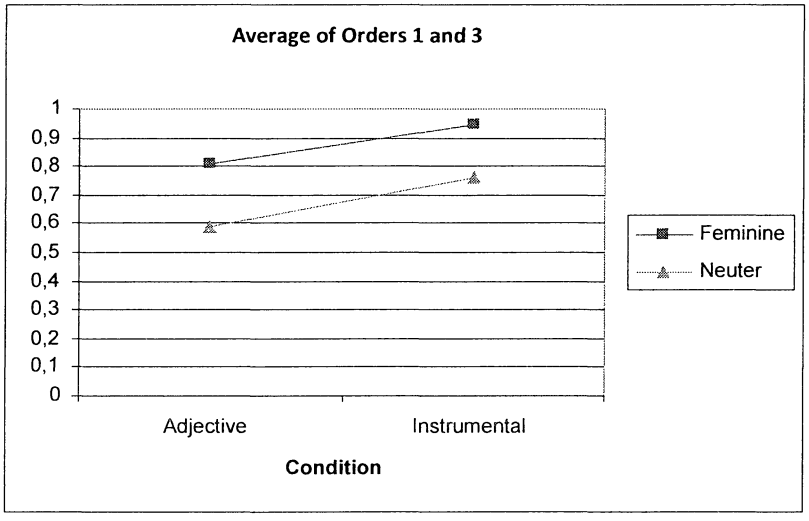


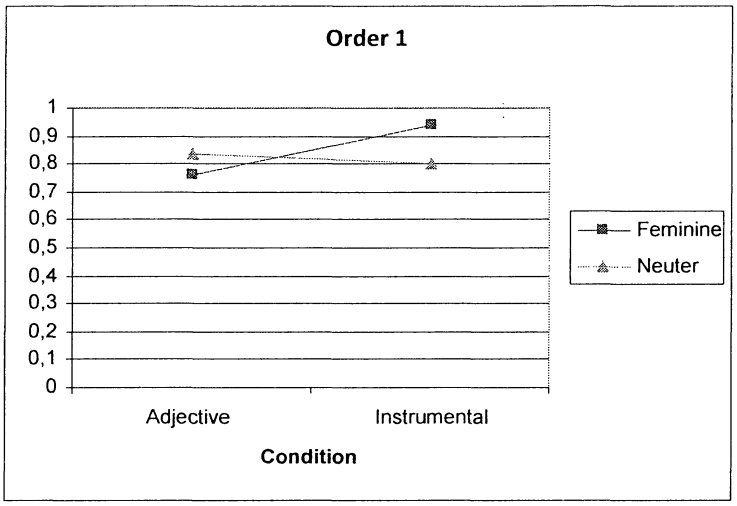
FIGURE 19 *ITEMS ANALYSIS: ORDERS 1 AND 3 GROUPS*



The figures for both kinds of analyses present the collapsed data from two groups. However, it is important to mention that there is one group of subjects whose results differ dramatically from the results of other groups. This is the group of subjects from order 1. When combined with the other groups, the average shows the significance of condition effect on the performance of both

feminine and neuter nouns. Let us look at the graph of order 1 group results in Figure 20:

FIGURE 20 *ITEMS ANALYSIS: ORDER 1*



When we look at this group's data separately, however, it becomes obvious that the patterns there are quite different. Such difference shows up in both subjects and items analyses. There is a crossover of lines for the different genders under different conditions. It turned out that the performance of neuter nouns was not enhanced by the Instrumental case condition; it even got a little worse. But the performance of Feminine nouns improved under Condition 2.

4 DISCUSSION

The main general result of the performed experimental study is the significant effect of condition for the accurate production of novel nouns' gender by the subjects. This result supports the hypothesis that for correct gender assignment children need the relevant exposure to the novel noun in the input. Moreover, the children's performance on gender assignment depends on the kind of exposure: the condition under which the novel noun was introduced in the context of its declensional paradigm (condition 2 of the experiment) proved to be significantly more successful at facilitating correct gender assignment than the condition under which the novel noun is presented in the context of adjectival agreement.

Such results support the Declension-to-Gender (Corbett 1982, Corbett & Fraser 1994) view of the relationship between gender and declension in Russian: gender assignment can be predicted by the information provided in the nominal declensional paradigm. The full paradigm with nouns' unambiguous morphological forms reduces the discrepancy between nouns' declension class and gender caused by the opacity of the morphological ambiguous forms, at least those tested in this experiment.

Unlike learners of Russian as a second language (Taraban 1999), the morphological cue of the novel nouns' agreement with adjectives (condition 1 of the experiment) did not cause the children to perform well on the gender assignment. In fact, in most cases the children made specific errors in their production where the nouns and adjectives did not agree with each other on

gender. The most frequent type of error (noun-adjective disagreement on gender) serves as additional support of the general result that the Adjectival agreement condition is not too helpful for the gender acquisition by children. The children who made such errors do not care to agree the noun with the adjective in their output.

The fact that the condition effect was similarly significant in the statistical tests on both pairs of groups shows that it cannot be the learning effect, because the order of conditions was reversed. The group of children who received the novel nouns under the Instrumental case condition prior to the Adjectival agreement condition (order 3 group) showed the result similar to those of the other order.

The pattern of children's responses with the Nominative case of the novel noun was more frequent under the Adjectival agreement condition. Under this condition the children could easily assume that the novel noun belonged to the class of non-declinable nouns in Russian, like loan words (cf. *pianino* 'piano', *pal'to* 'coat'), therefore they did not decline them, which is grammatical in Russian. What seems to be more important is that it almost did not occur under the Instrumental case condition. It can be explained by the fact that under the latter condition the noun is presented in the instrumental case, and therefore cannot remain non-declinable. Such pattern in the children's responses serves as additional support that children obviously pay attention to the nominal declensional paradigm.

Another general result from the study is a marginally significant effect of gender in the subject analysis, which was significant in the items analysis. This result shows that generally children are better at feminine nouns' gender assignment than neuter nouns. Such result matches with a greater frequency of feminine nouns in adult grammar. However, children's production from order 1 group was opposite from this generalization: those subjects performed better with neuter nouns, unlike other children. This is an observation that cannot be explained at this point. However, it is connected with the significance of order and the interaction of order*gender effect in the items analysis.

Order was significant because the nouns were treated as different items in the item analysis. The items in order 1 group were more biased toward neuter gender. There was a difference in items being biased in orders 1 and 2 groups. The nouns in order 1 under the Adjectival agreement condition are different from the nouns in orders 1 and 3 groups under the same condition. This is a quirk of my study. For some reason which I cannot explain the nouns in order 1 group presented under the Adjectival agreement condition were "better" for neuter gender. Children were much more likely to call them neuter despite the fact that other groups including adults were more likely to call them feminine under any condition. I checked with the adults in the second adult study. These nouns (8 nouns from the first 16 novel items) were assigned feminine gender 83.75% by adults. There is no reason for the children to assign neuter to these nouns as a bias. Nevertheless, even children who did less than 0.8% under this condition in

order 1 group still did better with neuter. This quirk cannot be explained at this point. It is just an observation, or 'noise' in the data.

The interaction of order*gender effect in the items analysis is related to the above quirk. It shows that for the neuter nouns in order 1 group the condition almost did not matter. In the group of order 1 the Instrumental case condition solely facilitated feminine nouns, whereas in the other two groups this condition facilitated both genders (neuter to a higher degree in the group of order 3).

The significance of order effect resulted in the significance of other interactions with order.

5 CONCLUSION

Two theoretical approaches to gender and declension in adult grammar were evaluated in this chapter: Declension-to-Gender and Gender-to-Declension views. These approaches differ in their acknowledgment of what comes first: can a noun's gender be predicted on the basis of its declension (Declension-to-Gender approach), or can nominal declensional class paradigm be derived from the gender of a noun (Gender-to-Declension approach). I investigated what kind of relevant context of the novel nouns the children used more readily for successful acquisition of gender. Among the options of such cues, I focused on the nominal declensional paradigm as one cue, and the nouns' agreement with adjectives as another.

Having analyzed the predictions of both, I came to the conclusion that Declension-first account is a more accurate one, since it appears to be less problematic for the mapping between gender and declension class. On the basis of these evaluations, I held an experimental study whose results supported the Declension-first approach.

The main conclusion is that children successfully coped with the task of determining the gender of the novel nouns under the condition where these nouns were introduced in the context of unambiguous declensional information (in the instrumental case). The condition of another cue – adjectival agreement – was significantly less facilitating, as the statistical analysis of the experimental

data showed. This difference is taken as supporting the Declension-to-Gender model.

This interpretation of the results obtained from this study is based on an additional assumption, which is that there is an expected discrepancy between the possible ways children process gender information. Even if the Declension-to-Gender approach is the correct model for adult grammar, we still find that adults have no problem assigning correct gender to novel nouns using either kind of input: nominal declension or the adjectival agreement information. This means that the adults are successful at applying the rules in the backwards direction; that is, getting the declension given the gender. However, we expect children not to be very good at processing backwards: given the Declension-to-Gender model, they are expected to be more successful at getting the gender information from the nominal declension than applying the rules backwards and getting the gender information from the adjective. This is what the results of the performed experiment show. Note that children are not completely unsuccessful at gender assignment under the condition of adjectival agreement, but just less successful. Since their processing is not as efficient as adults' when going backwards, we see evidence for one model over another.

There could be an alternative explanation for why children performed better under the Instrumental case condition over the Adjectival agreement condition, which has to do with the possibility that children could have problems with processing agreement in general. The information about a novel noun's

gender given on the noun itself as opposed to the information about the noun given outside of the nominal domain could be acquired earlier and/or easier by children. If this were the case, the results of experiment 2 would not necessarily bear on any of the discussed theories of gender. If children had an agreement processing problem, the results of the presented experiment would not falsify either theoretical approach I discussed in this chapter. In other words, problems with the processing of agreement could remain a problem even if the other model (Gender-first approach) was the correct one. However, given the results of experiment 1 presented in chapters 2 and 3 where I looked at various kinds of agreement phenomena show that this is not the case, since children in general coped with agreement quite successfully.

CHAPTER 5 DISCUSSION AND CONCLUSION

1 INTRODUCTION

In this chapter I summarize the results of both experiments, and then present a discussion of how these results bear on the theoretical questions raised in the first chapter. Then I discuss the implications of the agreement experiment on the experimental study of gender – declension relationship. I conclude that the acquisitional data collected in the two experiments provides evidence of alliterative agreement, false morphological parsing and extension of underspecified morphological forms in young children's grammar at the stage of emergence, while children's forms become adult-like at the mastery stage. I also present the learning path that children take to reach adult-like mastery in accordance with the overall conclusions of one of the working hypotheses, making use of markedness and underspecification of the features involved in the morphemes' representations in the child grammar.

2 SUMMARIES OF THE RESULTS OF EXPERIMENTS 1 AND 2

2.1 EXPERIMENT 1: NP AGREEMENT ON GENDER, NUMBER AND CASE

The current dissertation is based on two experimental studies performed with Russian monolingual children between the ages of 2;5 and 5 years old. Both studies were set up as elicited production. The first study, which consisted of three subparts, was dedicated to examining ordering effects in the acquisition of number, gender and case agreement features within the noun phrase. This experiment was designed in such a way that each morphological feature was targeted separately from other features in each of the experiment subparts. Moreover, ordering effects in the acquisitional data were found within each morphological feature. Thus, the study compared singular vs. plural feature values within the number feature, masculine vs. feminine vs. neuter within the gender feature and accusative vs. dative within the case feature.

The results of the overall comparison reveal the following acquisition ordering effects: children were most successful in their production of case features, with gender following case, and number finalizing the list. The overall results for the children from younger and older groups are summed up in Table 30:

TABLE 30 *OVERALL PERFORMANCE RESULTS ACROSS NUMBER, GENDER AND CASE*

	CASE	GENDER/DECLENSION	NUMBER
YOUNG	59.7%	45.7%	18.4%
OLD	94.3%	80.4%	53.6%

Within each of the tested morphological features the following ordering effects have been observed.

Within the feature of case the main comparison was drawn between structural accusative and oblique dative cases (both in the singular). The results show no difference in performance for older children due to both cases being equally well performed (93.8% for accusative and 94.8% for dative). For the younger group, performance is better on accusative than dative: 68.4% for accusative and 51% for dative.

Within the declension and gender features, the results from the gender subpart of the first experiment show younger children's best success at feminine declension class 2 NPs, and for the older children, performance is best on masculine declension class 1 NPs. Both age groups performed the worst on feminine declension class 3 NPs, as shown inTable 31:

TABLE 31 *CHILDREN'S RESULTS ON DECLENSION/GENDER FEATURE VALUES (PERCENT CORRECT)*

GENDER	MASCULINE	FEMININE		NEUTER
DECLENSION CLASS	I	II	III	IV
YOUNG GROUP	52.6	69.7	25	35.5
OLD GROUP	95.2	89.3	65.5	71.4

Finally, even though older subjects did not perform better than 59% on number agreement, they still had a greater performance rate of the [+singular] NPs: 59% and 46.8% respectively. Younger children, however, showed a very low rate of performance on number agreement in general. Their results were almost equal on [+singular] and [-singular] NPs: 22.5% and 19.1%.

2.2 EXPERIMENT 2: NP AGREEMENT ON GENDER

The second experiment was conducted with 30 monolingual Russian speaking children aged 3 to 5 years old. In the experiment, children were introduced to novel feminine or neuter nouns and were prompted to produce these novel nouns in an NP with an adjective under one of two different conditions The first condition was an adjective agreement condition, where children were supposed to extract gender information from the adjectival agreement. Declension information was unavailable in the input under this condition because the stimulus phrase was in the nominative case: neuter and feminine novel nouns sound ambiguous with an unstressed final vowel (cf.*: golub-oje xot-o* (nom.sg.N) vs. *golub-aja xot-a* (nom.sg.F)). The second condition was an instrumental case condition, where the input stimuli children received consisted of a novel noun in

instrumental singular without the adjective. Thus, such input provides declension information, but does not provide gender agreement information (cf.: xot-om vs. xot-oj).

The results showed a significant effect of condition. Children were able to extract the necessary cues, both agreement and declension, but they were significantly more successful at the instrumental case condition than the adjectival agreement condition.

Another significant contrast was found between feminine and neuter gender NPs. Feminine nouns had a higher rate of performance than neuter nouns in this study.

3 HOW EXPERIMENTS RESULTS BEAR ON OVERALL THEORETICAL RESEARCH QUESTIONS

My dissertation is dedicated to the study of morphological features of case, number and gender and agreement with these features within the noun phrase in the speech of young children acquiring Russian. I investigated several factors which have been proposed to influence the ordering of the acquisition of these morphological features. These factors were derived from accounts which differ on their views about the relative importance of meaning versus form in determining the acquisition of agreement features. Such factors are semantic grounds, canonicity, and feature specificity. I also took a closer look at the acquisition of gender in Russian nouns to compare competing accounts of gender and declension class representation in Russian.

3.1 THE SEMANTIC HYPOTHESIS

The semantic approach (Clark 2001) emphasizes the role of meaning in the process of agreement acquisition; hence semantically transparent features are expected to be acquired prior to abstract features. There were two specific research predictions to test the role of the semantic factor:

(1) If the semantic factor across and within agreement features of number, gender and case is crucial,

   a. Number being the most semantically transparent is predicted to be acquired prior to the more arbitrary features of gender and case.

   b. The acquisition of semantically-driven oblique cases is predicted to proceed faster than that of structurally-driven direct cases.

The idea to contrast number to the other features comes from the fact that number is the most semantically transparent feature other than animacy, which I did not include the list of investigated features. With the exception of singularia and pluralia tantum as well as some exceptional cases, a [+singular] noun denotes an object that is semantically singular, and a noun marked [+plural] represents multiple objects:

(2)

student-ø	student-y
student-M1,nom,sg	student-nom,pl
professor-ø	professor-a
professor-M1,nom,sg	professor-nom,pl

Nominal plural morphemes *–y* and *–a* mark semantically plural nouns when there are more than 1 students or professors in the semantic context.

In contrast to the semantically transparent category of number, the semantic contribution of gender and case is not as transparent. Thus, only [+animate] nouns are semantically transparent as far as gender marking goes:

(3)

devochk-a	mysh-ø	mal'chik-ø
girl-nom,sg,F2	mouse-nom,sg,F3	boy-nom,sg,M
lis-a	rys'-ø	volk-ø
fox-nom,sg,F	lynx-nom,sg,F3	wolf-nom,sg,M

There are categories of animate nouns, e.g. one denoting a profession (*vrach-ø* 'doctor'), or personal names (*Antosh-a* 'Anton-diminutive) that show either feminine or masculine semantic agreement depending on the person's biological gender female or male:

(4)

moj-a	vrach-ø	xorosh-aja
my-nom,sg,F	doctor-nom,sg,F1	good-nom,sg,F

'My (female) doctor is good'

moj-ø vrach-ø xorosh-ij
my-nom,sg,F doctor-nom,sg,F1 good-nom,sg,F
'My (male) doctor is good'

moj syn-ø Antosh-a xorosh-ij
my-nom,sg,M son-nom,sg,M Anton-nom,sg,M2 good-nom,sg,M
'My son Anton is good'

There are no neuter gender nouns among [+animate] nouns.

Even though in these cases semantics is the main factor for gender assignment, agreement with some of these nouns is not always based on semantic gender. For example, both feminine and masculine agreement is possible in the following NP where the noun *vrach-ø* 'doctor' is semantically feminine:

(5) Moj-a vrach-ø prish-l-a
my-nom,sg,F doctor-nom,sg,F1 come-past-sg,F
'My (female) doctor came'

mo-j vrach-ø prishe-l-ø
my-nom,sg,M doctor-nom,sg,M come-past-sg,M
'My (female) doctor came'

Unlike number and semantic gender discussed above, gender marking in [-animate] nouns is semantically arbitrary and rests mostly on the declension type and the phonological form of the noun: masculine nouns are usually those of declension 1 whose form in the nominative singular ends with a consonant, feminine gender is assigned to the nouns of declension class 2 ending in *–a* or

palatal consonant-final declension 3 nouns, and neuter gender are declension class 4 nouns with the nominative singular form ending in vowels *–o* or *–e*[29].

(6) stol-ø knig-a
table-nom,sg,M1 book-nom,sg,F2

okn-o sol'-ø
window-nom,sg,N4 salt-nom,sg,F3

Case, like gender, is also less semantically transparent than number. This agreement feature differs from 'direct features' (Zwicky 1992) of number and gender because it is not a feature of the noun, but instead is imposed on the noun phrase "by government by some other syntactic element [...] Thus the noun and adjective [...] are in the same case because it is imposed equally on both" (Corbett 2001, 195). In the following examples the NP 'big car' is the direct object in accusative case, and in locative case when governed by the preposition 'in':

(7) Anton risuj-et bol'sh-uju mashin-u
Anton-nom,sg,M draw-3p,sg,pres big-acc,sg,F car-acc,sg,F2
'Anton is drawing a big car.

Anton sid-it v bol'sh-oj mashin-e
Anton-nom,sg,M sit-3p,sg,pres in big-loc,sg,F car-loc,sg,F2
'Anton is sitting in a big car.'

As reported in the previous section, the data from the first experiment do not support the predictions of the semantic hypothesis: children showed the worst performance on the number agreement feature, which would be expected to be acquired first on the semantic account (see Table 30). Such results do not only

[29] This classification is presented here for general illustrational purposes without any commitment to any morphological analysis with the goal of emphasizing the idea that gender of the majority of Russian nouns is assigned arbitrarily.

contradict the predictions of the semantic hypothesis, but they also sound counter-intuitive, since number assignment intuitively should not cause a lot of trouble for children. One striking observation is that during the experiment, children reported their understanding of the semantics of the plural or singular NPs by saying 'there are many of them', for example; yet, they made number errors even when they realized the NP was semantically plural or singular.

What the numbers in Table 30 indicate is the percentage of correct (target-like) responses in each of the three experimental subparts where one of the features has been tested and the other two kept constant. Thus, if a child, for example, made a gender error in the number subpart of the experiment, it was still scored as an overall error in the number subpart of the experiment, since the elicited NP appeared different from the targeted NP:

(8) Subject 21, subgroup 1, age 2;5, experiment 1: number subpart, item 23

Input:	bol'sh-im gazel'-am big-dat,pl gazelle-dat,pl 'to the big gazelles'
Target:	bol'sh-oj gazel'-i big-dat,sg,F gazelle-dat,sg,F3 'to the big gazelle'
Elicited production:	*bol'sh-omu gazel'-u big-dat,sg,M gazelle-dat,sg,M1 'to the big gazelle'

Error type: *G/M*Cl (incorrect gender assignment (masculine) on both the noun and the adjective, incorrect noun declension class).

In order to check whether there was a drawback in the experiment set up, and, hence, the results reported in Table 30, I separated 9 selected children's performance[30] on the assignment of each of the features in question on the noun and the adjective within the NP to see whether the pattern would be different. This time what I took into consideration was separate numbers indicating children's correct gender, case or number assignment in the noun in all three subparts of the experiment, and the same in the adjective. This way, regardless of whether the overall elicited NP was target-like or not, I scored the child's response as correct on each of the features separately; therefore, for instance, if the child made an error on gender assignment but number and case are target-like in any experiment subparts, it counts only as a gender error, and the child still gets credit for correctly assigning case and number. With such scoring system, the example above in (8) shows the following scoring where 1 corresponds to correct, and 0 to incorrect feature assignment:

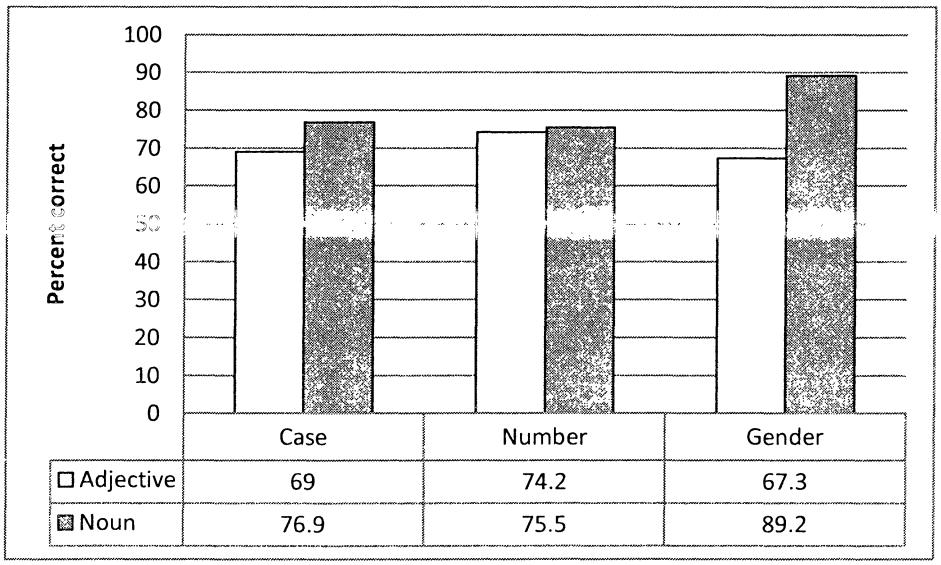
(9) Elicited production: *bol'sh-omu gazel'-u
big-dat,sg,M gazelle-dat,sg,M1
'to the big gazelle'

	Noun	Adjective
Case	1	1
Number	1	1
Gender	0	0
Class	0	

[30] The selected subjects are the same subjects selected for paradigm samples and individual error patterns discussion in chapter 3. This set of subjects equally represents participating children of all ages who showed the lowest overall result in each of the 8 age subgroups, plus one more subject (subject 37) who showed one of the lowest results in the whole experiment.

Even though the results of the new scoring are different from those that belong to the overall rate of performance across the three experimental parts in table 1, they still do not support the semantic hypothesis. The first interesting difference is that children above age 4 years old did not differ significantly in the way they performed on number, gender and case because, similar to their agreement ('concord') score (see Figure 14 in chapter 3), they performed at ceiling, i.e. they showed achievement of mastery stage of all three features, the lowest percentage being 91.7% on adjective gender assignment for subject 1 (age 4;11). The second difference is a different ordering of performance across features for the younger participants. Please refer to the figure below:

FIGURE 21 *ADJECTIVE AND NOUN FEATURE ASSIGNMENT: SEPARATED SCORING, SUBJECTS UNDER AGE 4*



	Case	Number	Gender
Adjective	69	74.2	67.3
Noun	76.9	75.5	89.2

The scoring that was used in the experiment results presented in chapter 3 showed that children did not succeed at the number experiment subpart, but

were best at the case and performed in the middle on the gender subparts. The separated scoring results show that the best performance appears on gender assignment of the nouns, and that there is a contrast between adjective and noun gender assignment.

Number does not stand out to be the worst performed feature, but it does not appear to be significantly the best either. On the adjective children did perform slightly better at number, but not so on the noun. Given that number feature has only two available possibilities for its values (singular and plural) whereas case has a lot more (cf. six cases in Russian), we can consider children's performance on case to be even more successful than that of number since chances of correct feature assignment are higher for number and lower for case.

With the new selected scoring I conclude that the semantic hypothesis is still not supported by the obtained data. Another argument against it is the fact that the least semantically transparent feature of gender reaches almost a 90% accurate performance rate on the noun. It shows that children are past the level of feature emergence and are able to extract the necessary information, but still drag behind and cannot as successfully apply this information on the adjective within the NP.

Coming back to the second research question pertaining to the semantic hypothesis spelled out in (1), I repeat that it was questioned whether or not the acquisition of semantically-driven oblique cases proceeds easier than that of structurally-driven direct cases. The results of the first experiment indicate that

this is not the case; hence this part of the semantic hypothesis is not supported by the obtained acquisitional data either. A possible confound that proponents of non-generative grammar approaches may argue for is that the obtained results are due to the effect of frequency[31], since structural cases are more frequent than oblique in adult and child-directed speech. In order to argue against such a possibility, I consider children's performance on other oblique cases with different frequency rates. If children are more successful at a less frequent case than at a more frequent one, the frequency rate is not the deciding factor, but could still play a role in the acquisition of cases. The relevant example to argue against the frequency effect is children's higher rate of instrumental case in contrast to lower rates of dative and genitive. An analysis of adult Russian child-directed speech based on 10 pages of a published Russian fairy-tale 'Alenjkij Tsvetochek' by S. Aksakov (with an average of 350 words per page) shows that instrumental case is the least frequent case among the three compared ones, as can be seen in the following table.

Table 3 *Relative frequency of selected oblique cases in Russian CDS*

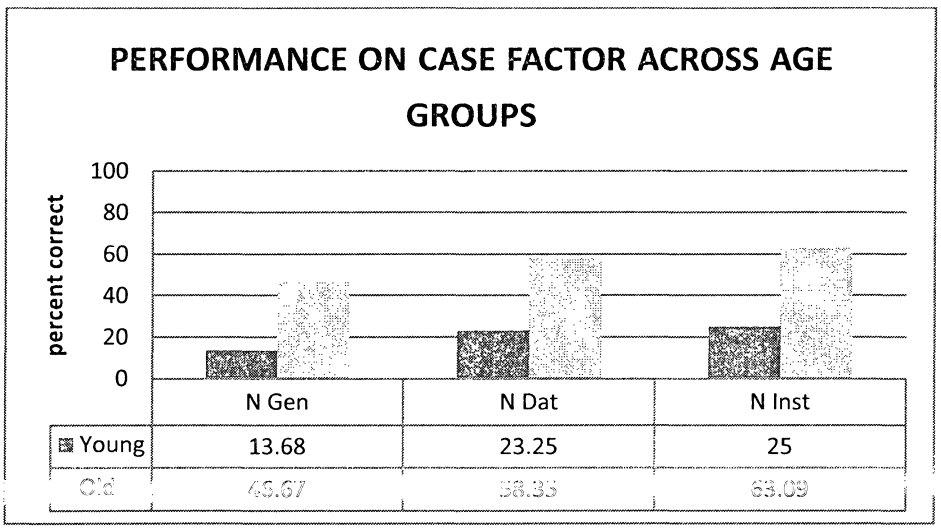
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**Total**	
Gen Sg	22	11	8	9	12	18	17	15	17	15	144	**168**
Gen Pl	5	3	1	3	0	4	2	2	5	1	24	
Dat Sg	6	4	4	7	5	9	9	6	8	6	64	**79**
Dat Pl	0	2	3	3	2	2	2	1	0	0	15	

[31] Thank you to Jonathan D. Bobaljik for this valuable comment and to Olga Popova for performing the frequency sample analysis.

Inst Sg	4	3	1	4	4	6	4	5	0	4	35	**58**
Inst Pl	4	2	2	2	2	0	3	3	2	3	23	

This sampling shows that there are 58 instances of instrumental singular and plural case nouns on the 10 pages, whereas genitive and dative numbers are higher. The tested children, however, performed best on the instrumental case, as shown in Figure 8 of chapter 2 repeated below for convenience:

FIGURE 22 (REPEATEDFIGURE 8 CHAPTER 2)



To conclude, two research questions were put forward to test the semantic hypothesis: the study of ordering effects of agreement features acquisition and the test of possible contrast of case feature values. The acquisitional data from the first experiment does not support the predictions of the semantic hypothesis.

3.2 THE CANONICITY HYPOTHESIS

The second factor under investigation is the factor of feature canonicity introduced by Corbett, a representative of Network Morphology (Corbett 2008). The criteria of feature canonicity are the following:

(10) Corbett (2008)

(i) exclusiveness: a lexical item belongs to just one part of speech; a value belongs to just one feature.

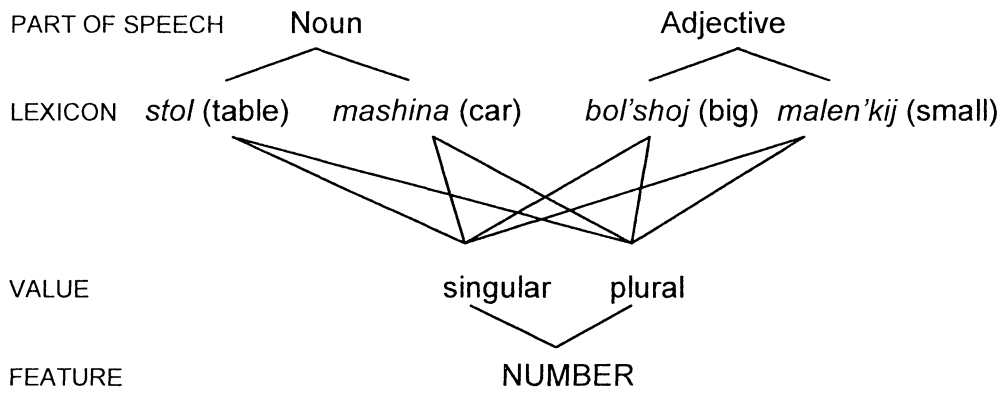
(ii) exhaustiveness: every lexical item has available all values of all features.

(iii) open and closed classes: all classes are closed, except the class of lexical items.

(iv) compositionality: given the lexical semantics of a lexical item and a specification of its feature values, the meaning of the whole is fully predictable.

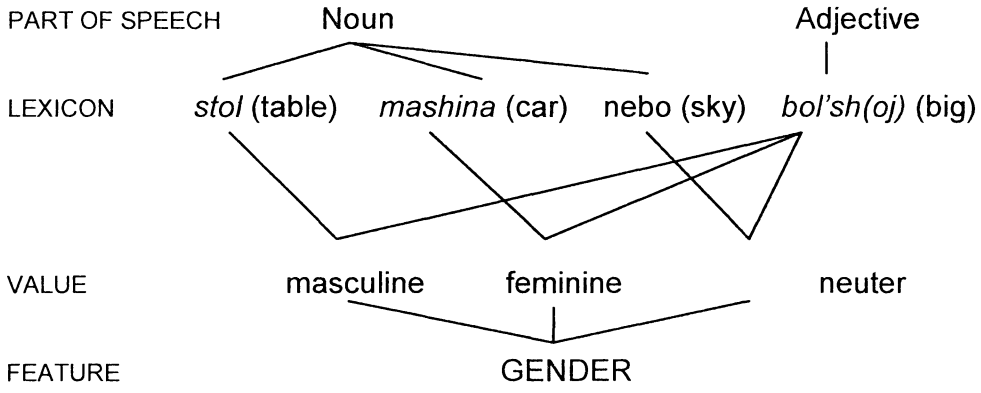
Canonicity of features and their values represents an ideal paradigm where every value for every feature is available for every lexical item for every part of speech. Out of the three features of number, gender and case that are in the focus of this dissertation, number is the closest to this ideal since it matches the above criteria.

(11)



Gender feature violates the criterion of exhaustiveness because nouns can be marked only for one of the gender values, not all three.

(12)



The feature of case also deviates from the canonical patterns because its values are shared with others: there is case syncretism. Case also violates the criteria of compositionality, since case is not an inherent feature of the noun, and its meaning cannot be predicted by feature specification and the lexical semantics of the LI.

The research question that I ask is whether a canonicity approach to acquisition is supported by the ordering of agreement features in children's

production performance I observed. The canonicity approach can be taken to make the following predictions:

(13) Given that the degree of feature canonicity decreases in the order *number* > *gender* > *case*, the features and their values with a higher degree of canonicity are predicted to be acquired earlier than features and their values with a lower degree of canonicity.

The above predictions are similar to those of the semantic hypothesis. They were tested on the overall performance of the three features in children's elicited speech, and as has been discussed in the previous section, such predictions are not borne out. The separated scoring of the overall performance, however, showed good results for gender performance on the nouns, which can be due to the canonicity factor: gender is more canonical than case.

In order to consider the canonicity factor from the point of view of feature values, I focused on case. I needed to compare the children's performance on non-canonical syncretic feature value to that of a more straightforward case value. Feminine class 3 genitive and dative in contrast to feminine class 3 instrumental cases can serve as such comparison grounds. First, let me justify this choice with the relevant part of the paradigm:

(14) Feminine class 3

SINGULAR	CASE VALUE	Declension class 3 Feminine
	GENITIVE	sol'-i
	DATIVE	
	INSTRUMENTAL	sol'-ju

Genitive and dative case values are syncretic, thus less canonical, whereas the instrumental case exponent has a higher degree of canonicity since it has a more straightforward one to one mapping.

In order to interpret the relevant results from the experimental data with the above goal in mind, I needed to look at children's production of these values and pay particular attention to the kind of errors children made in these contexts. It is important to not just compare the overall performance rate, but rather make sure children are or are not using a different case exponent.

Overall, instrumental singular F3 morpheme –ju was one of the last ones to be produced correctly by children; and its rate was definitely lower than the rate of dative and/or genitive cases. This may strike one as an argument against the canonicity approach predictions. However, a closer look at the erroneous performance of the younger children in these contexts reveals that when children were required to use –ju, instead they either used morpheme –om, which is a masculine class 1 instrumental morpheme, or repeated the input. They never use an exponent of a different case. Crucially, children who made an error on this straightforward case exponent actually made an error on gender and declension class, but not case. What about syncretic genitive and dative case exponents? The data from younger subjects that is summed up in children's sample paradigms in chapter 3 shows the following: (i) children make case errors by using nominative singular morpheme –ø[32] or masculine instrumental singular

[32] This could be regarded as an omission error.

morpheme -om; (ii) if children use –i, most of the time, it is the case exponent of a diminutive noun that belongs to class 2, not class 3.

The observations of the data from the point of view of feature values spelled above may indicate that canonicity factor is a relevant one for the acquisition of agreement features and their values. However, such a conclusion is the opposite from the conclusion about the ordering of features themselves which did not support the canonicity hypothesis. That is why I conclude that canonicity cannot be a valid explanation of all the ordering effects in children's acquisition of agreement features. Instead, I consider an alternative account of the full range of empirical data, which I proceed to discuss in the next section.

3.3 THE FACTOR OF FEATURE SPECIFICITY

I propose that the ordering effects in the acquisition of agreement features within the NP are due to overregularization of underspecified forms rather than the role of canonical highly defined forms. This conclusion was reached after the examination of two alternative hypotheses pertaining to the factor of specificity summarized below (repeated from (5) and (6) in chapter 1):

(15) **Hypothesis A**: 'Paradigm' formation "proceeds through an incremental specification metric, according to which only one feature is added at a time". (Blom, Polišenska & Weerman 2006, 321).

Hypothesis B: With a universal set of features being available to the learner, the child initially assigns a highly specified set of features to each

morphological entry and later rules out the features that are irrelevant or redundant.

The two alternative ways to resolve competition for a morphological slot differ in their prediction of overgenerated underspecified forms in children's speech. Empirical evidence in favor of hypothesis A over hypothesis B would be the abundant use of overgeneralization errors, since under hypothesis A the child's initial and more widely spread forms are underspecified at earlier stages, and at later stages of the acquisition process, the particular forms become more specific with added necessary features to distinguish between them. No overgeneralization errors are expected under hypothesis B: all forms the child is learning start as fully specified, but the child has to learn the features. Thus at the initial stage the child is learning two similar, for example, syncretic, forms as two different ones – homophones; at a later stage she realizes that these forms are the same, so then at the final stage she posits an underspecified representation of them.

Hypotheses A and B were tested by acquisitional data from the agreement experiment from two angles. The first research question that was asked contrasted highly specified allomorphic genitive plural case exponents *–ov, -ej, -ø* with the syncretic dative plural exponent *–am* with the following predictions repeated from (8) of the first chapter:

(16) *Predictions with respect to case syncretism and allomorphy:*

HYPOTHESIS A: **INITIAL FORMS ARE UNDERSPECIFIED**	HYPOTHESIS B: **INITIAL FORMS ARE HIGHLY SPECIFIED**
DAT.PL >> GEN.PL (SYNCRETIC) >> (ALLOMORPHIC)	GEN.PL NOT DISTINCT FROM DAT.PL (ALLOMORPHIC) = (SYNCRETIC)

If children perform better on dative plural, it supports hypothesis A, while the opposite pattern supports hypothesis B.

The predictions of hypothesis A were borne out: children's performance on dative plural was 54.38%, which is significantly higher than their performance on genitive plural, at 15.47% - see

Figure 9 in chapter 2. Such results show the general pattern that the initial forms in the children's productions are underspecified. However, in order to check whether the child overgeneralizes such forms, it was necessary to examine children's error patterns. The specific predictions concerning expected errors are spelled out in (9) of chapter 1, repeated below:

(17) *Predictions with respect to individual children's error types:*

<table>
<tr><td>HYPOTHESIS A:
INITIAL FORMS ARE UNDERSPECIFIED</td><td>HYPOTHESIS B:
INITIAL FORMS ARE HIGHLY SPECIFIED</td></tr>
<tr><td colspan="2">(i) WHEN THERE IS A MISTAKE IN A CHILD'S PRODUCTION, THE CHILD USES _____ IN MORE MULTIPLE CONTEXTS.</td></tr>
<tr><td rowspan="3">A LESS SPECIFIED MORPHEME
(OVERGENERALIZATION ERRORS)</td><td>MORE VARIABLE ERROR FORMS, SUCH AS:</td></tr>
<tr><td>• A LESS SPECIFIED MORPHEME</td></tr>
<tr><td>• INPUT REPETITION OR OTHER</td></tr>
<tr><td colspan="2">(ii) THE CHILD USES _____ IN THE MOST SPECIFIED CONTEXTS.</td></tr>
<tr><td>AN UNDERSPECIFIED MORPHEME
(NON-TARGET PERFORMANCE)</td><td>VARIABLE FORMS SOME OF WHICH MAY BE TARGET-LIKE</td></tr>
</table>

In order to test these predictions I followed the algorithm suggested in chapter 3 that replicates the research questions above based on the selected data samples from three individual subjects two of which received the lowest score on the overall performance on the agreement experiment, and one, in contrast, who was one of the best performers. The error patterns of the selected subjects support the predictions of hypothesis A. Based on the results of algorithm analyses of children's error patterns and the data showing children's initial morphological forms as underspecified, I conclude that the factor of feature specificity plays an important role in the acquisition of agreement features of number, gender and case. Namely, the ordering effects in the acquisition of

agreement features within the NP are due to overregularization of underspecified forms, while the role of semantic meaning or the canonicity of features and their values do not possess such importance in accounting for these ordering effects.

3.4 GENDER VS. DECLENSION CLASS IN RUSSIAN

The final research question that I discuss in this dissertation focuses on the debate between two competing accounts of the representation of gender in Russian. These accounts differently answer the question of whether gender in Russian is derived from declension class (Declension-to-Gender account; Corbett 1982), or if, on the contrary, declension class is derived from gender (Gender-to-Declension; Vinogradov 1960 among others). On the surface there is no straightforward mapping between one another, and both of these directions are not flawless. However, gender-to-declension mapping appears to be even less straightforward due to the fact that feminine nouns can be either declension class 2 or 3. A simplified version of the mapping (excluding semantic gender based on sex and rare exception nouns) introduced in Figure 15 of chapter 4 is presented below for illustration purposes:

(18) *Declension-to-gender mapping* *Gender-to-declension mapping*

Declension class		Gender	Gender		Declension class
1	→	M	M	→	1
2	→	F	F	→	2 or 3
3	→	F	N	→	4
4	→	N			

In order to evaluate both of these accounts, I conducted the second experiment focusing on the acquisition of gender. In this experiment I asked the research question about two types of contextual cues children rely on to extract the relevant information in order to assign gender to novel NPs. Following the above models, the cues are: (i) declension class information and (ii) gender information from adjectival agreement. Since the set-up of the experiment was such that the novel NPs were phonologically ambiguous and semantically non-transparent, the only way children could extract gender information was from the morphological cue provided in the input.

4 INTERPRETATION OF THE PROCESS OF LEARNING IN LIGHT OF HYPOTHESIS A

The overall conclusion based on the results of the study emphasized the preference of Hypothesis A over Hypothesis B on the basis of evidence of abundant overregularization of underspecified forms. In this section I would like to discuss how the child's acquisition process reflects Hypothesis A, repeated below for convenience:

(19) **Hypothesis A**: 'Paradigm' formation "proceeds through an incremental specification metric, according to which only one feature is added at a time". (Blom, Polišenska & Weerman 2006, 321).

In order to understand the child's representation of the morphemes in her grammar at the tested stage and to discuss the learning path, I will specify the views on underspecification with respect to the learning process taken in this work. I start with one that appears to be unable to account for the range of collected data.

This interpretation of children's use of the forms that are 'underspecified' rests on the child's mental representation of the vocabulary item (the morpheme) as a subset of the target context feature specification, especially for the more highly marked ones in adult grammar. Thus, if the adult form is specified, for example, as [+α, -β], the child's representation is [+α], and therefore underspecified. This attempt of the analysis heavily relied on nominal morpheme

feature specifications by G. Müller used in the discussion of children's production in chapter 3 (Müller 2004) repeated below:

(20) Müller (2004)

	cases	**gender/declension classes**		
Nom	[+subj, -gov, -obl]	1	Masc	[+α,-β]
Acc	[-subj, +gov, -obl]	2	Fem	[-α,+β]
Gen	[+subj, +gov, +obl]	3	Fem	[-α,-β]
Dat	[-subj, +gov, +obl]	4	Neut	[+α,+β]
Inst	[+subj, -gov, +obl]			
Loc	[-subj, -gov, +obl]			

(21) Müller'd feature specifications of morphemes (Müller 2004)

Singular

1.	/oj/	↔	{[+N],[-α,+β],[+subj,-gov,+obl]}
2.	/ju/	↔	{[+N],[-α,-β],[+subj,-gov,+obl]}
3.	/om/	↔	{[+N],[+α],[+subj,-gov,+obl]}
4.	/e/$_{dat}$	↔	{[+N],[-α,-β],[-subj,+obl]}
5.	/e/$_{loc}$	↔	{[+N],[+α],[-subj,-gov,+obl]}
6.	/o/	↔	{[+N],[+α,+β],[-obl]}
7.	/ø/	↔	{[+N],[-β],[-obl]}
8.	/i/	↔	{[+N],[-α],[+obl]}
9.	/u/	↔	{[+N],[-subj,+gov]}
10.	/a/	↔	{[+N]}

Plural

1.	/ax/	↔	{[+N],[+pl],[-subj,-gov,+obl]}
2.	/ami/	↔	{[+N],[+pl],[+subj,-gov,+obl]}
3.	/am/	↔	{[+N],[+pl],[-subj,+gov,+obl]}
4.	/ov/	↔	{[+N],[+pl],[-β],[+subj,+obl]}
5.	/ø/	↔	{[+N],[+pl],[+β],[+subj,+gov,+obl]}
6.	/i/	↔	{[+N],[+pl],[¬(+α,+β)],[-obl]}
7.	/a/	↔	{[+N],[+pl],[-obl]}

Under this view, I assumed that the child's hypothetical representations of the VIs used in error was the same as that of corresponding adult representations according to Müller's proposed list. Given that, there is only one possibility that the child's VI representation is in a subset relation with the target context both for

singular and plural nouns in Russian. This possibility is children's use of genitive feminine class 2 morpheme -i in place of dative feminine class 2 morpheme -e. The detailed analysis of the data of 8 selected subjects from the first experiment did not show any instances of such a case; however, Kempe et al (2009) report a high rate of such errors with familiar nouns in their elicited production study. Let me illustrate this case with the stimuli items from Kempe et al (2009) and morpheme feature specifications from Müller (2004):

(22)

CHILD	MORPHEME SPECIFICATION	ADULT	MORPHEME SPECIFICATION
plit-y	{[+N],[-α],[+obl]}	plit-e	{[+N],[-α,+β],[-subj,+obl]}
stove-gen,F2,sg		stove-dat,F2,sg	

Such a take on underspecification of features in a child's grammar not only fails to account for the collected data but also predicts errors that are never found. Under this interpretation we expect children to use such 'underspecified' morphemes in all contexts that this representation fits. For example, if the child's representation of instrumental F2 singular morpheme -oj were underspecified as {[+N],[+obl]}, we would expect overgeneralization errors for which -oj is used in all contexts where the feature specification {[+N],[+obl]} is present, which is not the case. Likewise, it is not the case that the most underspecified morpheme -a, which in the list of Müller's morpheme specification is marked simply as {[+N]}, is the morpheme that children use in all other contexts, even though such a view of underspecification predicts this pattern because -a fits all {[+N]} contexts, both singular and plural. Moreover, in the context of genitive singular masculine class 1, where -a is the target morpheme, children use the target as well as other

morphemes. For example, subject 28, age 3;7 used morpheme -ø, which is {[+N],[-β],[-obl]}. The specification of this morpheme according to the list by Müller is more highly specified than that of the default -a.

So, I take a more general look at underspecification in order to account for a larger number of errors in children's elicited production and provide a representation of the vocabulary items (the morphemes) used by children in various contexts. Such view rests on Jakobson's theory of feature markedness (Jakobson 1936, 1958) and the learning algorithm proposed by Blom and Don (unpublished manuscript) following Pinker's theory of learning inflection (Pinker 1984). Before I discuss the children's production and its representation, I briefly summarize Jakobson's features and his proposal of their specifications for Russian cases. Jakobson proposed the following three binary features:

(23) i. *Directionality*, which signals the goal of the event;

ii. *Marginality*, which assigns to the entity an accessory place in the message;

iii. *Quantification*, which signals the extent to which the entity takes part in the message.

Certain combinations of these features represent eight Russian cases[33] in the following way:

(24)

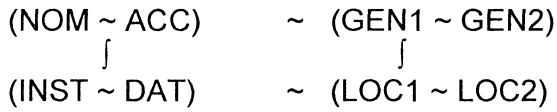
	Nom	[-marg, -quant, -dir] unmarked
	Acc	[-marg, -quant, +dir]
	Gen1 /a/	[-marg, +quant, +dir]

[33] Eight cases are nominative, accusative, dative and instrumental, plus two genitive and two locative cases.

Gen2 /u/	[-marg, +quant, -dir]
Dat	[+marg, -quant, +dir]
Inst	[+marg, -quant, -dir]
Loc1 /u/	[+marg, +quant, -dir]
Loc2 /e/	[+marg, +quant, +dir]

Crucially, Jakobson proposed that in the distinctive feature oppositions presented in the next figure members on the right and below are marked relative to those on their left or above:

FIGURE 23 JAKOBSON'S SYSTEM OF RUSSIAN CASES



The data from the experimental study presented in this dissertation showed that children were past the stage of emergence of the morphemes. For every child there were morphemes that were used correctly in the right contexts. For those subjects with the least rate of target performance those morphemes used correctly were [-obl] singular morphemes, which replicates the results of spontaneous production data (Gvozdev 1949, Babyonyshev 1993 among others). However, the data also showed that apart from target-like morphemes, children used other morphemes in error in the same contexts. Given the innate set of morpho-syntactic features and assuming that the child at this stage obtains the relevant information from the syntactic context (i.e. they 'know' what the context specification should be), the child faces a situation where she needs specific features, but either cannot access or does not yet have the correct form to match this set of features. My proposal is that in this situation the child uses

the form with as much feature match as possible and then chooses the less marked form.

To illustrate this conclusion, let us consider all erroneous forms used by subject 21, age 2;5 in singular nouns. The table is partially repeated from chapter 3, where the shadowed morphemes correspond to the target morphemes used in the correct context and the fully shadowed cells represent untested contexts. The data presented in this table shows all the forms used by the child.

TABLE 32 SUBJECT 21 SUBGROUP 1 AGE 2;5

Subject 21 Subgroup 1 Age 2;5				
SINGULAR				
GENDER	NEUTER	MASCULINE	FEMININE	FEMININE
CASE CLASS	IV	I	III	II
NOMINATIVE	-o/-e	-∅		-a
ACCUSATIVE				-u
GENITIVE	-a, -∅, IR		-i, WW	-i, IR
DATIVE	-u		-u	-e, WW
INSTRUMENTAL	-om/-em		-ej, -em	-oj/-ej, -em
PREPOSITIONAL				

This child's data shows four errors where she used a different morpheme than the expected one. Two errors were in those contexts where the correct form was also used, and two other errors represent the contexts where the target morpheme was never used. Let us consider each of these four errors with respect to both Jakobson's markedness and Müller's morpheme specification proposals.

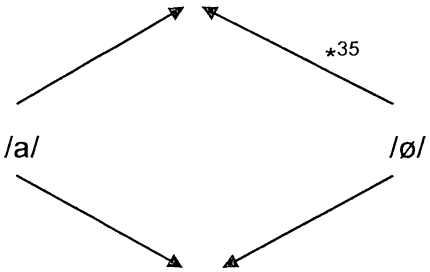
(25) /ø/ ← /a/ (gen.m1,sg)

The syntactic environment is genitive masculine class 1 singular, which corresponds to Müller's {[+N][34],[+α,-β],[+subj, +gov, +obl]} and Jakobson's [-marg, +quant, +dir]. The child used the form that matched as many features as possible to the target context except for case, i.e. the used form is also singular in number and is compatible with gender (masculine) and declension class 1 or 3 ([-β]). As far as the feature of case, the child used the unmarked nominative instead of genitive case, which is in accordance with the markedness principles of Jakobson.

Given the data from Subject 21, we know that the child also correctly used both forms -a and -ø in the relevant nominative case contexts, but different declension/gender classes: -a is used in [-α,+β] feminine 2, and -ø is the morpheme for masculine class 1 [+α,-β] and feminine class 3 [-α,-β]. That suggests that the child's representation of both forms is actually the same and that it is {[+s]}, which is schematically illustrated below:

[34] The feature [+N] remains the same, since it is relevant for all the forms and contexts I will discuss. That's why I omit it in the discussion for the sake of the argument simplicity.

(26) Syntactic environment of the error: {[+α,-β],[+subj, +gov, +obl]}



Other (correct) syntactic environments: {[-α,+β],[+subj, -gov, -obl]}
{[-α,+β],[+subj, -gov, -obl]}
{[-α,+β],[+subj, -gov, -obl]}

Child's hypothesized representation is two (multiple) not fully specified forms -a and -ø represented in child's grammar at this stage as {[+subj]}. One of these forms (-a) happens to correctly match both syntactic environments and the other (-ø) to be produced in error. Later on in the learning process the child gradually modifies the hypothesized representation to target the adult one. I assume this learning process to happen according to the learning algorithm proposed by Blom and Don.

Now let us consider Blom and Don's learning algorithm, in particular, proposed learning principles of ADD and DELETE, based on previous work by Pinker (Blom and Don: 13):

[35] * = non-target form

(27) ADD

As soon as [36] two VIs are both compatible with the syntactic environment, add a feature specification to either one of them, which is compatible with its syntactic environment.

(28) DELETE

As soon as a VI is parsed in a syntactic environment, which is not compatible with its existing feature specification, delete that specification.

At this stage subject 21 hypothesized the representation of morphemes -ø as {[+subj]}. In order to get the adult representation of this form, the child has to add the specification [-obl] and [-β] to morpheme -ø and delete the specification [+subj]. With the help of the relevant contrasts in the forthcoming input, the child should be able to revise her form representation by trial and error.

Let me illustrate the proposed learning path with the example from the data of the above subject. It should be noted that the error I will discuss now represents a typical and very steady one across all represented children.

(29) /ej/ ← /ju/ (inst.F3,sg)

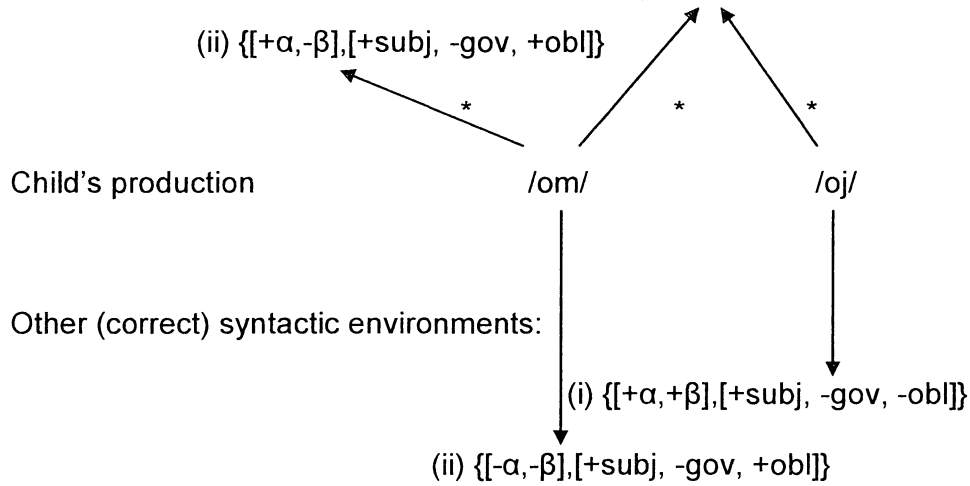
(30) /em/ ← /ju/ (inst.F3,sg)

What we see here and in the data of other subjects is that in instrumental feminine class 3 singular context the child never uses the target morpheme -ju,

[36] This rule is actually not applied 'As soon as' but rather happens gradually since our data shows existence of both correct and incorrect forms in the same syntactic environment.

but instead uses two other instrumental singular forms: -em (a variant of -om) and -ej (a variant of -oj)[37]. Noticeably, there are two observations which are relevant for the learning path discussion: (i) neither this child, nor the other children make errors in masculine instrumental context; and (ii) morpheme -oj used in feminine class 3 context is by far a less frequent error than morpheme -om. Let us represent schematically the pattern that we observe in these data:

(31) Syntactic environments of the error: (i) {[-α,-β],[+subj, -gov, +obl]}



Given the distribution of the forms above, I propose that at this particular time in the acquisition process the child posited the following representation of the forms she used:

(32) /om/ {[+subj, -gov, +obl]}

/oj/ {[-α],[+subj, -gov, +obl]}

Let me go back and state that at the earliest stages the only vocabulary item for instrumental case is -om, which is overgeneralized across all declension/gender

[37] From here on I will use allomorphs -oj and -om respectively to avoid confusion.

classes in the instrumental case. An example of such stage is the data from subject 8 aged 3;0 whose data are summarized in Table 6 of chapter 3 or subject 28, Table 8 of chapter 3. Later on, the vocabulary item -oj appears due to the existence of two different instrumental forms in the child's input that she is paying attention to. The child realizes that morpheme -oj fits {[+subj, -gov, +obl]} context and is challenged with a situation when two vocabulary items have the same representation:

(33) /om/ {[+subj, -gov, +obl]}

/oj/ {[+subj, -gov, +obl]}

It is similar to the earlier example (25), where two equally not fully specified forms existed and fitted the same context. Therefore, in order to distinguish between the two forms (old and new), the child applies the ADD principle described in (27) and adds more specification to form -oj. Morpheme -om at this stage remains to be the default form for instrumental case; therefore we see the state of affairs as in (32). This given specification of form -oj allows the child to use this morpheme in error in another [-α] context: feminine class 3 singular instrumental {[-α,-β],[+subj,-gov,+obl]} in place of morpheme -ju which does not yet exist in the child's lexicon. At the same time, [-α] specification of morpheme -oj prevents the child from using it in masculine class 1 instrumental context in place of -om, which is consistent with the observed data. At this stage the child uses two forms -om and -oj for feminine class 3 context, but the child definitely prefers -om, which is the default instrumental form, over a more specified -oj. Alternatively, the fact that -oj was used only once in this feminine 3 context can

be due to a performance error, even though not an unexpected one. Moreover, we know that this child and other children also use -om in the context of -oj. This indicates that there is a retrieval problem with the less frequent form, even though under the DM view one would expect the form that most closely matches the target context to win the competition for the morphological spot. However, at this point the child sometimes uses the unmarked masculine gender and the more frequent form /om/ in the input even though the correct form -oj exists in her lexicon.

The next step in the learning path is the emerging awareness of further contrast within instrumental singular. When the child realizes that in the syntactic environment {[-α,-β],[+subg,-gov,-obl]}, which is feminine class 3 instrumental, the input has a different form -ju, she needs to go through a couple of more rounds of revisions of her hypothesized representations of the forms, and add more specification to one of these two alternatives: the new form -ju and the existing form -oj. The mental representation of the child's grammar at this time might look like the following:

(34) /om/ {[+subj, -gov, +obl]}

/oj/ {[-α],[+subj, -gov, +obl]}

/ju/ {[-α],[+subj, -gov, +obl]}

Adding [-β] to the specification of form -ju or [+β] to the specification of form –oj will solve the problem of having two distinct forms correspond to the same meaning. Which way will the child goes does not probably matter for the final result. One possibility could be that due to the restriction of the child's memory

capacities, the child might quickly modify the newly arrived form rather than keep in mind the existing form and modify that. On the other hand, the child has settled her current representation of –oj and it would not be so difficult to retrieve and revise that representation with the evidence from new input. Anyway, I propose that at this step of the acquisition process the child's grammar can contain the following revised forms:

(35) /om/ {[+subj, -gov, +obl]}

/oj/ {[-α],[+subj, -gov, +obl]}

/ju/ {[-α,-β],[+subj, -gov, +obl]}

The step represented in (35) would be found at the stage which this particular child, subject 21, has not reached yet. But we can expect that those children who have would make overgeneralization errors where the 'subset' forms are produced in place of the 'superset' target morpheme. Thus, we expect overgeneralization of /om/ over the other two forms and overgeneralization of -oj over -ju, but not the other way. Such expectations are supported by the data from our first experiment.

Finally, the child realizes that overgeneralization of such errors never happens in adult grammar and that the three forms are distinct from each other and correspond to the distinct syntactic environments. At this final stage the child adds more specification to morphemes -oj and -om and reaches adult representation:

(36) /om/ {[+α],[+subj, -gov, +obl]}

/oj/ {[-α],[+subj, -gov, +obl]}

/ju/ {[-α,-β],[+subj, -gov, +obl]}

The example with instrumental singular contexts discussed above illustrates a possible learning path within Hypothesis A, the learning algorithm proposed by Blom and Don, the theory of markedness by Jakobson (1936, 1958) and feature specificity by G.Müller (2004). Having observed the data and taking into account the above theoretical implications I would like to draw the following conclusions:

- The child produces the correct form most of the time, but correct forms are not the only one used by the child in the same context;
- The child does not always have access to correct forms even though they are present in the child's grammar;
- The child's error is the less marked or unmarked form most of the time;
- The child attempts to use the form that matches at least in one or more feature specifications to the target context;
- The child has multiple underspecified entries for one domain;
- The child uses the form where it does not fully match the target context.

In sum, under hypothesis B the child reaches the state of ineffability when she cannot grammatically produce the needed form because its full specification does not match the syntactic environment, therefore the child's choice in a spontaneous production would be to omit the forms that have not yet been acquired, and in the elicited production to choose randomly among equally ungrammatical choices. The latter would result in symmetry where there is no pattern in the child's responses. Such model is different from hypothesis A under

which the child does not reach ineffability since there is always a default vocabulary item to use in a difficult context.

5 ELICITED AND SPONTANEOUS PRODUCTION DATA: THE RELATION BETWEEN THE RESULTS

The data from the elicited production study offered for discussion in this dissertation supports previous findings from longitudinal studies of Russian language acquisition and sheds light on the questions that were raised by researchers in this area. Thus, Gagarina and Voeykova (2009) presented a longitudinal data study of Russian-speaking children aged 1;7 – 2;10 years old and concluded that it was not clear what the children acquired first: case or number, since both of these features appeared simultaneously. However, within number they noted the nominative plural forms to be the first ones with oblique plural case forms to appear later. The data from my study supports this conclusion. Moreover, elicited production from the first experiement provides an answer to Gagarina and Voeykova's study: the category of case is acquired first since it has a higher rate of successful production.

In her earlier study, Voeykova (1997) reported wrong morphological parsing of adjectival inflections in children's speech. She claimed that children are making false morphemic division of the adjectives influenced by the nominal declension. With the help of the collected data I support and extend her idea that children do the same in their elicited production. Both in spontaneous and elicited production children exhibited erroneous adjectival inflections where the first vowel of the disyllabic inflection is changed, as illustrated in the following example:

(37)

	Adult form		Child form
Nom,Sg,fem	malen'k-aja	mashin-a	malen'k-aja mashin-a
Dat,Sg,fem	malen'k-uju	mashin-u	malen'k-aju mashin-u

The proposed analysis is that children replicate the noun's inflection on the adjective in both of the illustrated cases where the first syllable of the nominative case adjectival morpheme is erroneously parsed into the adjectival stem. So, in fact, the child did not change the vowel, but simply posited a false morphemic division of the adjective, as illustrated below:

(38)

	Adult form		Child form
Nom,Sg,fem	malen'k-aja	mashin-a	malen'kaj-a mashin-a
Dat,Sg,fem	malen'k-uju	mashin-u	malen'kaj-u mashin-u

Such patterns may be track back to the historical development of Russian morphology, which I suggest for future research.

APPENDICES

Appendix 1 Russian Nominal Declension (Paradigm View)

Number	SINGULAR							
Class	IV	I		II		III		
Gender	N	M	F	F	M	F	M	N
NOM	*-o / -e*	*- ∅*		*-a*		*- ∅*		*-a*
ACC		*- ∅* [-an]	*-a*	*-u*				
GEN	*-a (+partitive –u for M)*			*-i (y)*				
DAT	*-u*			*-e*		*-i*		
INST	*-om (-em)*			*-oj (-ej)*		*-ju*	*-om*	*-em*
LOC	*-e*					*-i*		
Number	PLURAL							
Class	IV	I		II		III		
NOM	*-i (-y) / -a*			*-i (y)*		*-i*		*-a*
ACC	*-i / -**a***	*-ej / -ov/ -a / -i, -∅*		*-i (-y)* [-an]	*-∅* [+an]			
GEN	*-ov (-jev)/ -ej/ -∅*			*-∅*		*-ej*		*-on*
DAT	*-am*							
INST	*-ami*							
LOC	*-ax*							

Appendix 2 Russian Adjectival Declension (Paradigm View)

GENDER / CASE	MASCULINE	FEMININE	NEUTER	PLURAL
	'red' 'big' 'blue'	'red' 'big' 'blue'	'red' 'big'	
NOMINATIVE	*krasn-**yj** / bol'sh-**oj** / sin'-**ij***	*krasn-**aja** /bol'sh-**aja**/ sin'-**aja***	*krasn-**oje** / bol'sh-**oje**/ sin'-**eje***	*krasn-**yje** / bol'sh-**ije**/ sin'-**ije***
ACCUSATIVE INANIMATE	*krasn-**yj** / bol'sh-**oj** / sin'-**ij***	*krasn-**uju** / bol'sh-**uju**/ sin'-**uju***	*krasn-**oje** / bol'sh-**oje**/ sin'-**eje***	*krasn-**yje** / bol'sh-**ije**/ sin'-**ije***
ACCUSATIVE ANIMATE	*krasn-**ogo** / bol'sh-**ogo**/ sin'-**ego***			*krasn-**yx** / bol'sh-**ix**/ sin'-**ix***
GENITIVE	*krasn-**ogo** / bol'sh-**ogo**/ sin'-**ego***	*krasn-**oj** / bol'sh-**oj**/ sin'-**ej***	*krasn-**ogo** /bol'sh-**ogo**/ sin'-**ego***	*krasn-**yx** / bol'sh-**ix**/ sin'-**ix***
DATIVE	*krasn-**omu** / bol'sh-**omu**/ sin'-**emu***	*krasn-**oj** / bol'sh-**oj**/ sin'-**ej***	*krasn-**omu** /bol'sh-**omu**/ sin'-**emu***	*krasn-**ym** / bol'sh-**im**/ sin'-**im***
INSTRUMENTAL	*krasn-**ym** /bol'sh-**im**/ sin'-**im***	*krasn-**oj** / bol'sh-**oj**/ sin'-**ej***	*krasn-**ym** /bol'sh-**im**/ sin'-**im***	*krasn-**ymi** /bol'sh-**imi**/ sin'-**imi***
LOCATIVE	*krasn-**om** /bol'sh-**om**/ sin'-**em***	*krasn-**oj** / bol'sh-**oj**/ sin'-**ej***	*krasn-**om** / bol'sh-**om**/ sin'-**em***	*krasn-**yx** / bol'sh-**ix**/ sin'-**ix***

Appendix 3 Experiment 1 Stimuli: Number Subpart

a. Instrumental stimuli (12 items)

#	INPUT	INPUT GLOSS	TARGET OUTPUT	OUTPUT GLOSS
-im –om → -imi –ami (2 items)				
1	Ostr-ym Nož-om	sharp-M-inst-sg knife-1-M-inst-sg	Ostr-ymi Nož-ami	sharp-inst-pl knife-inst-pl
2	Bol'š-im Karandaš-om	Big-M-inst-sg pencil-1-M-inst-sg	Bol'š-imi Karandaš-ami	Big-inst-pl pencil-inst-pl
-oj –oj → -imi –ami (2 items)				
3	Mal'en'k-oj Spičk-oj	small-F-inst-sg match-2-F-inst-sg	Mal'en'k-imi Spičk-ami	small-inst-pl match-inst-pl
4	vkusn-oj sosisk-oj	tasty-F-inst-sg sausage-2-F-inst-sg	vkusn-ymi sosisk-ami	Tasty-inst-pl sausage-inst-pl
-oj –ju → -imi –ami (2 items)				
5	čern-oj pedal'-ju	black-F-inst-sg pedal-3-F-inst-sg	čern-ymi pedal'-ami	Black-inst-pl pedal-inst-pl
6	gust-oj brov'-ju	thick-F-inst-sg eyebrow-3-F-inst-sg	gust-ymi brov'-ami	thick-inst-pl eyebrow-inst-pl
-imi –ami → -im –om (2 itmes)				
7	Bol'š-imi molotk-ami	big-inst-pl axe-inst-pl	Bol'š-im molotk-om	big-M-inst-sg axe-1-M-inst-sg
8	golub-ymi flomaster-ami	blue-inst-pl marker-inst-pl	golub-ym flomaster-om	blue-M-inst-sg marker-1-M-inst-sg
-imi –ami → -oj –oj (2 items)				
9	vkusn-ymi kotlet-ami	tasty-inst-pl cutlet-inst-pl	vkusn-oj kotlet-oj	tasty-F-inst-sg cutlet-2-F-inst-sg
10	Zolot-ymi monet-ami	golden-inst-pl coin-inst-pl	Zolot-oj monet-oj	golden-F-inst-sg coin-2-F-inst-sg

-imi –ami → -oj –ju (2 items)				
11	Bel-ymi Skatert'-ami	White-inst-pl Table cloth-inst-pl	Bel-oj Skatert'-ju	White-F-inst-sg Table cloth-3-F-inst-sg
12	Tonk-imi Trost'-ami	thin-inst-pl stick-inst-pl	Tonk-oj Trost'-ju	thin-F-inst-sg stick-3-F-inst-sg

b. Dative stimuli (12 items)

#	INPUT	INPUT GLOSS	TARGET OUTPUT	OUTPUT GLOSS
-omu –u → -im –am (2 items)				
13	Ser-omu kot-u	Gray-M-dat-sg cat-1-M-dat-sg	Ser-ym kot-am	Gray-dat-pl cat-dat-pl
14	Bol'š-omu medved'-u	Big-M-dat-sg bear-1-M-dat-sg	Bol'š -im medved'-am	Big-dat-pl bear-dat-pl
-oj –e → -im –am (2 items)				
15	Želt-oj pčel-e	Yellow-F-dat-sg bee-2-F-dat-sg	Želt-ym pčel-am	Yellow-dat-pl bee-dat-pl
16	Xitr-oj lis-e	Cunning-F-dat-sg Fox-2-F-dat-sg	Xitr-ym lis-am	Cunning-dat-pl fox-dat-pl
-oj –i → -im –am (2 items)				
17	Bol'š -oj loš ad-i	Big-F-dat-sg horse-3-F-dat-sg	Bol'š -im loš ad'-am	Big-dat-pl horse-dat-pl
18	Ser-oj myš -i	Gray-F-dat-sg mouse-3-F-dat-sg	Ser-ym myš -am	Gray-dat-pl mouse-dat-pl
-im –am → -omu –u (2 itmes)				
19	Krasiv-ym kon'-am	Beautiful-dat-pl horse-dat'pl	Krasiv-omu kon'-u	Beautiful-M-dat-sg horse-1-M-dat-sg
20	Bel-ym baran-am	White-dat-pl sheep-dat-pl	Bel-omu baran-u	White-M-dat-sg sheep-1-M-dat-sg
-im –am → -oj –e (2 items)				

21	Umn-ym sov-am	Smart-dat-pl owl-dat-pl	Umn-oj sov-e	Smart-F-dat-sg owl-2-F-dat-sg
22	Bel-ym koz-am	White-dat-pl goat-dat-pl	Bel-oj koz-e	White-F-dat-sg goat-2-F-dat-sg
-im –am → -oj –i (2 items)				
23	Bel-ym gazel'-am	Whilte-dat-pl gazelle-dat-pl	Bel-oj gazel-i	Whilte-F-dat-sg gazelle-3-F-dat-sg
24	Umn-ym rys'-am	Smart-dat-pl lynx-dat-pl	Umn-oj rys-i	Smart-F-dat-sg lynx-3-F-dat-sg

c. Genitive stimuli (25 items)

#	INPUT	INPUT GLOSS	TARGET OUTPUT	OUTPUT GLOSS
-ogo –a → -ix –ov (3 items)				
25	Bel-ogo oblaka	White-N-gen-sg cloud-4-N-gen-sg	Bel-yx oblak-ov	White-gen-pl cloud-gen-pl
26	Ser-ogo vorob'j-a	Gray-M-gen-sg sparrow-1-M-gen-sg	Ser-yx vorob'j-ov	Gray-gen-pl sparrow-gen-pl
27	Starš-ego brat-a	Older-M-gen-sg brother-1-M-gen-sg	Starš-ix brat'j-ev	Older-gen-pl brother-gen-pl
-ogo –a → -ix –ej (3 items)				
28	Golub-ogo m'ač-a	Blue-M-gen-sg ball-1-M-gen-sg	Golub-yx m'ač-ej	Blue-gen-pl ball-gen-pl
29	Sin'-ego mor'-a	Blue-N-gen-sg Sea-4-N-gen-sg	Sin-ix mor-ej	Blue-gen-pl sea-gen-pl
30	Krasn-ogo kirpič-a	Red-M-gen-sg brick-1-M-gen-sg	Krasn-yx kirpič-ej	Red-gen-pl brick-gen-pl
-ogo –a → -ix -∅ (3 items)				
31	Ser-ogo soldat-a	Gray-M-gen-sg soldier-1-M-gen-sg	Ser-yx soldat-∅	Gray-gen-pl soldier-gen-pl
32	Krasn-ogo jablok-a	Red-N-gen-sg apple-4-N-gen-sg	Krasn-yx jablok-∅	Red-gen-pl apple-gen-pl
33	Sin-ego glaz-a	Blue-M-gen-sg eye-1-M-gen-sg	Sin-ix glaz-∅	Blue-gen-pl eye-gen-pl
-oj –i → -ix –ej (3 items)				

34	Zolot-oj medal-i	Golden-F-gen-sg medal-3-F-gen-sg	Zolot-yx medal-ej	Golden-gen-pl medal-gen-pl
35	Bel-oj kost-i	White-F-gen-sg bone-3-F-gen-sg	Bel-yx kost-ej	White-gen-pl bone-gen-pl
36	Blesťašč-ej forel-i	Sparkling-F-gen-sg trout-3-F-gen-sg	Blesťašč-ix forel'-ej	Sparkling-gen-pl trout-gen-pl
-oj –i → -iz -∅ (3 items)				
37	Vysok-oj sosn-y	Tall-F-gen-sg pine-tree -2-F-gen-sg	Vysok-ix sosen-∅	Tall-gen-pl pine-tree –gen-pl
38	Ostr-oj strel-y	Sharp-F-gen-sg arrow-2-F-gen-sg	Ostr-yx strel-∅	Sharp-gen-pl arrow-gen-pl
39	Bel-oj dosk-i	White-F-gen-sg board-2-F-gen-sg	Bel-yx dosok-∅	White-gen-pl board-gen-pl
-ix –ov → -ogo –a (2 items)				
40	Malen'k-ix dom-ov	Small-gen-pl house-gen-pl	Malen'k-ogo dom-a	Small-M-gen-sg house-1-M-gen-sg
41	Vkusn-yx banan-ov	Tasty-gen-pl banana-gen-pl	Vkusn-ogo banan-a	Tasty-M-gen-sg banana-1-M-gen-sg
-ix –ej → -ogo –a (2 items)				
42	širok-ix pol-ej	Wide-gen-pl field-gen-pl	širok-ogo pol'-a	Wide-N-gen-sg field-4-N-gen-sg
43	Železn-yx kluč-ej	Iron-gen-pl key-gen-pl	Železn-ogo kluč-a	Iron-M-gen-sg key-1-M-gen-sg
-ix –ej → -oj –i (2 items)				
44	Detsk-ix kolybel-ej	Children's-gen-pl bassinet-gen-pl	Detsk-oj kolybel-i	Children's-F-gen-sg bassinet-3-F-gen-sg
45	Zolot-yx cep-ej	Golden-gen-pl chain- gen-pl	Zolot-oj tsep-i	Golden-F-gen-sg chain-3-F-gen-sg
-ix -∅ → -ogo –a (2 items)				
46	Krasn-yx sapog-∅	Red-gen-pl boot-gen-pl	Krasn-ogo sapog-a	Red-M-gen-sg boot-1-M-gen-sg
47	Dlinn-yx brjoven-∅	Long-gen-pl log-gen-pl	Dlinn-ogo brevn-a	Long-N-gen-sg log-4-N-gen-sg

-ix -∅ → -oj –i (2 items)				
48	Glubok-ix nor-∅	Deep-gen-pl hole-gen-pl	Glubok-oj nor-y	Deep-F-gen-sg hole-2-F-gen-sg
49	Ostr-yx pil-∅	Sharp-gen-pl saw-gen-pl	Ostr-oj pil-y	Sharp-F-gen-sg saw-2-F-gen-sg

Appendix 4 Experiment 1 Stimuli: Gender Subpart

#	INPUT	INPUT GLOSS	TARGET OUTPUT	OUTPUT GLOSS
Training				
50	golub-aja zvezd-a	blue-F-nom-sg star-2-F-nom-sg	golub-oj stak-an	blue-M-nom-sg glass-1-M-nom-sg
51	bol'sh-oj divan-ø	big-M-nom-sg sofa-1-M-nom-sg	bol'sh-aja metl-a	big-F-nom-sg mop-2-F-nom-sg
52	prost-oje gnezd-o	simple-N-nom-sg nest-4-N-nom-sg	prost-aja postel'-ø	simple-F-nom-sg bed-3-F-nom-sg
53	prost-aja vod-a	simple-F-nom-sg water-2-F-nom-sg	prost-oje molok-o	simple-N-nom-sg milk-4-N-nom-sg
-aja –a → -oj –ø (2 items)				
54	kudjan-aja nog-a	NI-F-nom-sg leg-2-F-nom-sg	kudjan-oj nos-ø	NI-M-nom-sg nose-1-M-nom-sg
55	gal't-aja dosk-a	NI-F-nom-sg board-2-F-nom-sg	gal't-oj chajnik-ø	NI-M-nom-sg teapot-1-M-nom-sg
-aja –a → -oje –o (2 items)				
56	smet-aja lun-a	NI-F-nom-sg moon-2-F-nom-sg	smet-oje lits-o	NI-N-nom-sg face-4-N-nom-sg
57	gal't-aja golov-a	NI-F-nom-sg head-2-F-nom-sg	gal't-oje kryl-o	NI-N-nom-sg wing-4-N-nom-sg
-aja –ø → -oj –ø (2 items)				
58	pink-aja krovat'-ø	NI-F-nom-sg bed-3-F-nom-sg	pink-oj stul-ø	NI-M-nom-sg chair-1-M-nom-sg
59	smet-aja karusel'-ø	NI-F-nom-sg carousel-3-F-nom-sg	smet-oj mototsikl-ø	NI-M-nom-sg motorcycle-1-M-nom-sg
-aja –ø → -oje –o(2 items)				
60	klastjan-aja dver'-ø	NI-F-nom-sg door-3-F-nom-sg	klastjan-oje okn-o	NI-N-nom-sg window-4-N-nom-sg

61	klastjan-aja jel'-ø	Nl-F-nom-sg Fir-tree-3-F-nom-sg	klastjan-oje vesl-o	Nl-N-nom-sg paddle-4-N-nom-sg
-oj –ø → -aja –a (2 items)				
62	grin-oj zabor-ø	Nl-M-nom-sg fence-1-M-nom-sg	grin-aja sten-a	Nl-F-nom-sg wall-2-F-nom-sg
63	grin-oj pomidor-ø	Nl-M-nom-sg tomato-1-M-nom-sg	grin-aja jed-a	Nl-F-nom-sg food-2-F-nom-sg
-oj –ø → -aja –ø (2 items)				
64	lustov-oj stol-ø	Nl-M-nom-sg table-1-M-nom-sg	lusov-aja mebel'-ø	Nl-F-nom-sg furniture-3-F-nom-sg
65	svexov-oj parovoz-ø	Nl-M-nom-sg engine-1-M-nom-sg	sxexov-aja kachel'-ø	Nl-F-nom-sg swing-3-F-nom-sg
-oje –o → -aja –a (2 items)				
66	klastjan-oje vedr-o	Nl-N-nom-sg bucket-4-N-nom-sg	klastjan-aja skovorod-a	Nl-F-nom-sg frying pan-2-F-nom-sg
67	lustov-oje koles-o	Nl-N-nom-sg wheel-4-N-nom-sg	lustov-aja ruk-a	Nl-F-nom-sg hand-2-F-nom-sg
-oje –o → -aja –ø (2 items)				
68	kudjan-oje per-o	Nl-N-nom-sg feather-4-N-nom-sg	kudjan-aja tetrad'-ø	Nl-F-nom-sg notebook-3-F-nom-sg
69	pink-oje jajts-o	Nl-N-nom-sg egg-4-N-nom-sg	pink-aja sol'-ø	Nl-F-nom-sg salt-3-F-nom-sg

Appendix 5 Experiment 1 Stimuli: Case Subpart

a. Accusative Stimuli

#	INPUT	INPUT GLOSS	TARGET OUTPUT	OUTPUT GLOSS
-aja –a → -uju –u (10 itmes)				
70	kudjan-aja korobk-a	NI-F-nom-sg box-2-F-nom-sg	kudjan-uju kryshk-u	NI-F-acc-sg lid-2-F-acc-sg
71	grin-aja verevk-a	NI-F-nom-sg rope-2-F-nom-sg	grin-uju lent-u	NI-F-acc-sg ribbon-2-F-acc-sg
72	pink-aja klubnik-a	NI-F-nom-sg strawberry-2-F-nom-sg	pink-uju malin-u	NI-F-acc-sg raspberry-2-F-acc-sg
73	pink-aja majk-a	NI-F-nom-sg vest-2-F-nom-sg	pink-uju shub-u	NI-F-acc-sg coat-2-F-acc-sg
74	svexov-aja koljask-a	NI-F-nom-sg stroller-2-F-nom-sg	svexov-uju teleg-u	NI-F-acc-sg cart-2-F-acc-sg
75	grin-aja gazet-a	NI-F-nom-sg newspaper-2-F-nom-sg	grin-uju knig-u	NI-F-acc-sg book-2-F-acc-sg
76	gal't-aja jubk-a	NI-F-nom-sg skirt-2-F-nom-sg	gal't-uju zhiletk-u	NI-F-acc-sg vest-2-F-acc-sg
77	smet-aja roz-a	NI-F-nom-sg rose-2-F-nom-sg	smet-uju kosynk-u	NI-F-acc-sg headscarf-2-F-acc-sg
78	smet-aja bumag-a	NI-F-nom-sg paper-2-F-nom-sg	smet-uju trjapk-u	NI-F-acc-sg cloth-2-F-acc-sg
79	klastjan-aja kistochk-a	NI-F-nom-sg brush-2-F-nom-sg	klastjan-uju ruchk-u	NI-F-acc-sg pen-2-F-acc-sg

b. Dative Stimuli

#	INPUT	INPUT GLOSS	TARGET OUTPUT	OUTPUT GLOSS
-aja –a → -oj –e (10 itmes)				
80	svexov-aja tachk-a	NI-F-nom-sg pushcart-2-F-nom-sg	k svexov-oj mashin-e	to NI-F-dat-sg car-2-F-dat-sg
81	lustov-aja koft-a	NI-F-nom-sg sweater-2-F-nom-sg	k lustov-oj rubashk-e	to NI-F-dat-sg shirt-2-F-dat-sg

82	gal't-aja shapk-a	NI-F-nom-sg hat-2-F-nom-sg	k gal't-oj koron-e	to NI-F-dat-sg crown-2-F-dat-sg
83	grin-aja korzin-a	NI-F-nom-sg basket-2-F-nom-sg	k grin-oj tarelk-e	to NI-F-dat-sg plate-2-F-dat-sg
84	smet-aja balalajk-a	NI-F-nom-sg balalaika-2-F-nom-sg	k smet-oj gitar-e	to NI-F-dat-sg guitar-2-F-dat-sg
85	klastjan-aja lozhk-a	NI-F-nom-sg spoon-2-F-nom-sg	k klastjan-oj vilk-e	to NI-F-dat-sg fork-2-F-dat-sg
86	pink-aja butylk-a	NI-F-nom-sg bottle-2-F-nom-sg	k pink-oj sosk-e	to NI-F-dat-sg pacifier -2-F-dat-sg
87	grin-aja chashk-a	NI-F-nom-sg cup-2-F-nom-sg	k grin-oj vaz-e	to NI-F-dat-sg vaze-2-F-dat-sg
88	gal't-aja zakolk-a	NI-F-nom-sg hair clip-2-F-nom-sg	k gal't-oj prishchepk-e	to NI-F-dat-sg pin-2-F-dat-sg
89	lustov-aja kastrjul'-a	NI-F-nom-sg pan-2-F-nom-sg	k lustov-oj kruzhk-e	to NI-F-dat-sg mug-2-F-dat-sg

Appendix 6 Experiment 2: Novel Items Stimuli with Gloss and Situational Adjectives/ Verbs

NOVEL ITEM	ASSIGNED ORDER #	ASSIGNED MEANING	ADJECTIVES PAIRS	VERB + NOVEL ITEM-INSTRUMENTAL (AS EXPECTED IN OUTPUT)
1. lokama	3	Pumpkin	Prostaja /zolotaja 'plain' 'golden'	Pokormi popugaja zolotoj lokamoj 'Feed the parrot with the golden NI'
2. l'ufa	5	Soft cloth	Tsvetnaja / zolotaja 'colored' 'golden'	Ukroj kuklu tsvetnoj lufoj 'Cover the doll with the colored NI'
3. sifa	6	Sharp scoop	Svoja / chuzhaja 'own' 'stranger's'	Vykopaj jamku svojej sifoj 'Dig a hole with your own NI'
4. ganta	8	Lotion	Ruchnaja / nozhnaja 'hand' 'foot'	Pomazh kukle ruchki ruchnoj gantoj 'put some hand NI onto the doll's hands'
5. polta	9	Chain	Stal'naja / prostaja 'steel' 'plain'	Priv'azhi loshadku stal'noj poltoj 'Tie the horse with a steel NI'
6. tsula	11	Tooth brush	Zavodnaja / prostaja 'electric' 'plain'	Pochisti zuby zavodnoj tsuloj 'Clean your teeth with an electric NI'
7. zavuna	14	Little fork	Svoja / chuzhaja 'own' 'stranger's'	Sjesh pirozhnoje svojej zavunoj 'Eat the cake with your own NI'
8. dasta	15	Earplug	Golubaja / zolotaja 'blue' 'golden'	Zatkni ovechke ushi zolotoj dastoj 'Plug a golden NI into the sheep's ear'
9. xota	1	Big pencil	Golubaja / zolotaja 'blue' 'golden'	Porisuj goluboj xotoj 'Draw with a blue NI'
10. spira	2	Straw	Prjamaja / krivaja 'straight' 'zigzagged'	Pomeshaj chaj krivoj spiroj 'Stir the tea with a zigzagged NI'
11. igopa	4	Massager	Golubaja / zolotaja 'blue' 'golden'	Pricheshi l'vu grivy goluboj igopoj 'brush the lion's manor with a blue NI'
12. gruva	7	Sponge	Golubaja / smeshnaja 'blue' 'funny'	Potri mal'chiku spinku goluboj gruvoj 'rub the boy's back with a blue NI'
13. tirla	10	Decorated soap	Prostaja / tsvetnaja 'plain' 'colored'	Pomoj ruki tsvetnoj tirloj 'wash your hands with a colored NI'
14. pruza	12	Bike	Bol'shaja / prostaja 'big' 'plain'	Poigraj s bol'shoj pruzoj 'play with a big NI'

15. krjana	13	Lipstick	Prostaja / tsvetnaja 'plain' 'colored'	Pomazh kukle guby tsvetnoj krjanoj 'apply colored NI on the doll's lips'
16. poguta	16	Brush	Bol'shaja / prostaja 'big' 'plain'	Poshchekoti pokemona bol'shoj pogutoj 'tickle Pokemon with a big NI'
17. svasha	18	Milkshake (in a package)	Golubaja / zolotaja 'blue' 'golden'	Napoi mal'shika goluboj svashej 'let the boy drink blue NI'
18. dibola	19	Bone	Bol'shaja / prostaja 'big' 'plain'	Ugosti sobachku bol'shoj diboloj 'treat the dog with a big NI'
19. kagola	22	Knife	Golubaja / zolotaja 'blue' 'golden'	Razrezh konfetu zolotoj kagoloj 'cut the candy with a golden NI'
20. xanena	24	Fan	Zavodnaja / prostaja 'electric' 'plain'	Poduj na indushku zavodnoj xanenoj 'blow at the turkey with an electric NI'
21. boskata	25	comb	Bol'shaja / prostaja 'big' 'plain'	Pricheshi kuklu prostoj boskatoj 'brush the doll's hair with a plain NI'
22. taneva	26	Toy plane	Zavodnaja / prostaja 'electric' 'plain'	Poigraj zavodnoj tanevoj 'play with an electric NI'
23. fluba	30	Light tube	Golubaja / zolotaja 'blue' 'golden'	Posveti goluboj fluboj 'light with a blue NI'
24. gatoga	32	Flag	Tsvetnaja / golubaja 'colored' 'blue'	Pomashi tsvetnoj gatogoj 'wave a blue NI'
25. mumta	17	Cloth paint tube	Bol'shaja / prostaja 'big' 'plain'	Porisuj bol'shoj mumtoj 'Draw with a big NI'
26. shava	20	Boat	Ruchnaja / zavodnaja 'manual' 'electric'	Perevezi dinozavrika ruchnoj zhavoj 'take the dinosaur to the other side of the river with a manual NI'
27. tamjala	21	Ribbon	Naduvnaja / zolotaja 'blown' 'golden'	Ukras' kuklu zolotoj tamjaloj 'decorate the doll with a golden NI'
28. muveda	23	Syringe	Bol'shaja / prostaja 'big' 'plain'	Polechi sobachku bol'shoj muvedoj 'cure the dog with a big NI'
29. blosa	27	Screwdriver	Svoja / chuzhaja 'own' 'stranger's'	Pochini telegu svojej blosoj 'fix the cart with your own NI'
30. kuljamba	28	Bell	Bol'shaja / prostaja 'big' 'plain'	Pozvoni bol'shoj kuljamboj 'ring with a big NI'
31. gurula	29	Badge	Bol'shaja / prostaja 'big' 'plain'	Ukras' obezjanku prostoj guruloj 'decorate the monkey with a plain NI'

32. soshta	31	House	Lesnaja / gorodskaja 'forest' 'urban'	Posadi pal'mu pered gorodskoj soshtoj 'plant the palm tree in front of the urban NI'

Appendix 7 Experiment 2: Adult Control Study Set-up, Conditions 1 and 2

a. Condition 1

Task: Imagine that you have two objects of the same category (for example, a tool), but of different sizes (ordinary and big). I will name these objects without mentioning their size. Choose one of the objects and tell me *what I should fix the bike with*, mentioning the object's size.

Model:

EX: *Eto prost-oje / prost-aja* _____. *A eto bol'sh-oje / bol'sh-aja* _____.
This plain-n / plain-f _____-nom. And this big-n / big-f _____- nom.

Chem mne pochinit' velosiped?
What-inst I-dat to fix bike?

'This is a plain NI. And this is a big NI. What should I fix the bike with?'

ADULT: *Pochini ego bol'sh-im / bol'sh-oj [*or: *prost-ym / prost-oj] __-om /- oj.*
Fix it big-n/ big-f [or: plain-n/ plain-f] __- inst-n/inst-f
'Fix it with a big [or: plain] NI'

Novel Items List: introduced orally in the nominative case, in the order and gender given below; accompanied by an adjective.

1. lokama-f	5. polto-n	9. xoto-n	13. tirla-f
2. lufa-f	6. tsulo-n	10. spiro-n	14. pruzo-n
3. sifo-n	7. zavuna-f	11. igopo-n	15. krjano-n
4. ganta-f	8. dasto-n	12. gruva-f	16. poguta-f

b. Condition 2

Task: Imagine that you have two objects of the same category (e.g. a tool), but of different sizes. I will say *what I was fixing the bike with yesterday, and what I will fix the bike with tomorrow,* without mentioning the size of the objects. Choose one of the objects and tell me *what I should fix the motorcycle with*, including the information about the object's size.

Model:

EX: *Vchera ja chinila velosiped____. A zavtra ja budu chinit'*
Yesterday I fix-past bike ____-inst. And tomorrow I will fix
velosiped_____.
bike ____-inst.
Chem mne pochinit' mototsikl?
What-inst I-dat to fix motorcycle?

ADULT: *Pochini ego bol'sh-im / bol'sh-oj [*or: *prost-ym / prost-oj] __-om /- oj*
Fix it big-n/ big-f [or: plain-n/ plain-f] __-inst-n/ inst-f
'Fix it with a big [or: plain] NI'

Novel Items List: introduced orally in the instrumental case, in the order and gender given below; without adjectives.

1.	svasha-f	5. boskata-f	9. mumto-n	13. blosa-f
2.	dibolo-n	6. tanevo-n	10. shavo-n	14. kuljambo-n
3.	kagolo-n	7. fluba-f	11. tamjala-f	15. gurula-f
4.	xanena-f	8. gatogo-n	12. muveda-f	16. soshto-n

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